Gallenkamp

Gallenkamp

19th Edition

GENERAL CATALOGUE OF LABORATORY APPARATUS FURNITURE AND SCIENTIFIC INSTRUMENTS

Gallenkamp

A Gallenkamp & Co Ltd
Registered Office
PO Box 290 Technico House
Christopher Street London EC2P 2ER
Registered in England—No 68260

Other members of the Gallenkamp group of companies include

Griffin & George Ltd
science and education

T Gerrard & Co
the centre of biology supply

REGISTERED TRADEMARKS

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Introduction

This 19th edition is the first of a new generation of Gallenkamp catalogues.

It retains the established basic structure of several previous editions in that it is organised alphabetically, but it uses a new system of reference numbering and brief ordering specifications.

ALPHABETICAL PRESENTATION

Over 8,000 individual items are listed in the Gallenkamp catalogue and for convenience they are grouped under 220 product headings. The more common items are listed under their usual names e.g. beakers, flasks, ovens, viscometers, etc.

Less common products and those which fall naturally into related groups are listed under group headings such as clinical chemistry, dissecting instruments and tools.

Product headings are presented in alphabetical sequence and each page has printed at its top the relevant alphabetical letter.

The value to the user of this alphabetical presentation is that in most cases he can locate his requirements directly and quickly.

A comprehensive index is provided at the back of the catalogue. The index gives alternative names for many products so that if an item is not found by direct entry to the catalogue, its position may be determined by reference to the index.

SIMPLIFIED SPECIFICATION ON ORDERS

With this catalogue we are introducing a new system of catalogue numbering. Each new number is specific to only one catalogued item, in one size, one type, one voltage range and even one pack quantity. Where there is any choice of size, type, voltage or pack quantity, a different number is used for every different combination. In the catalogue each item is listed with a detailed specification. This is followed by the catalogue numbers of all the available variations of the item. Each number is printed with a brief summary description. When ordering it is necessary only to write on your order:

List number, brief summary description and the quantity of that particular list number which you require.

If you require one 10 ml Technico bulb pipette to BS 1583, Class A, order

PMC-280-080V, quantity 1, Pipette 10 ml

Alternatively if you require ten 10 ml pipettes of the same type, order

PMC-280-082R, quantity 1, Pipettes 10 ml, pack of 10

For a 12 litre capacity Gallenkamp modular water bath with solid state Compenstat temperature controller, for operation from 220 - 240V 50Hz supplies, order

BKA-300-010B, quantity 1, Water Bath, 10 litre, 220-240V 50Hz

If you order

GMX-300-010L, quantity 4, Gauzes, 125 x 125mm

you will receive a total of 40 gauzes because GMX-300-010L specifies a pack of 10 gauzes.

This system has been designed to make ordering easier for you and order processing quicker and easier for us. The system is also compatible with computerised buying records.

UNITS AND TERMINOLOGY

We have continued our policy to introduce SI Units throughout the catalogue wherever practicable. SI is the term used for the SYSTEME INTERNATIONAL d'UNITES which was the form of the metric system of measurements agreed in 1960 by the General Conference of Weights and Measures, which is the supreme international authority on units of measurement.

The user of the catalogue who may be unfamiliar with some of these units is recommended to refer to page 120 where metric SI units and Imperial equivalents are tabulated.

PRICES

The prices printed in this catalogue were estimated several months before publication date. They may therefore not necessarily be correct at the time of publication. Customers requiring confirmation of current prices will be given a firm quotation on application to their appropriate sales office.

Sales and Service Overseas

The Gallenkamp Export Department provides a direct service to customers throughout the world.

In most countries the Gallenkamp range is also available from appointed distributors or dealers, many of whom carry stocks and provide after-sales service.

The addresses of our distributors or details of distribution arrangements will be advised on enquiry to the

Export Department
A Gallenkamp & Company Ltd
PO Box 290
Technico House
Christopher Street
London EC2P 2ER

Telegraphic address
Gallenkamp London EC2

Telephone 01-247 3211

Telex 886041

COMPREHENSIVE SERVICE FOR OVERSEAS CUSTOMERS

The specialist knowledge and resources available to Gallenkamp together with our years of experience in equipping laboratories in many countries enables us to prepare comprehensive recommendations and to submit quotations covering much of the equipment needed for most types of laboratories. Designers in the Gallenkamp Laboratory Furniture Department can complement such equipment proposals with those for laboratory furniture and fittings.

A few typical examples of laboratories for which Gallenkamp offer this comprehensive advisory and supply service are given below.

UNIVERSITY SCIENCE

Inorganic chemistry
Organic chemistry
Biochemistry
Botany
Genetics
Microbiology
Tissue culture
Agricultural research

INDUSTRIAL AND GENERAL

Cement works
Petroleum refinery
Steel foundry
Rubber and palm oil plantations
Pharmaceutical quality control
Sterile fluids testing
Forensic
Animal feed mill
Flour mills
Sugar refinery
Brewery
Water testing
Sewage testing

MEDICAL AND VETERINARY

Clinical chemistry
Haematology
Pathology
Histology
Dispensary
Poultry diseases research

Naturally we must reserve the right to deal with enquiries within our range of capabilities and available resources at the time and normally we would not expect to include in our proposals any highly complex equipment or machines requiring very specialised installation and maintenance.

The many advantages of dealing with Gallenkamp for most of the basic requirements of a new laboratory include savings in time and cost, simpler planning, ordering and liaison, easier importation and clearance of goods—all these in addition to the benefits of our advisory service.

We welcome detailed enquiries for comprehensive projects from our overseas customers, which should include clear specifications of the purpose for which the laboratory is to be used and an indication of the size of the laboratory in terms of staff, space available and budgetary cost.



World Wide Distribution

Gallenkamp distribute to customers throughout the United Kingdom and in more than 160 countries overseas.

The distribution process starts in our warehouses, where a substantial percentage of catalogued items are kept in stock for prompt delivery.

Within the UK, stock is moved from our factories and suppliers and between our stock-holding branches and distribution depots by trailer-towing vehicles of large capacity. These are regularly to be seen on the motorway network of Britain. Deliveries from the branches or transit depots are made by smaller vehicles which call directly on customers at least once each week and more frequently in the larger conurbations.

Goods for despatch overseas are packed by experts in our own packing department to ensure maximum protection against breakage in transit.

Export documentation and shipping arrangements are dealt with by experienced staff and, where no specific shipping instructions are given, they will select the most expeditious means and freight route.

Overland road transport using roll-on/roll-off ferries is often used for Europe and the Near and Middle East. For more distant countries sea transport from the Port of London or one of the other seaports in the UK is usual.

Air freight by regular cargo flights, or by air charter flights, is carrying an increasing proportion of Gallenkamp exports. For some of our largest markets Gallenkamp regularly utilise the entire capacity of chartered cargo aircraft. Expertise and experience in warehousing, packing and despatch arrangements are the essential ingredients of our world-wide distribution service.




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Sales and Service in the UK

The Gallenkamp organisation is strategically structured to provide an efficient service to our customers. To ensure that your orders or enquiries are processed as quickly as possible we request that you address these to the area sales correspondent responsible for your location. Details are given below:—

London—Head Office

A Gallenkamp & Co Ltd
PO Box 290 Technico House
Christopher Street London EC2P 2ER
Telephone 01-247 3211
Telex 886041

Sales areas served from London

1 — London postal districts NW, W, WC, GLC Boroughs of Brent, Ealing, Harrow, Hillingdon, Hounslow, Richmond (north of Thames), and postal districts of Middlesex outside Greater London

2 — London postal districts SE, SW, GLC Boroughs south of the Thames

3 — London postal districts E, EC and N, GLC Boroughs of Barking, Havering, Newham, Redbridge and the parts of the GLC Boroughs of Barnet and Enfield outside the London postal districts

4 — Kent excluding GLC Boroughs, East Sussex

5 — Oxfordshire, Buckinghamshire, Bedfordshire, Berkshire

6 — Cambridgeshire, Suffolk, Norfolk

7 — Hertfordshire, Essex excluding GLC Boroughs

8 — Cornwall, Devon, Somerset, Dorset, Wiltshire

9 — Hampshire, Isle of Wight, West Sussex, Surrey excluding GLC Boroughs

Birmingham Branch Office

Frederick Street Birmingham B1 3HT
Telephone 021-236 2552

Sales areas served from Birmingham

10 — Warwickshire and West Midlands excluding the urban districts of Sandwell, Dudley, Walsall and Wolverhampton

11 — Avon, Gloucestershire, Hereford and Worcester and the West Midlands urban districts of Dudley and Warley part of Sandwell

12 — Leicestershire, Lincolnshire, Northamptonshire and Nottinghamshire

13 — Derbyshire, Staffordshire, Shropshire and the West Midland urban districts of Walsall, Wolverhampton and West Bromwich part of Sandwell

14 — Dyfed, Gwent, Powys, Mid, South and West Glamorgan

Widnes Branch Office

PO Box 19 Victoria House
Croft Street Widnes Cheshire WA8 0NL
Telephone 051-424 2040

Sales areas served from Widnes

20 — Cumbria, North West Lancashire, St Helens, Widnes, Wigan, Warrington

21 — Merseyside (excluding St Helens), Gwynedd, Clwyd and Isle of Man

22 — Cheshire (excluding Warrington and Widnes), Sale, Altrincham, South Manchester, Tameside and Stockport

23 — South East Lancashire, Greater Manchester (excluding Wigan, Altrincham, South Manchester, Tameside and Stockport)

24 — Northern Ireland

Stockton-on-Tees Branch Office

Portrack Lane Stockton-on-Tees
Cleveland TS18 2PT
Telephone 0642 63441

Sales areas served from Stockton-on-Tees

30 — Cleveland (north of River Tees), Durham, Northumberland, Tyne and Wear

31 — Cleveland (south of River Tees), North Yorkshire and West Yorkshire (north of M62 motorway)

32 — Humberside, South Yorkshire and West Yorkshire (south of M62 motorway)

East Kilbride Branch Office

Braeview Place Nerston
East Kilbride Glasgow G74 3XJ
Telephone 035 52 22281

Sales areas served from East Kilbride

40 — Borders, Central Region south of River Forth (but excluding Stirling town), Lothians, and the following districts of Strathclyde: Cumbernauld, East Kilbride, Hamilton, Lanark, Monklands, Motherwell, Strathkelvin

41 — Grampian, Fife, Highlands and Islands, Tayside and the Central Region north of the River Forth, including Stirling town

42 — Dumfries, Galloway, Glasgow City and the following districts of Strathclyde: Argyle, Bearsden, Clydebank, Cumnock, Cunninghame, Dumbarton, Eastwood, Inverclyde, Kilmarnock, Kyle and Milngavie

After Sales Service

For after sales service and maintenance or repair either contact your nearest area sales office, or contact directly:

Gallenkamp Group Service Organisation
PO Box 290 Technico House
Christopher Street
London EC2P 2ER
Telephone 01-377-0359

The Gallenkamp range includes:

Gallenkamp manufactured instruments, apparatus and glassware.

A laboratory furniture design and supply service.

The products of the major overseas manufacturers for whom Gallenkamp are exclusive distributors in the U.K.

A large range of other items required by laboratories, which Gallenkamp have carefully selected for inclusion in this catalogue in order to offer a comprehensive service.

Gallenkamp factories manufacture goods of three basically different types and these are made at four different factory locations.

The Gallenkamp factories at Uxbridge and Chalfont St Peter

Gallenkamp expertise in laboratory temperature controlled apparatus dates back to the beginning of this century when Gallenkamp were granted a Patent for a furnace temperature controller.

Today our extensive range includes not only furnaces, but also ovens, incubators, autoclaves, water and oil baths, hotplates, stirrers, analytical instruments, centrifuges and many more items.

Machined, sheet steel, and specialised components such as the Compenstat electronic temperature controller, are made, assembled, and the finished products tested, at these factories.



Tool setting on an automatic lathe for flask shaker eccentric production



Assembling orbital shaker/incubator mechanisms

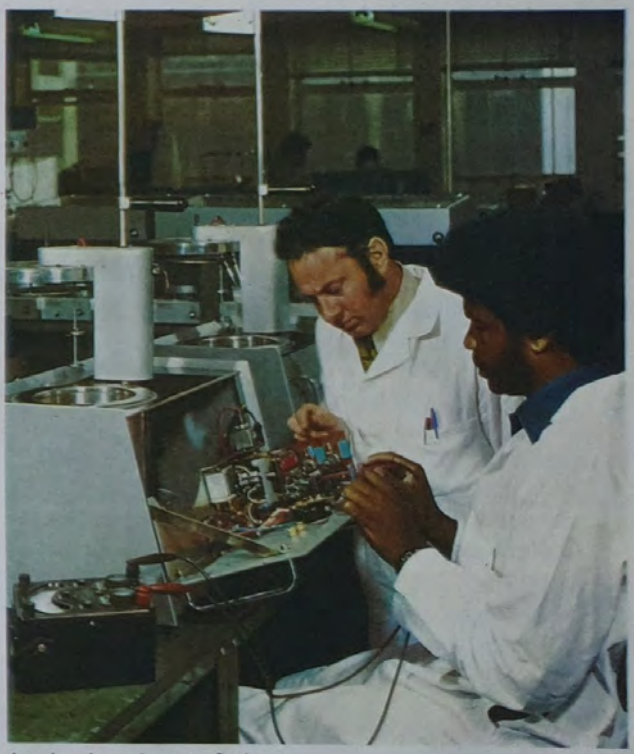


BS ovens on final operational test

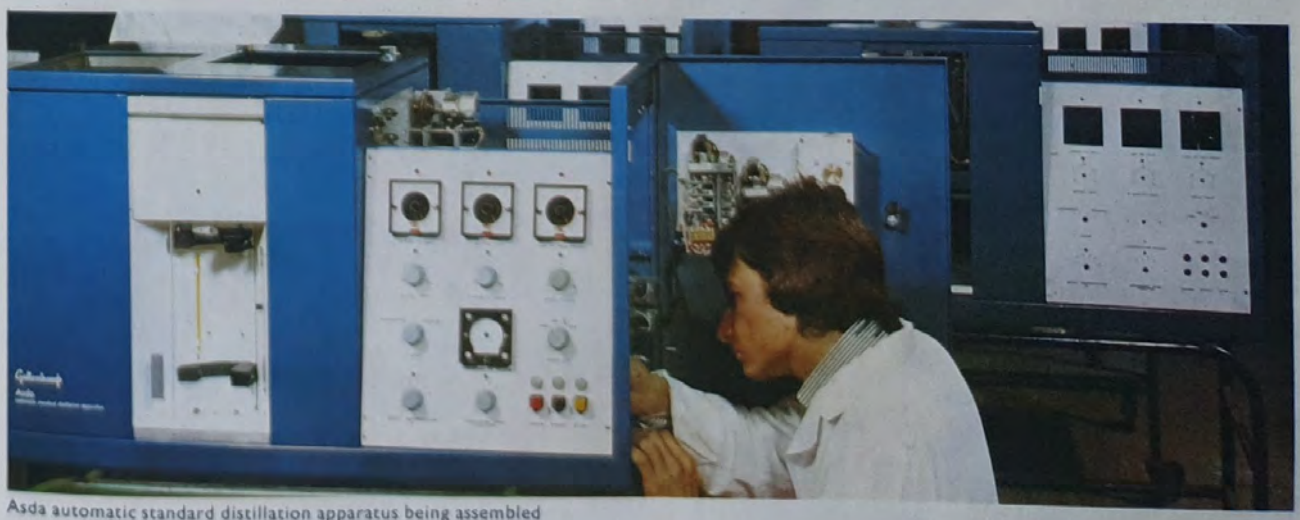
The Gallenkamp model shop

A part of our head office building in London is devoted to the manufacture of complex scientific instruments and of initial batches of all new products. This facility is deliberately sited in close proximity to our development team and their laboratories and test equipment so that new and complex instruments can be put into production with technical and design advice near at hand.

Once new instruments of a simpler character have been cleared for routine assembly they are transferred to Uxbridge or Chalfont St Peter factories. The specialised products regularly manufactured in this high skill department include Autobomb calorimeters and automated petroleum test instruments ASDA and Autoflash.



Autobombs undergoing final test

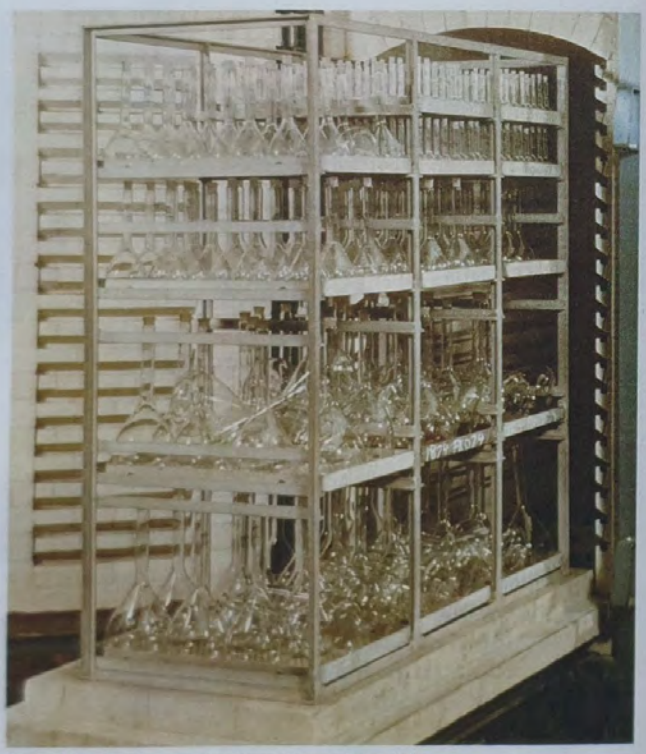


Asda automatic standard distillation apparatus being assembled

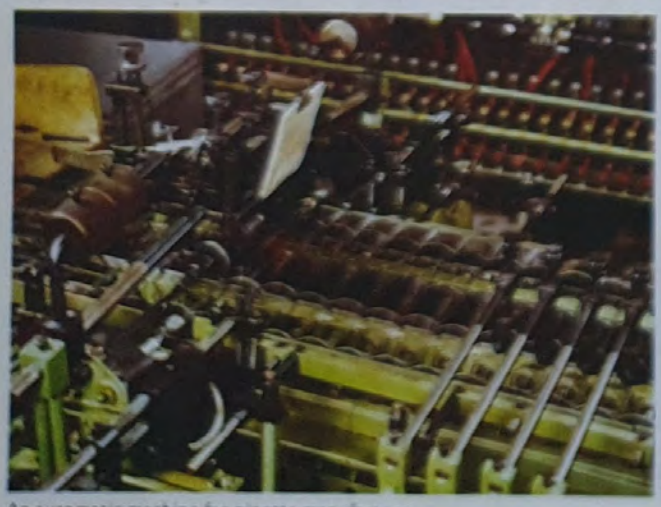
The Gallenkamp glassware factory at Sydenham

The Gallenkamp business was founded on supplying the demands of science for glassware at the end of the nineteenth century. Today the name Technico is known the world over as one of the principal trademarks for volumetric glassware. This range of volumetric ware and several other glassware specialities such as Sintaglass sintered filterware are manufactured at the Gallenkamp Technico glassworks in South London.

There the various skills of the engineer and the glassblower are combined with the precision of the calibrator to produce high quality scientific glass apparatus.



One of the large annealing/inscription firing kilns



An automatic machine for pipette manufacture



Lathe manufacture of a buchner funnel

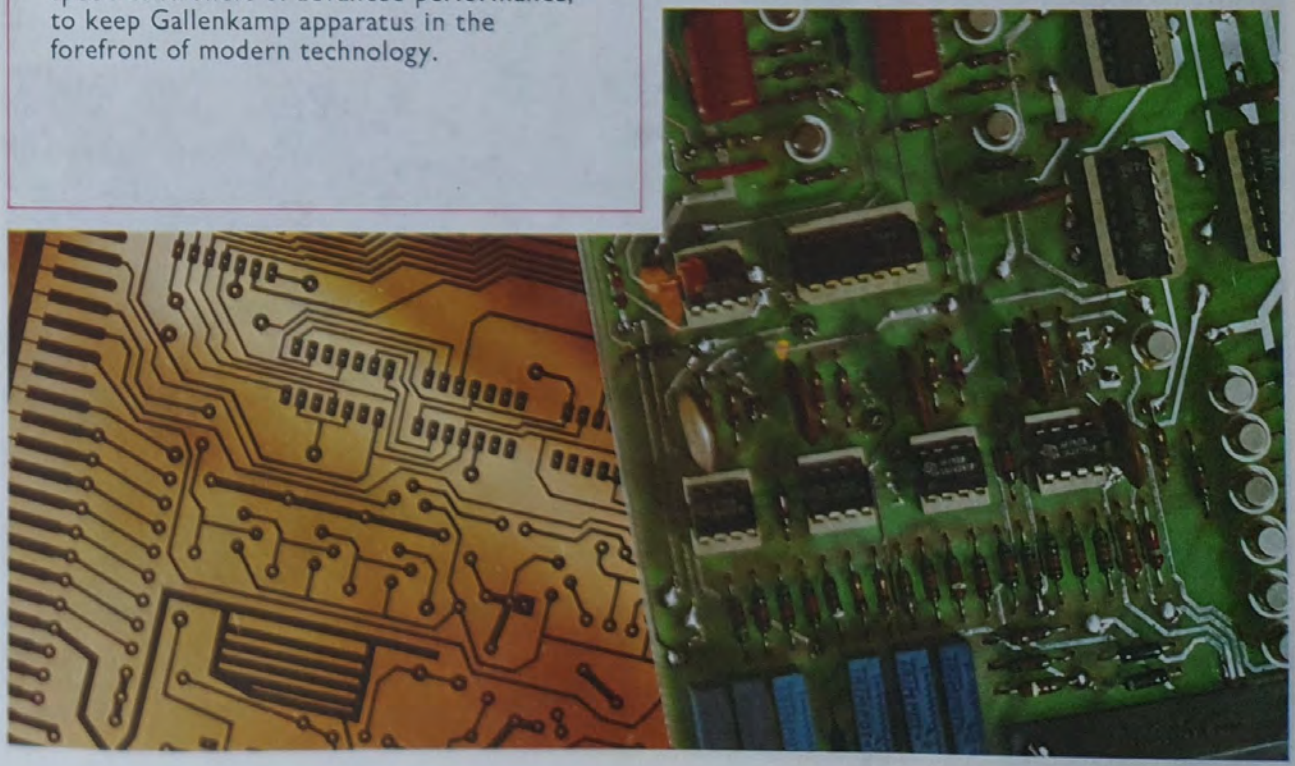
Product development group and laboratories

Gallenkamp products are designed and the prototypes and pre-production batches are tested by the Gallenkamp product development group in laboratories located in the head office building.

In recent years Gallenkamp have accumulated much skill in the design and production of electronic devices. This expertise has enabled us to develop temperature and speed controllers of advanced performance, to keep Gallenkamp apparatus in the forefront of modern technology.



Instrument control circuit designing



Mettler Instrumente AG of Zurich are among the leading designers and manufacturers in their field and their products are noted for advanced specifications, accuracy, reliability and long life.

The Mettler range of analytical, precision and electronic balances, statistical checkweighing systems and analytical instrumentation is distributed by Gallenkamp.

The illustration shows Mettler PL 300/3000 top loading electronic balances



Modern microscopy requires optical systems designed to resolve fine structure and colour both for observation and photomicrography. Olympus have computed and manufacture a range of objective lenses which combine these qualities with flatness of field and the virtual elimination of all optical aberration, even at full numerical aperture.

The Olympus range of biological microscopes, photomicrographic equipment, eyepieces and objectives is distributed exclusively in the United Kingdom by Gallenkamp.

A five place microscope nosepiece fitted with a set of Olympus plan apochromatic objectives



Gallenkamp

Glassware marking and coding

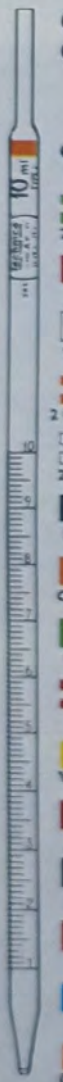
Technico Volumetric Glassware

Practically all *TECHNICO* volumetric glassware is marked with inscriptions and graduations in **permanent dark amber stain.** Most *TECHNICO* pipettes are **colour coded to BS 3996** to facilitate the sorting of similar types of pipettes by unskilled personnel.



Colour code for One Mark and Bulb Pipettes

Colour	Capacity ml
WHITE	0·005
ORANGE	0·01
BLACK	0·02
GREEN	0·05
RED	0·2
2 BLACK	0·5
BLUE	1
ORANGE	2
BLACK	3
2 RED	4
WHITE	5
RED	10
GREEN	15
YELLOW	20
BLUE	25
BLACK	30
WHITE	40
RED	50
YELLOW	100



Colour code for Graduated Pipettes

Colour	Capacity ml	Subdivision ml
2 GREEN	0·1	0·001
RED	0·1	0·005
WHITE	0·1	0·01
2 ORANGE	0·1	0·05
2 WHITE	0·2	0·002
BLACK	0·2	0·01
ORANGE	0·2	0·1
GREEN	0·5	0·005
2 RED	0·5	0·02
YELLOW	1	0·01
RED	1	0·1
BLACK	2	0·02
RED	5	0·05
BLUE	5	0·1
ORANGE	10	0·1
GREEN	25	0·2

Where two bands of colour are printed on the pipette to denote its capacity, they are printed in equal widths. When a second band of the same colour is much narrower than the first it denotes that the pipette is a graduated pipette to BS 700 type 1.

A plain white band or a sandblast band denotes that the pipette is designed for blow out of the last drop.

Sintaglass Sintered Glassware

Most Sintaglass sintered glassware is colour coded for porosity as shown below.

Colour	Porosity	Maximum Pore Diameter
	0	SINTAGLASS 0 — 200–250 μm
	1	SINTAGLASS 1 — 100–120 μm
	2	SINTAGLASS 2 — 40–50 μm
	3	SINTAGLASS 3 — 20–30 μm
	4	SINTAGLASS 4 — 5–10 μm
	5	SINTAGLASS 5 — 1–1·8 μm

Conditions of sale

REF 7701

SECTION 1: Applicable to ALL orders

1.1 **ACCEPTANCE** We contract and do business solely upon the following conditions notwithstanding anything to the contrary contained or purported to be contained in any document or oral statement made by the party contracting with us and no variation or alteration of these conditions shall be of any effect unless expressly agreed to in writing by us.

1.2 **PRICES** All quoted and printed prices for goods are ex warehouse unless expressly specified to the contrary and are subject to alteration without notice. We reserve the right to invoice goods at our prices and at the VAT rates ruling at the date of despatch.

1.3 **QUANTITY RATES** Many goods are listed both as singles and as quantity packs in order to offer a price advantage in favour of orders for the larger pack quantities. Pack prices apply only to one or more complete packs.

1.4 **QUOTATIONS AND INVOICES** All quotations are subject to confirmation by us, and we reserve the right to correct any accidental errors or omissions on quotations or invoices. Where all factors governing the price of the goods are under our direct control we will, unless otherwise stated, hold quoted prices firm if an order is received within 30 days from the date of the quotation.

1.5 **DELIVERY** While every effort is made to adhere to delivery dates, lateness or failure in delivery shall not entitle the purchaser to cancel any contract or hold up any payment. We shall not be under any liability for any loss, injury or damage caused by or consequent upon any delay in delivery or non-delivery from any cause whatsoever. In particular deliveries offered ex stock are subject to the goods being unsold at the time of receipt of the purchaser's order.

1.6 **AMENDMENTS OR CANCELLATIONS** While every effort will be made to meet the purchaser's individual requirements, we shall be under no obligation to accept amendments or cancellation of an order or any part thereof.

1.7 **WARRANTY AND RESPONSIBILITY** Subject to the due observance of any installation, user, storage, operating or maintenance instructions, we warrant that any goods or parts of goods of our own manufacture returned to us, carriage paid, within 12 months of the date of despatch by us, accompanied by detailed particulars of the alleged defects, and proved to our satisfaction to be defective by reason only of our use of defective materials or by reason only of defective workmanship, will be replaced by us under the same conditions as the original goods or at our option repaired and in either case free of charge to the purchaser. In the case of goods or parts not manufactured by us we will pass on to the customer the benefit of any guarantee or warranty received by us from the manufacturer in respect thereof in so far as such guarantee or warranty shall be capable of assignment. Any expense we may incur in enforcing such guarantee or warranty shall be for the account of the purchaser. This condition excludes every warranty, condition or liability not herein expressly set out and all liability for every form of consequential damage or loss and damage or loss caused by the act or neglect of us our servants or agents is hereby expressly excluded; provided that this condition shall only exclude or restrict the liability and remedy mentioned in Section 3 of the Misrepresentation Act 1967 to the extent therein mentioned. Users are warned to test and examine goods and/or to exercise special care in cases where the use and/or storage of the goods involves danger to person and/or property.

1.8 **REPAIRS** We are not responsible for damage occurring in transit to goods sent to us for repair or examination, nor for incidental damage to glass apparatus and delicate instruments in the course of repair howsoever caused. In the event of no order being placed we may charge for time involved in the preliminary examination and the reassembly of any article. Goods returned for repair should be sent carriage paid, and be clearly labelled with the sender's name and address, and at the same time a letter should be sent detailing the work required.

1.9 **DRAWINGS AND SKETCHES** We reserve the right to charge for the preparation of drawings or sketches prepared either for the submission of quotations or in the execution of orders. All such materials remain our property.

1.10 **CATALOGUES ETC.** Illustrations and descriptions of goods in our catalogues and other literature are believed to be correct at the time of going to press. Designs and sources of supply are, however, subject to alteration without notice and the right is reserved to fulfil orders by goods of the altered design or new source of supply. The contents and arrangements of all catalogues and other literature published by us are protected by copyright and may not be reproduced or used in whole or in part without our written permission.

1.11 **EXPORT** To conform with existing distributorship arrangements (if any) in overseas territories, trade houses may not, without our written consent, export goods purchased from us, but such consent will be granted in any case where the purchaser satisfies us that its customer is purchasing for use in a Member State of the European Common Market and that customers' orders were not directly or indirectly solicited by the purchaser.

1.12 **LAW OF CONTRACT** The contract shall in all respects be construed and take effect in accordance with the laws of England.

SECTION 2: Applicable in addition to Section 1 to orders for delivery IN THE UNITED KINGDOM

2.1 **TERMS OF PAYMENT** Prices are strictly net for prompt monthly payment and no deductions can be allowed. We retain the right to suspend deliveries or cancel any contract if the amount outstanding under this and/or any other contract of the purchaser is in excess of the credit we are willing to allow. Either a remittance or two approved trade references and a banker's reference should accompany orders from purchasers who have no previous account. Delivery against such orders will be effected after the references have been cleared by us and a credit limit established in the new purchaser's name.

2.2 **CASES AND CONTAINERS** Cases and other containers where chargeable will be invoiced to purchasers and will subsequently be credited if returned in good condition and carriage paid to our warehouse within 30 days from receipt. Charges for cases or containers must not be deducted from our account unless and until a credit note for them has been issued in respect of the deduction. No credit note will be issued unless the case(s) and/or container(s) is/are received by us in a satisfactory condition for further service.

2.3 **CARRIAGE** Unless otherwise agreed and stated in writing in respect of individual transactions, we reserve the right to make a charge for carriage (irrespective of the mode of delivery). When a carriage charge is made, it will be shown on the invoice. When despatched by road or other common carrier, corrosive acids, ammonia, explosives, flammable and other chemicals included in the Railways 'Classification of Dangerous Goods' are carried under special conditions and are forwarded at the risk and charge of the consignee.

2.4 **DAMAGE AND/OR LOSS IN TRANSIT AND INSURANCE** No claims shall be made on us for breakage, loss or damage in transit, except where goods are conveyed by our own motor transport. Where goods are not conveyed by our own transport all goods shall be at the risk of the purchaser or its consignee from the time they leave our premises or those of our agents. Both the carriers concerned and ourselves must be advised in writing of shortages, errors, breakages, loss or damage within three days of receipt of goods and of non-delivery within 14 days from date of advice of despatch. Any claim for shortages, errors or breakages, loss or damage in transit by our own transport must be so notified to us in writing within three days of receipt of the goods and any claim for non-delivery by our own transport must be so notified within 14 days from the date of advice of despatch. In the event of no such notification being received by us the goods shall be deemed to have been delivered complete and in compliance with the contract requirements. If requested by the purchaser or considered necessary by us we will effect insurance against transit risks at the cost of the purchaser. We shall not be liable for failure to insure unless insurance was requested by the purchaser. If we effect insurance we shall be under no liability to take proceedings for recovery of any loss or damage and if we do claim as agents for the purchaser our responsibility shall be limited to accounting for any amount received by us and we may deduct any reasonable expenses incurred by us.

2.5 **POISONS** The sale of poisons is regulated by the Pharmacy and Poisons Act 1933, The Poisons List and The Poisons Rules. We supply poisons only to persons requiring them for use in scientific education or research and to authorised users and sellers. For the purchase of all poisons a written order on purchaser's official order form is required, but excluding any conditions inconsistent herewith, signed by the purchaser, stating his name, address, trade, business or profession and the purpose for which the poison is required. Poisons listed in Part 1 of the Poisons List are prefixed 'P'. Poisons listed in Schedule 1 to the Poisons Rules are prefixed 'S'. Poisons will be supplied only for invoicing against accredited accounts and will in no circumstances be supplied on cash sale.

SECTION 3: Applicable in addition to Section 1 to orders for delivery OUTSIDE THE UNITED KINGDOM

3.1 **ORDERS** When placing orders the following information must be given:
- (a) shipping marks, route and preferred method of despatch
- (b) limits, if any, as to weight and size of packages
- (c) all information necessary to make consular declarations
- (d) the number and date of expiry of a valid import licence, if applicable.

We advise purchasers to leave packing details to our discretion.

3.2 **CHARGES**
- (a) All cases and other containers, packaging costs, delivery to docks and airports, dock and airport dues, port rates and Customs entry, freight, insurance, agency fees and other charges which may be incurred are chargeable to the purchaser unless expressly specified by us to the contrary. Cases and other containers are not returnable.
- (b) Quotations or proforma invoices submitted on an FOB basis are, unless otherwise specified, for delivery to London docks or London airport and include dock or airport charges. Deliveries to docks or airports other than London may be charged extra.
- (c) Quotations or proforma invoices submitted on a C & F basis are for delivery to London docks or London airport and include in addition to FOB charges, despatch charges which include Customs entry, Bills of Lading and agency fees. Freight costs to the designated port or airport of destination will also be included.
- (d) Quotations or proforma invoices submitted on a CIF basis will include all costs as for C & F offers plus insurance of the goods to the designated port or airport of destination.

Charges for any other special documentation requirement including Certificates of Origin and Consular invoices will be extra unless specifically stated by us to the contrary.

3.3 **TERMS OF PAYMENT**
- (a) Orders from purchasers in the United Kingdom. Prices are strictly nett for prompt monthly payment and no deductions can be allowed. Either a remittance or two approved trade references and a bankers reference should accompany orders from purchasers who have no previous account.
- (b) Orders from purchasers outside the United Kindom. Unless other arrangements are agreed and made in writing in approved cases, payment shall be by an irrevocable Letter of Credit confirmed by a London bank. When an order is for a large number of items, the Letter of Credit should allow for part payments and shipments. All expenses in respect of such payment must be discharged by the purchaser.

3.4 **DELIVERY** When we state a delivery time on our quotation, proforma invoice, acknowledgement of order, etc, it is to be understood that this is the time we estimate within which we can have the goods ready packed for shipment (please refer to Condition 1.5). Where the order requests us to apply for shipping instructions, instructions for delivery must be furnished to us within 30 days from the date of our application. We cannot accept any responsibility for delays in despatch caused through non-availability of shipping space or any other cause beyond our control.

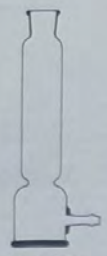
3.5 **DAMAGE AND/OR LOSS IN TRANSIT AND INSURANCE**
- (a) We accept no liability for breakage, loss or damage in transit, and all goods shall be at the risk of the purchaser or its consignee from the time they leave our premises or those of our agents.
- (b) Unless we are specifically instructed otherwise goods will be insured for the CIF value plus 25% against 'ALL RISKS' in the terms of the Institute Cargo Clauses (All Risks) but excluding breakage and including war, strike, riots, civil commotions and malicious damage (Institute Clauses) and the cost of such insurance will be charged to the purchaser's account. We can accept no responsibility for goods shipped uninsured at the purchaser's request.
- (c) Claims against insurance effected by us under our policy(ies) up to a value of £20 may not necessitate survey by a marine assessor. In the event of loss or damage resulting in a claim which may exceed £20 immediate notice should be given to the insurer's agent at the port or place where the loss or damage is discovered, and to us. Purchasers' attention is drawn to the clauses on the Certificates of Insurance referring to documentation of claims and liabilities of our carriers, bailees or other third parties. Claims will be settled abroad by the nearest insurer's agent unless we are specifically instructed to claim in London. In such cases we will, if requested, supply under the same conditions as the original goods free replacements to the value, at the CIF prices and costs ruling at the date of despatch of the replacement, of the amount received from the insurers less reasonable charges for negotiating a claim, but we will be under no further liability other than that of accounting for any ultimate balance of the insurance money so received. Where, at purchaser's request, insurance arrangements have been made other than for cover under our policy(ies) we shall not be obliged to claim in respect of damage or loss.

3.6 **SHORTAGES OR ERRORS** No claims in respect of shortages or errors can be entertained unless notification in writing together with a copy of the carrier's delivery note is despatched to us within three days of the receipt of the goods by the purchaser or consignee.

ABSORPTION

Vessels for the absorption, cleaning, drying and filtration of gases

All capacities and dimensions quoted are nominal



ABL-300



ABL-330



ABL-370



ABL-400



ABL-430



ABL-460



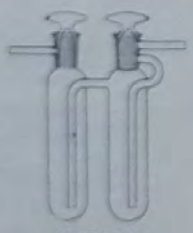
ABL-500



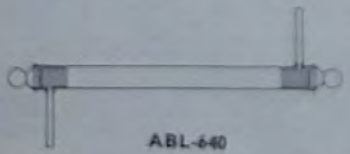
ABL-540



ABL-580



ABL-620



ABL-640

ABSORPTION TOWERS, glass, with riffled tubulure at base. Dimensions given are overall height × diameter.

ABL-300-010C	Absorption tower, 200 × 40 mm	**£2·95**
ABL-300-030T	Absorption tower, 250 × 50 mm	**£3·47**

ABSORPTION TOWERS, as ABL-300 but with 34/35 ground neck and 14/23 ground inlet. Without stopcock and tubing adapter. Dimensions given are overall height × diameter.

ABL-330-010E	Absorption tower, 250 × 50 mm	**£4·46**
ABL-330-030V	Absorption tower, 300 × 50 mm	**£4·77**

ACCESSORIES

Stopcock, 14/23	*See QAL-510-Y*
Stopcock, 34/35	*See DES-450-150L*
Tubing adapter, 14/23	*See QAL-200-Q*
Tubing adapter, 34/35	*See QAL-240-L*

ABSORPTION TUBES, glass, straight form, with one bulb and tube long enough for bending. Dimensions given are length, excluding narrow tube, × external diameter.

ABL-370-010W	Absorption tubes, 100 × 12 mm	Pack of 5 **£3·03**
ABL-370-030Q	Absorption tubes, 150 × 20 mm	Pack of 5 **£3·63**
ABL-370-050K	Absorption tubes, 200 × 25 mm	Pack of 5 **£6·29**

ABSORPTION TUBES, glass, plain U-form. Dimensions given are overall length × diameter.

ABL-400-010R	Absorption tubes, 100 × 12 mm	Pack of 5 **£2·79**
ABL-400-030L	Absorption tubes, 125 × 15 mm	Pack of 5 **£2·90**
ABL-400-050F	Absorption tubes, 150 × 20 mm	Pack of 5 **£3·75**

ABSORPTION TUBES, glass, U-form with side arms. Dimensions given are overall length × diameter.

ABL-430-010T	Absorption tubes, 100 × 12 mm	Pack of 5 **£3·26**
ABL-430-030N	Absorption tubes, 125 × 15 mm	Pack of 5 **£3·49**
ABL-430-050H	Absorption tubes, 150 × 20 mm	Pack of 5 **£4·28**

ABSORPTION TUBES, glass, U-form with side arms and two ground-in stopper-stopcocks. Dimensions given are overall length × diameter.

ABL-460-010V	Absorption tube, 100 × 12 mm	**£2·90**
ABL-460-030P	Absorption tube, 125 × 15 mm	**£3·12**
ABL-460-050J	Absorption tube, 150 × 20 mm	**£3·77**

ABSORPTION TUBE, Arnold, borosilicate glass, with two bulbs. Overall height 125 mm.

ABL-500-M	Absorption tube	**£3·34**

ABSORPTION TUBE, Midvale-Stetser Norton, borosilicate glass, with ground-in stopper-stopcock. Overall height 125 mm.

ABL-540-H	Absorption tube	**£5·61**

ABSORPTION TUBE, Nesbitt, borosilicate glass, with ground-in stopper-stopcock and external tube for conduction of gas to the bottom of the vessel. Capacity 50 ml, overall height 125 mm.

ABL-580-C	Absorption tube	**£6·90**

ABSORPTION TUBE, Blount, *Methods of Air Analysis,* Haldane and Graham, for the absorption of moisture and carbon dioxide. Overall height 137 mm.

ABL-620-N	Absorption tube	**£10·28**

ABSORPTION TUBE, Flaschenträger type, soda glass, with stopper-stopcock at each end. Diameter 10 mm, filling length 90 mm, overall length 145 mm, mass 10 g.

ABL-640-W	Absorption tube	**£4·50**

ADAPTERS

Two- and three-way adapters for connecting flexible tubing

GLASS ADAPTERS

ADAPTERS, glass, straight form. Dimensions given indicate bores of tubing accepted.

ADF-300-010R	Adapters, 3 to 5mm	Pack of 5 **£1·78**
ADF-300-030L	Adapters, 5 to 8mm	Pack of 5 **£1·78**



ADF-300

ADAPTERS, glass, straight form, with tapered corrugations at each end for joining flexible tubing of 5 to 12mm bore.

ADF-330-W	Adapters, 5 to 12mm	Pack of 5 **£2·87**



ADF-330

ADAPTERS, glass, T-shape, with tapered corrugations for joining flexible tubing of 5 to 12mm bore.

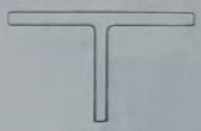
ADF-360-B	Adapters, 5 to 12mm	Pack of 5 **£5·20**



ADF-360

ADAPTERS, glass, T-shape. Dimensions given are external diameter of each limb.

ADF-390-010A	Adapters, 5mm	Pack of 5 **£1·10**
ADF-390-030R	Adapters, 7mm	Pack of 5 **£1·23**
ADF-390-050L	Adapters, 10mm	Pack of 5 **£1·24**



ADF-390

ADAPTERS, glass, T-shape, with two stopcocks. Dimensions given are external diameter of each limb.

ADF-420-010S	Adapter, 5mm	**£3·51**
ADF-420-030M	Adapter, 7mm	**£3·99**



ADF-420

ADAPTERS, glass, Y-shape. Dimensions given are external diameter of each limb.

ADF-460-010N	Adapters, 5mm	Pack of 5 **£3·99**
ADF-460-030H	Adapters, 7mm	Pack of 5 **£3·99**
ADF-460-050B	Adapters, 10mm	Pack of 5 **£4·39**

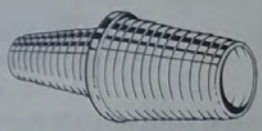


ADF-460

PLASTICS ADAPTERS

ADAPTERS, nylon, straight form. With tapered corrugated limbs of unequal size. Dimensions given are minimum external diameter of limbs, small end × large end.

ADF-600-010Q	Adapters, 4 × 7mm	Pack of 10 **£2·18**
ADF-600-030K	Adapters, 4 × 9mm	Pack of 10 **£2·18**
ADF-600-050E	Adapters, 7 × 10mm	Pack of 10 **£2·67**
ADF-600-070V	Adapters, 10 × 13mm	Pack of 5 **£1·74**
ADF-600-090P	Adapters, 13 × 19mm	Pack of 5 **£2·30**



ADF-600

ADAPTERS, polythene, straight form. In two push-fit parts which can be easily joined or separated. Dimensions given indicate bores of tubing accepted.

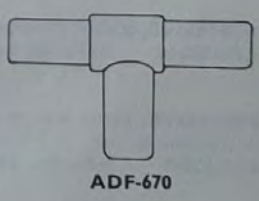
ADF-630-010S	Adapters, 7 to 9mm	Pack of 10 **£2·48**
ADF-630-030M	Adapters, 10 to 16mm	Pack of 10 **£3·38**



ADF-630

ADAPTERS, nylon, T-shape, for joining flexible tubing of 3 to 4mm bore.

ADF-670-Q	Adapters, 3 to 4mm	Pack of 5 **£0·45**



ADF-670

ADAPTERS, polypropylene, T-shape. Dimensions given indicate bores of tubing accepted.

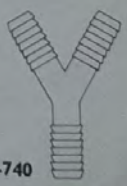
ADF-710-010B	Adapters, 5 to 7mm	Pack of 3 **£0·51**
ADF-710-030S	Adapters, 7 to 8mm	Pack of 3 **£0·51**
ADF-710-050M	Adapters, 10 to 12·5mm	Pack of 3 **£0·70**



ADF-710

ADAPTERS, polypropylene, Y-shape. Dimensions given indicate bores of tubing accepted.

ADF-740-010D	Adapters, 5 to 7mm	Pack of 3 **£0·56**
ADF-740-030U	Adapters, 9 to 11mm	Pack of 3 **£0·59**
ADF-740-050X	Adapters, 12 to 14mm	Pack of 3 **£0·99**



ADF-740

ADHESIVES

The following table is a guide to the selection of adhesives for common applications. For special purposes preliminary trials may be necessary.

List No.	Description	Drying/setting time	Appearance of dry film	Bond withstands	Types of materials joined	Examples of applications
AES-300-R	Epoxy resin and hardener	10 to 15 minutes	Amber, translucent, rigid	Water up to 100°C. Acid and alkali solutions. Dry heat to 150°C	Porous or non-porous rigid solids, thermosetting resins, etc.	Bonding ceramics, metal, glass, wood. Casting. Encapsulating
AES-340-M	Rubber/resin impact adhesive. Hydrocarbon mixture solvent	15 minutes	Black, opaque	Water. Dry heat up to 100°C (slight softening above 76°C)	Porous or non-porous flexible solids	Bonding cork, felt, rubber, etc. to metal, wood, etc.
AES-380-H	Synthetic rubber/resin solution impact adhesive. Ketone solvent	5 to 10 minutes	Colourless, transparent, flexible	Water. Acid and alkali solutions. Dry heat up to 85°C	Porous or non-porous flexible or rigid solids	Bonding PVC, leather, fabrics, metal, glass, wood and thermoplastics except polythene, polypropylene and expanded polystyrene
AES-420-S	Neoprene/resin solution impact adhesive. Ester/hydrocarbon solvent	10 to 35 minutes	Yellow/brown, opaque, flexible	Water. Acid and alkali solutions. Dry heat up to 60°C	Laminated and other rigid plastics to solid surfaces. Also fibrous materials	Bonding decorative laminates, PVC, etc. and thermoplastics except polythene, polypropylene and expanded polystyrene to metal, wood or board. Leather, fabrics. Unsuitable for use with cellulose paint
AES-460-N	PVA emulsion in water	10 to 25 minutes	Colourless, translucent, semi-flexible	Dry heat up to 60°C	Natural or fabricated fibrous solids	Bonding wood, board, paper, fabrics, cork and expanded polystyrene
AES-500-B	Perspex (PMM) solution in chlorinated hydrocarbon	Initial setting: 3 hours, full hardness: 2 weeks at 25°C or 6 hours at 60°C	Colourless, transparent	Water. Acid and alkali solutions. Dry heat up to 70°C	Perspex, Plexiglas, Diakon and other forms of PMM (acrylic) plastics	Assembly of fabrications from sheet, mouldings, tubing of PMM
AES-540-T	Styrene copolymer/ chlorinated hydrocarbon solution	1 to 3 minutes	Colourless, transparent, semi-flexible	Water. Ambient temperatures	Rigid polystyrene	Bonding rigid polystyrene components, etc.

ADHESIVE, *ARALDITE* **Rapid,** as specified, in pack containing tube of resin, tube of hardener and instructions for use.
AES-300-R Adhesive, Araldite — Pack **£0·73**

ADHESIVE, *BOSTIK* **1261,** as specified.
AES-340-M Adhesive, Bostik — Can of 250 ml **£0·81**

ADHESIVE, *BOSTIK* **Clear,** as specified.
AES-380-H Adhesive, Bostik — Can of 250 ml **£1·04**

ADHESIVE, *EVO-STICK,* as specified, in collapsible tube with instructions for use.
AES-420-S Adhesive, Evo-stick — Tube of 40 g **£0·34**

ADHESIVE, *EVO-STICK* **Resin W,** as specified, in plastics dispenser bottle.
AES-460-N Adhesive, Resin W — Bottle of 122 g **£0·63**

ADHESIVE, *PERSPEX,* as specified.
AES-500-B Adhesive, Perspex — Can of 500 ml **£2·36**

ADHESIVE, polystyrene, as specified.
AES-540-T Adhesive, Polystyrene — Tube of 25 g **£0·30**

NOTE: The adhesives listed on this page are available for Export by deck cargo Sea Freight only.

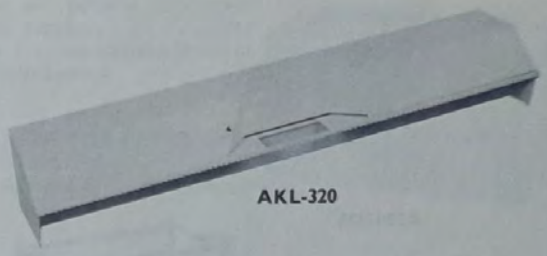
ALUMINIUM

ALUMINIUM FOIL, suitable for many laboratory applications including sealing bottles, culture tubes, etc., stopping leaks, reducing evaporation or heat losses, covering corks, making weighing boats or dishes, etc. Can be labelled using a Chinagraph pencil. Dimension given is foil width.

AKL-300-010S	Aluminium foil, 70mm	Roll of 120m **£1·91**
AKL-300-030M	Aluminium foil, 450mm	Roll of 75m **£5·74**

ACCESSORY for AKL-300-030M

AKL-320-502G	Dispenser, wall mounting, with cutting edge	**£1·18**



AKL-320

Gallenkamp ANAEROBIC JARS

ANAEROBIC JAR, glass, *GALLENKAMP*, modified McIntosh & Fildes pattern, for the growth of anaerobes utilising a catalyst which is active above 0°C. The heavy glass jar 230mm high × 150mm diameter has an anodised aluminium cover which is fitted with a sealing ring and held in position by a bridge clamp. The cover is fitted with two needle valves for evacuating and filling, and a sachet containing the catalyst. With tube of Lucas indicator and instructions.

ANF-250-V	Anaerobic jar, glass	**£12·80**

SPARE PARTS

ANF-270-030V	Glass jar only	**£3·60**
ANF-270-070J	Sealing ring	**£0·77**
ANF-270-090D	Catalyst, in sachet	Pack of 3 **£4·31**
ANF-270-130R	Lucas indicator in tube	**£2·21**



ANF-250

ANAEROBIC JAR, aluminium, *GALLENKAMP*, as ANF-250-V but with anodised aluminium jar and a side arm on the top plate connected to a tube containing the Lucas indicator. With instructions.

ANF-350-N	Anaerobic jar, aluminium	**£20·48**

SPARE PARTS

Sealing ring	*See ANF-270-070J*
Catalyst	*See ANF-270-090D*
Lucas indicator	*See ANF-270-130R*



ANF-350

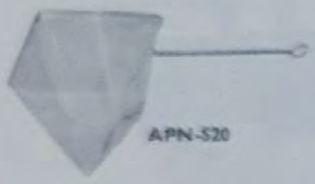
AQUARIA



APN-300



APN-330



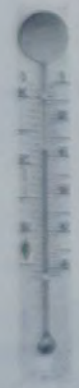
APN-520



ANP-590 with flexible tubing



APN-750



APN-790

AQUARIA, high impact polystyrene frame having glass panels sealed internally with silicone rubber. Suitable for fresh or salt water.

APN-300-030G	Aquarium, 406 × 305 × 305 mm high	**£10·01**
APN-300-070R	Aquarium, 610 × 305 × 305 mm high	**£10·80**
APN-300-110Y	Aquarium, 925 × 305 × 305 mm high	**£14·96**

ACCESSORIES

APN-320-502A	Canopy, hinged, 406 × 305 mm	**£5·46**
APN-320-512U	Canopy, hinged, 610 × 305 mm	**£6·36**
APN-320-522R	Canopy, hinged, 925 × 305 mm	**£7·65**
	Stands, square section metal. Will support two aquaria.	
APN-330-504M	Stand, 406 × 305 × 780 mm high	**£10·97**
APN-330-514J	Stand, 610 × 305 × 780 mm high	**£11·36**
APN-330-524G	Stand, 925 × 305 × 780 mm high	**£12·38**

AQUARIUM OUTFIT, complete, comprising plastics framed glass aquarium 500 × 300 × 300 mm, air pump, tubing, diffuser, air flow controller, filter, carbon, filter wool, heater with thermostat, thermometer, aquarium scraper and net.

APN-410-A	Aquarium outfit	**£21·03**

AQUARIUM NET, nylon, on rectangular galvanised wire frame 150 × 130 mm, with handle.

APN-520-Y	Aquarium net	**£0·33**

AQUARIUM FORCEPS, strong polystyrene, 400 mm long, with serrated ends and easy-grip sides.

APN-560-D	Aquarium forceps	**£0·90**

DIFFUSER, for aerating aquaria. Comprises porous block with inlet tube for 5 mm bore flexible tubing.

APN-590-F	Diffuser	**£0·34**

AQUARIUM HEATERS, thermostatically controlled, comprising nickel-chromium coiled-coil type element wound on a ceramic former with a bimetal thermostat having silver contacts, sealed in a thick walled borosilicate glass tube. With earth lead and 1A fuse incorporated in the mains cable. If water reaches the heating element, the fuse breaks the electrical circuit, thus rendering the aquarium electrically safe. A suction clip is provided to enable attachment to the side of the aquarium. Must be used completely submerged in an upright position and must not be buried in sand. For 200–250 V a.c. supplies.

APN-750-030Y	Aquarium heater, 75 W	**£4·74**
APN-750-050C	Aquarium heater, 100 W	**£4·74**
APN-750-070T	Aquarium heater, 125 W	**£4·74**
APN-750-090N	Aquarium heater, 150 W	**£4·74**

AQUARIUM THERMOMETER, red spirit filled, dual scale 0 to 32°C and 30 to 90°F, mounted on clear plastics backplate 130 × 20 mm. With suction disc to enable attachment to the side of the aquarium.

APN-790-M	Aquarium thermometer	**£1·33**

ARSENIC



ARF-300

ARSENIC TEST APPARATUS, Gutzeit, to BP specification. Comprises test paper holder with clip mounted at the top end of a glass tube which is drawn to a fine jet at the lower end and fitted in a 120 ml capacity test bottle.

Without mercuric chloride test paper.

ARF-300-E	Arsenic test apparatus	**£3·12**

ARSENIC TEST TILES (streak plates), unglazed porcelain approximately 75 × 40 mm. (F)

ARF-340-W	Arsenic test tiles	Pack of 10 **£3·32**

ASBESTOS

Attention is drawn to Asbestos Regulations 1969 (SI 1969 No. 690) covering the storage, distribution and handling of asbestos materials and articles. Copies of the Regulations are obtainable from Her Majesty's Stationery Office. The asbestos goods listed are available only in the packs and dimensions stated.

ASBESTOS CLOTH, woven, approximately 1 m square × 2mm thick.

ASB-300-K	Asbestos cloth	**£7·09**

ASBESTOS FIBRE, for use in Gooch filter crucibles.

ASB-330-M	Asbestos fibre	Pack of 100g **£0·73**

ASBESTOS FIBRE, acid washed, for analytical work. Maximum loss 1% after 2 hours digestion with concentrated hydrochloric acid and 5% after 2 hours ignition at 1000°C.

ASB-360-X	Asbestos fibre	Pack of 100g **£3·38**

ASBESTOS MATS, hard asbestos cement, in squares approximately 4·7mm thick. Dimension given is the length of side.

ASB-420-010Y	Asbestos mats, 150mm	Pack of 10 **£2·18**
ASB-420-030C	Asbestos mats, 225mm	Pack of 10 **£3·38**
ASB-420-050T	Asbestos mats, 300mm	Pack of 10 **£5·18**

ASBESTOS PAPER, in roll approximately 900mm wide × 0·3mm thick.

ASB-460-G	Asbestos paper	Roll of 6m **£2·59**

ASBESTOS PAPER TAPE, in reel approximately 25mm wide × 0·4mm thick.

ASB-490-Y	Asbestos paper	Reel of 145m **£2·42**

ASBESTOS TAPE, woven, in reel approximately 25mm wide × 1·5mm thick.

ASB-530-T	Asbestos tape	Reel of 10m **£3·26**

ASBESTOS YARN. Dimension given is the diameter.

ASB-570-010L	Asbestos yarn, 4·5mm	Reel of 500g **£1·74**
ASB-570-030F	Asbestos yarn, 6mm	Reel of 500g **£1·74**

ASPIRATORS

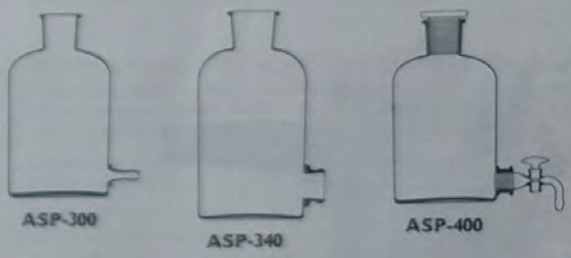
GLASS ASPIRATOR BOTTLES

All capacities and dimensions quoted are nominal

ASPIRATOR BOTTLES, borosilicate glass, with side tubulure near base for flexible tubing connection.

Capacity, ml	250	500	1000	2000
Height, mm	140	165	210	238
Diameter, mm	67	82	106	128

ASP-300-010F	Aspirator, 250ml	**£1·71**
ASP-300-012B	Aspirators, 250ml	Pack of 12 **£18·69**
ASP-300-030W	Aspirator, 500ml	**£2·56**
ASP-300-032S	Aspirators, 500ml	Pack of 12 **£27·95**
ASP-300-050Q	Aspirator, 1000ml	**£2·97**
ASP-300-052M	Aspirators, 1000ml	Pack of 12 **£32·37**
ASP-300-070K	Aspirator, 2000ml	**£3·61**
ASP-300-072G	Aspirators, 2000ml	Pack of 6 **£19·67**



ASPIRATOR BOTTLES, borosilicate glass, with moulded side outlet near base for rubber stopper 27mm diameter and stopcock.

Capacity, litres	2	5	10	20
Height, mm	238	326	395	492
Diameter, mm	128	184	219	280

ASP-340-010A	Aspirators, 2 litres	Pack of 2 **£9·89**
ASP-340-030R	Aspirators, 5 litres	Pack of 2 **£13·40**
ASP-340-050L	Aspirator, 10 litres	Each **£10·93**
ASP-340-070F	Aspirator, 20 litres	Each **£16·73**

ACCESSORIES

ASP-360-502L	Stopcock, glass, 5mm bore	**£2·32**
ASP-360-508W	Stopcock, glass, 8mm bore	**£4·42**
	Rubber stoppers	See STH-450 or STH-700

ASPIRATOR BOTTLES, borosilicate glass, as ASP-340 but with stoppered inlet at top and moulded outlet fitted with ground-in glass stopcock having a 29/32 cone.

ASP-400-010U	Aspirators, 2 litres	Pack of 2 **£20·59**
ASP-400-030X	Aspirators, 5 litres	Pack of 2 **£27·72**
ASP-400-050Y	Aspirator, 10 litres	Each **£19·55**
ASP-400-070C	Aspirator, 20 litres	Each **£27·60**

SPARE PART

ASP-420-010G	Stopcock, borosilicate glass	**£3·39**

ACCESSORY

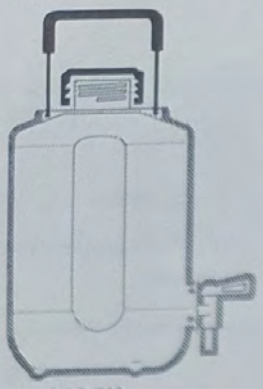
Stopcock, *FLEXICON*, borosilicate glass with two PVC rings around joint to give degree of flexibility. Suitable for 29/32 socket.

ASP-420-502Y	Stopcock	**£4·55**

Continued overleaf

PLASTICS ASPIRATOR BOTTLES

All capacities and dimensions quoted are nominal



ASP-510



ASP-560



ASP-620

ASPIRATOR BOTTLES, rigid polythene, with 8mm bore stopcock, screw-on cap and plastics covered hinged handle.

ASP-510-010F	Aspirator, 4·5 litres	**£2·67**
ASP-510-030W	Aspirator, 9 litres	**£3·12**

SPARE PART

ASP-530-010X	Stopcock	**£0·43**

ASPIRATOR BOTTLES, rigid polythene, rectangular, with large bore stopcock, screw-on cap and carrying handle.

ASP-560-010Q	Aspirator, 23 litres	**£5·74**
ASP-560-030K	Aspirator, 45 litres	**£15·86**

ASPIRATOR BOTTLES, thick polythene, with air-vented 12mm bore stopcock, 50mm diameter neck with screw-on cap and plastics covered band around shoulder incorporating lifting handles. (F)

ASP-620-010N	Aspirator, 20 litres	**£12·38**
ASP-620-030H	Aspirator, 30 litres	**£13·61**
ASP-620-050B	Aspirator, 40 litres	**£16·54**
ASP-620-070S	Aspirator, 60 litres	**£19·69**

AUTOCLAVES



AUX-200

AUTOCLAVE, portable, aluminium, with safety valve and control which can be set to obtain working pressures of 35, 70 or 105kN/m² (0·35, 0·7 or 1·05kgf/cm²). Comprises heavy base with slide locking lid both fitted with a heat resistant handle. Internal dimensions approximately 240mm diameter × 220mm deep. For heating by external gas or electric heater.

AUX-200-G	Autoclave	**£19·58**



AUX-240

AUTOCLAVE, portable, aluminium, with safety valve pressure controller which can be set to obtain working pressures of 70 or 105kN/m² (0·7 or 1·05kgf/cm²), pressure gauge and drain cock. A siphon tube removes steam and water after sterilisation and the partial vacuum thus created in the boiler may be used to dry the contents. Internal dimensions of boiler approximately 280mm diameter × 250mm deep. Will accommodate one dressing drum AUX-280-506K. **Without** gas burner.

AUX-240-B	Autoclave	**£103·50**

AUTOCLAVE, portable, as AUX-240-B but electrically heated. Fitted with two heaters, maximum power rating 1850 W, and 3-heat switch. Will accommodate one dressing drum AUX-280-506K. For 220–240 V a.c. single phase supplies.

AUX-260-K	Autoclave	**£145·69**

SPARE PARTS for AUX-240-B and AUX-260-K

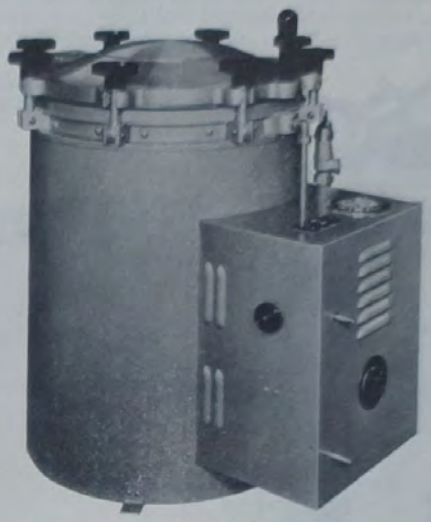
AUX-280-030E	Lid gasket	£2·93
AUX-280-070V	Safety valve	£7·20
AUX-280-090P	Heating elements for AUX-260-K	Set of 2 £15·24

ACCESSORIES for AUX-240-B and AUX-260-K

AUX-280-506K	Dressing drum, stainless steel	£29·53
	Burner for AUX-240-B	See B19-3/19-8

Gallenkamp AUTOCLAVES

For the steam sterilisation of surgical instruments, dressings and biochemistry equipment



AUX-500



AUX-540

- **Vertical and horizontal models**
- **Controlled steam temperature by bimetal thermostat**
- **Integral pressure gauge and safety valve**

Technical data

Maximum working pressure	206 kN/m² (2·1 kgf/cm²)	
Diameter of boiler, mm	345	460
Working depth of boiler, mm	300	380
Drain outlet diameter, mm	10	10
Overall dimensions with lid open	H W D	
Vertical autoclaves, mm	740 × 560 × 750	
	800 × 640 × 1000	
Horizontal autoclaves, mm	790 × 640 × 790	
	910 × 740 × 840	

All boilers are pressure tested during manufacture. Each autoclave is tested under working conditions before despatch and a certificate is supplied giving essential details of construction and tests.

DESIGN

Heating is by a sheathed immersion heater and temperature is controlled by a bimetal thermostat.

The boiler is copper, with an alloy cover and top ring incorporating a recessed gasket. It is mounted in a steel casing which in the vertical model extends to the floor. The horizontal model is supported on a strong tubular metal stand.

The cover of vertical models is hinged and, after releasing the bolts, may be raised clear of the boiler. Each vertical autoclave is supplied with a wire mesh basket and horizontal models have a perforated shelf and a door hinged on one side.

Steam fittings comprise a stopcock, adjustable safety valve, automatic air vent and pressure gauge, all connected to the body of the boiler. The controls are housed in a box mounted on the steel casing. The safety valve is fitted with an easing lever and the settings can be locked using the padlock supplied.

AUTOCLAVES, *GALLENKAMP*, **vertical type,** electrically heated, as specified, with thermostatically controlled immersion heater, pressure gauge, safety valve, wire mesh basket, certificate of test and instructions. For a.c. single phase supplies.

		345 × 300	460 × 380
Dimensions of boiler, dia. × depth, mm			
Power rating, kW		3	5
AUX-500-010C	Autoclave, 345 × 300 mm, 220–240 V		**£929·25**
AUX-500-030T	Autoclave, 345 × 300 mm, 110–120 V		**£941·63**
AUX-500-110V	Autoclave, 460 × 380 mm, 220–240 V		**£1031·63**
AUX-500-130P	Autoclave, 460 × 380 mm, 110–120 V		**£1044·00**

AUTOCLAVES, *GALLENKAMP*, **horizontal type,** electrically heated, as specified, with perforated shelf, certificate of test and instructions. For a.c. single phase supplies.

		345 × 300	460 × 380
Dimensions of boiler, dia. × depth, mm			
Power rating, kW		3	5
AUX-540-010U	Autoclave, 345 × 300 mm, 220–240 V		**£969·75**
AUX-540-030X	Autoclave, 345 × 300 mm, 110–120 V		**£982·13**
AUX-540-110Q	Autoclave, 460 × 380 mm, 220–240 V		**£1090·13**
AUX-540-130K	Autoclave, 460 × 380 mm, 110–120 V		**£1102·50**

SPARE PARTS for AUX-500 and AUX-540

AUX-560-010G	Heater, 3 kW, 220–240 V	**£14·51**
AUX-560-030A	Heater, 3 kW, 110–120 V	**£14·51**
AUX-560-110C	Heater, 5 kW, 220–240 V	**£14·63**
AUX-560-130T	Heater, 5 kW, 110–120 V	**£14·63**
AUX-560-190B	Lid gasket, for 345 × 300 mm models	**£0·84**
AUX-560-210V	Lid gasket, for 460 × 380 mm models	**£4·05**

Gallenkamp BS AUTOCLAVES

For the steam sterilisation of surgical instruments, dressings and biochemistry equipment



AUX-700

- **Outer case remains cool during operation**
- **Automatic air vent and safety valve**
- **Thermostatic control of steam temperature within ±1°C**

Technical data

Maximum working pressure	206 kN/m²(2·1 kgf/cm²)
Typical heating times	20 to 100°C 25 min 100 to 130°C 10 min
Working depth of boiler, mm	460
Internal diameter of boiler, mm	458
Overall dimensions of autoclave with lid open, mm	H W D 1600 x 800 x 1000
Drain outlet diameter, mm	13

All boilers are pressure tested during manufacture. Each autoclave is tested under working conditions before despatch and a certificate is supplied giving essential details of construction and tests.

DESIGN

Temperature is controlled by a direct reading thermostat calibrated 100 to 135°C, which switches a 6 kW immersion heater by means of a power relay. Indicator lamps show when the mains and heater are ON.

The autoclave must be connected to a 30A mains electricity switched outlet for 200–240V supplies or a 60A outlet for 110–120V supplies. A terminal block is fitted for mains cable connection.

The case is rigid steel and is mounted on castors for easy movement. The top is stainless steel and all other steelwork is rust resistant with exterior surfaces finished in stoved grey enamel.

The boiler is heavy gauge copper with all seams welded, and has a cast gunmetal top rim recessed to accept a rubber gasket. All internal surfaces are heavily tinned.

The cover is a light alloy casting, hinged at the rear and fitted with a lifting handle in front. It is secured by steel captive bolts fitted with plastics hand grips. A spring lifts each bolt away from the boiler when released, so preventing accidental damage when the cover is lowered.

The steam fittings connected to the boiler comprise a pressure gauge, stop valve, adjustable safety valve, automatic air vent, steam leak and water level indicator. A thermometer pocket between the boiler and the air vent enables the autoclave temperature to be measured with a thermometer.

The safety valve is fitted with an easing lever and the settings can be locked using the padlock supplied.

Gallenkamp BS AUTOCLAVES

AUTOCLAVES, *GALLENKAMP,* **BS 2646, vertical type,** electrically heated, as specified, with 6kW heater, automatic air vent, thermostat, pressure gauge, safety valve, steam exhaust system, steam leak, water level indicator, certificate of test and instructions. **Without** basket and mains cable. For a.c. single phase supplies.

AUX-700-010J	Autoclave, 6kW, 220–240V	**£1227·38**
AUX-700-030D	Autoclave, 6kW, 110–120V	**£1249·88**

SPARE PARTS

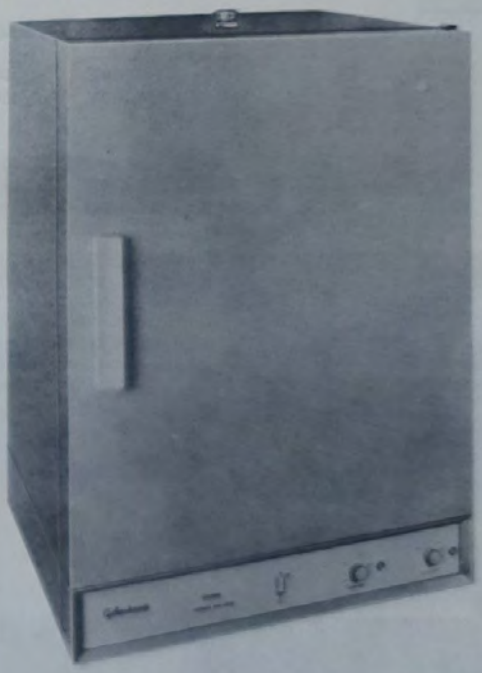
	Heaters, 6kW, for a.c. single phase supplies.	
AUX-730-010L	Heater, 220–240V	**£20·70**
AUX-730-030F	Heater, 110–120V	**£20·70**
	Lid gasket, rubber	*See AUX-560-210V*

ACCESSORIES

	Basket, stainless steel wire mesh, 450mm diameter × 450mm deep.	
AUX-730-504J	Basket	**£21·83**
	Half basket, stainless steel wire mesh, 450mm diameter × 200mm deep.	
AUX-730-510X	Half basket	**£16·65**
	Separator, stainless steel wire mesh, 26mm thick, for use when layers of small baskets are inserted in autoclaves.	
AUX-730-516C	Separator	**£12·83**
	Thermometer, for thermometer pocket	*See THL-290-070D*

Gallenkamp OVEN/STERILISER, 250°C

A large capacity modern sterilising oven scientifically designed to conform to the performance requirements of BS 3421 'Performance of Electrically Heated Sterilising Ovens'.



- **Accurate temperature control by direct reading COMPENSTAT (solid state) thermostat**
- **Safety thermostat for additional protection**
- **Capacity 210 litres**
- **Fan convection ensures temperature uniformity even at full load**

For detailed specification *See OVH-400*

For alternative sterilisers *See page headings Ovens and Sterilisers*

Gallenkamp BS AUTOCLAVES

For the steam sterilisation of surgical instruments, dressings and biochemistry equipment



AUX-700

- **Outer case remains cool during operation**
- **Automatic air vent and safety valve**
- **Thermostatic control of steam temperature within ±1°C**

Technical data

Maximum working pressure	206 kN/m²(2.1 kgf/cm²)
Typical heating times	20 to 100°C 25 min 100 to 130°C 10 min
Working depth of boiler, mm	460
Internal diameter of boiler, mm	458
Overall dimensions of autoclave with lid open, mm	H W D 1600 x 800 x 1000
Drain outlet diameter, mm	13

All boilers are pressure tested during manufacture. Each autoclave is tested under working conditions before despatch and a certificate is supplied giving essential details of construction and tests.

DESIGN

Temperature is controlled by a direct reading thermostat calibrated 100 to 135°C, which switches a 6kW immersion heater by means of a power relay. Indicator lamps show when the mains and heater are ON.

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Gallenkamp BS AUTOCLAVES

AUTOCLAVES, *GALLENKAMP,* **BS 2646, vertical type,** electrically heated, as specified, with 6kW heater, automatic air vent, thermostat, pressure gauge, safety valve, steam exhaust system, steam leak, water level indicator, certificate of test and instructions. **Without** basket and mains cable. For a.c. single phase supplies.

AUX-700-010J	Autoclave, 6kW, 220–240V	**£1227·38**
AUX-700-030D	Autoclave, 6kW, 110–120V	**£1249·88**

SPARE PARTS

	Heaters, 6kW, for a.c. single phase supplies.	
AUX-730-010L	Heater, 220–240V	**£20·70**
AUX-730-030F	Heater, 110–120V	**£20·70**
	Lid gasket, rubber	*See AUX-560-210V*

ACCESSORIES

	Basket, stainless steel wire mesh, 450mm diameter × 450mm deep.	
AUX-730-504J	Basket	**£21·83**
	Half basket, stainless steel wire mesh, 450mm diameter × 200mm deep.	
AUX-730-510X	Half basket	**£16·65**
	Separator, stainless steel wire mesh, 26mm thick, for use when layers of small baskets are inserted in autoclaves.	
AUX-730-516C	Separator	**£12·83**
	Thermometer, for thermometer pocket	*See THL-290-070D*

Gallenkamp OVEN/STERILISER, 250°C

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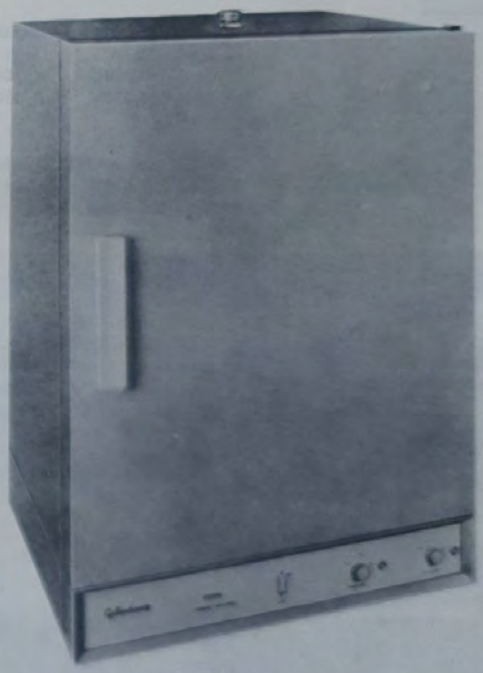


- **Accurate temperature control by direct reading COMPENSTAT (solid state) thermostat**
- **Safety thermostat for additional protection**
- **Capacity 210 litres**
- **Fan convection ensures temperature uniformity even at full load**

For detailed specification *See OVH-400*

For alternative sterilisers *See page headings Ovens and Sterilisers*

BAGS



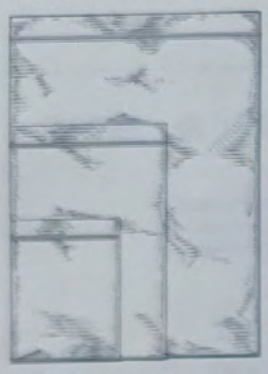
BAJ-300

BAGS, polythene film, opaque, 0·03mm thick, 89×114mm, length × width.

BAJ-260-N	Bags, 89×114mm	Pack of 100 **£0·62**

BAGS, polythene film. Dimensions given are length × width.

BAJ-300-030P	Bags, 125×75mm	Pack of 100 **£0·53**
BAJ-300-050J	Bags, 150×100mm	Pack of 100 **£0·64**
BAJ-300-070D	Bags, 175×125mm	Pack of 100 **£0·68**
BAJ-300-090U	Bags, 250×200mm	Pack of 100 **£1·01**
BAJ-300-110R	Bags, 300×200mm	Pack of 50 **£0·59**
BAJ-300-130L	Bags, 375×250mm	Pack of 50 **£0·96**



BAJ-340

BAGS, polythene film, resealable, with rim/channel sealing device which can be closed by finger pressure and reopened repeatedly. Reasonably dustproof when closed but not guaranteed airtight. With write-on panel. Dimensions given are length × width.

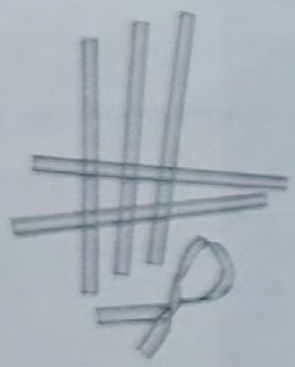
BAJ-340-030K	Bags, 115×90mm	Pack of 100 **£1·35**
BAJ-340-050E	Bags, 140×100mm	Pack of 100 **£1·52**
BAJ-340-070V	Bags, 185×125mm	Pack of 100 **£1·98**

FILM, polythene, 0·13mm thick, for protection and storage of instruments and general apparatus.

BAJ-400-030H	Film, 1·2m wide	Pack of 10m **£2·18**
BAJ-400-050B	Film, 1·8m wide	Pack of 10m **£3·26**

TIES, plastics covered wire, for closing polythene bags and sacks, etc.

BAJ-470-030E	Ties, 100mm long	Pack of 1000 **£1·59**
BAJ-470-050V	Ties, 150mm long	Pack of 1000 **£2·45**



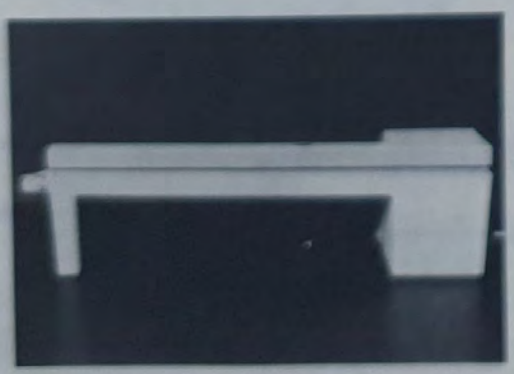
BAJ-470

RUBBER BANDS, width 6mm. Pack contents are approximate.

BAJ-500-030W	Rubber bands, 50mm long	Pack of 240 **£0·59**
BAJ-500-050Q	Rubber bands, 75mm long	Pack of 150 **£0·59**

SEALER, bench mounting, for making seams between thermoplastics films by fusion. Suitable for sealing polythene bags, joining PVC film etc., up to a total thickness of 0·5mm and a maximum width of 300mm. The films to be seamed are placed over the lower bar and the upper bar is depressed firmly. This action switches on a low voltage heater and an indicator lamp for an adjustable pre-determined brief period. With overload protection device and mains cable. For 220–240V a.c. single phase supplies. (F)

BAJ-580-V	Sealer	**£22·98**



BAJ-580

BALANCES

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METTLER INSTRUMENTE AG and METTLER OPTIC AG GREIFENSEE – ZURICH SWITZERLAND

SPRING BALANCES



BAW-200



BAW-240

BALANCES, spring, in flat form metal case with zero adjuster, suspension ring and load hook.

BAW-200-030Y	Balance, 100 × 1g	£2·42
BAW-200-050C	Balance, 200 × 2g	£2·42
BAW-200-070T	Balance, 500 × 5g	£2·42
BAW-200-090N	Balance, 1000 × 10g	£2·42

BALANCES, spring, in flat form metal case with zero adjuster, suspension ring and load hook.

BAW-240-030D	Balance, 1·5kg × 25g	£1·06
BAW-240-050U	Balance, 3kg × 50g	£1·06
BAW-240-070X	Balance, 6kg × 100g	£1·06
BAW-240-090Y	Balance, 10kg × 250g	£1·06

BALANCES, spring, dual scale, in flat form metal case with zero adjuster, suspension ring and load hook.

BAW-280-050P	Balance, 3kg × 50g (7 × ¼ lb)	£1·47
BAW-280-090D	Balance, 12kg × 250g (25 × ½ lb)	£1·80
BAW-280-110A	Balance, 25kg × 500g (56 × 1 lb)	£3·52



BAW-280



BAW-330

BALANCES, spring, in tubular metal case with zero adjuster, suspension ring and load hook.

BAW-330-030C	Balance, 1kg × 10g	£4·64
BAW-330-070N	Balance, 5kg × 100g	£4·64
BAW-330-110E	Balance, 10kg × 200g	£4·64

BALANCE, spring, dial, capacity 5kg × 25g. In metal case with zero adjuster, suspension ring and load hook. Dial diameter 150mm.

BAW-380-W	Balance, 5kg × 25g	£13·64

BALANCE, spring, dial, capacity 50kg × 200g. In metal case with tare adjustment, suspension ring and load hook. Dial diameter 150mm.

BAW-420-K	Balance, 50kg × 200g	£13·75

BALANCE, compression spring, dual scale, capacity 250 × 10g (8 × ¼oz). In plastics case with vertical quadrant scales. With tare and zero adjustment and plastics scoop pan 125mm diameter.

BAW-530-S	Balance 250 × 10g (8 × ¼oz)	£3·31

BALANCE, compression spring, capacity 1kg × 5g. In plastics case with circular scale protected by a transparent cover. With tare and zero adjustment and removable plastics pan 1 litre capacity.

BAW-600-Y	Balance, 1kg × 5g	£9·90



BAW-380
BAW-420 is similar



BAW-530



BAW-600



BAW-620



BAW-710



BAW-660



BAW-750

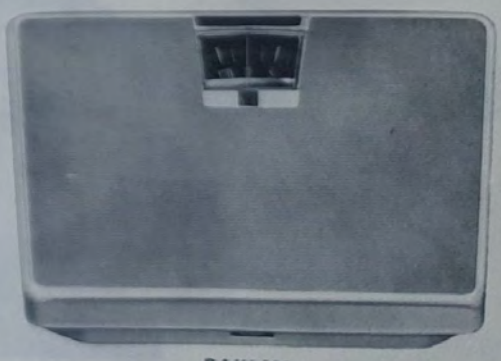
BALANCE, compression spring, capacity 5kg × 25g, as BAW-600-Y but with oval plastics pan 270 × 170 × 40mm deep.
BAW-620-R Balance, 5kg × 25g **£7·93**

BALANCE, compression spring, dual scale, capacity 4·5kg × 25g (10lb × 1oz). In plastics case with circular scale, zero adjustment and rectangular plastics pan 170 × 120 × 65mm deep.
BAW-660-M Balance, 4·5kg × 25g (10lb × 1oz) **£3·56**

BALANCE, compression spring, capacity 10kg × 50g. In metal case with circular scale, tare and zero adjustment and removable metal pan 240mm diameter.
BAW-710-Q Balance, 10kg × 50g **£21·27**

BALANCE, compression spring, dual scale, capacity 2·2kg × 25g (5lb × 1oz). With horizontal quadrant scale, tare adjustment and plastics weighing bowl.
BAW-750-L Balance, 2·2kg × 25g (5lb × 1oz) **£10·37**

BALANCE, compression spring, platform type, capacity 125 × 0·5kg. With magnifier over scale opening and zero adjustment. Overall dimensions 310 × 245 × 60mm high.
BAW-800-P Balance, 125 × 0·5kg **£7·88**



BAW-800

Gallenkamp

Griffin LEVER BALANCE



BCA-220

■ Rapid weighing ■ Dual range

BALANCE, lever pattern, *GRIFFIN*, with arc scale graduated 0 to 1000 x 5g and 0 to 250 x 1g, and scale reading cursor. Change from one range to the other made by moving two-position counterpoise. Mounted on heavy base fitted with a levelling screw. With removable plastics pan, 130mm diameter, having two lips and a central indentation to accommodate test tubes in an inclined position or pipettes in a horizontal position. Pan support fitted with hook for density determinations. Overall dimensions 525 x 185 x 450mm high, mass 5kg. With instructions.

BCA-220-R	Balance, 1000g	**£21·41**

SPARE PARTS

BCA-240-030R	Cursor	**£1·22**
BCA-240-050L	Pan	**£0·90**

TORSION BALANCES

Fitted with jewelled bearings, hardened steel pivots, magnetic damping, zero adjustment, spirit level, levelling screws and a rapid action lock and release device which enables the beam to be clamped in any position. The scale, 330mm long, extends through approximately 250° and has 500 divisions. With suspension hook for sample. 5mg capacity models are also supplied with a 10mm diameter scale pan.



BCA-300

BALANCES, TORSION, standard model, accurate to 0·4%. As specified, with tripod base and hinged cover to protect beam and hook.

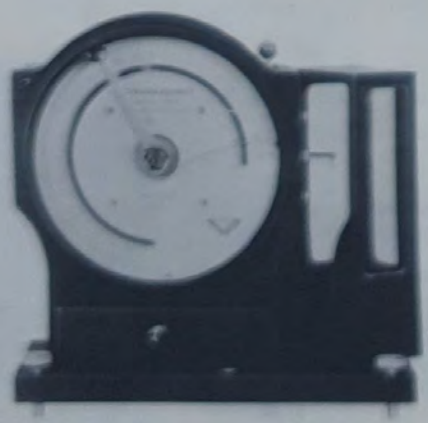
BCA-300-030X	Balance, 5mg	**£128·82**
BCA-300-070C	Balance, 50mg	**£105·00**
BCA-300-090T	Balance, 500mg	**£105·00**
BCA-300-110Q	Balance, 1000mg	**£105·00**
BCA-300-130K	Balance, 10g	**£105·00**

BALANCES, TORSION, precision model, accurate to 0·2%. As specified, with glass sided hinged enclosure to shield sample during weighing and small drawer to accommodate forceps and accessories.

BCA-320-030A	Balance, 5mg	**£176·99**
BCA-320-070L	Balance, 50mg	**£153·68**
BCA-320-090F	Balance, 500mg	**£153·68**
BCA-320-110C	Balance, 1000mg	**£153·68**
BCA-320-130T	Balance, 10g	**£153·68**

ACCESSORIES for BCA-300 and BCA-320

BCA-340-510S	Check masses for 5 and 50mg balances	Set of 10 **£28·47**
BCA-340-520P	Check masses for 500mg balances	Set of 10 **£28·47**
BCA-340-530M	Check masses for 1000mg and 10g balances	Set of 10 **£28·47**



BCA-320

Griffin SPEEDSCALE BALANCES

- **Maximum capacity 2kg**
- **Tare beam and alternative scoop pan options**
- **Stainless steel knife edges and self-aligning bearings**

Strongly constructed beam balances permitting quick, accurate weighing up to 2kg. With scales graduated 0 to 200 × 10g and 0 to 10 × 0·1g respectively and zero adjustment. Masses are unnecessary for weighings up to 210g.



BCJ-200

BALANCE, sliding mass, double pan, *GRIFFIN* **SPEEDSCALE**

Capacity 2kg Sensitive to 0·1g

As specified, with two removable stainless steel circular dished pans 150mm diameter.

BCJ-200-K Balance, 2kg **£40-31**

BALANCE, sliding mass, double pan, *GRIFFIN* **SPEEDSCALE**

Capacity 2kg Sensitive to 0·1g

As BCJ-200-K but with one stainless steel circular dished pan 150mm diameter and one stainless steel scoop.

BCJ-230-M Balance, 2kg **£43-43**

BALANCE, sliding mass, double pan, *GRIFFIN* **SPEEDSCALE**

Capacity 2kg Sensitive to 0·1g

As BCJ-200-K but with additional ungraduated tare beam capacity 170g.

BCJ-260-X Balance, 2kg **£43-52**

ACCESSORY for BCJ-200-K to BCJ-260-X

Masses, for use when weighing above 210g. Set comprising 100, 200, 500 and 1000g masses in block.

BCJ-280-504S Masses Set **£15-75**



BCJ-355

OHAUS DOUBLE PAN SLIDING MASS BALANCES

BALANCE, sliding mass, *OHAUS* **1550SD**

Capacity 2kg Sensitivity 0·1g

With beams graduated 0 to 200 × 10g and 0 to 10 × 0·1g respectively. Masses are unnecessary for weighings up to 210g. With zero adjustment and two flat stainless steel pans 150mm diameter. Magnetically damped movement ensures rapid weighing. (F)

BCJ-355-G Balance, 2kg **£60-19**

BALANCE, sliding mass, *OHAUS* **1560SD**

Capacity 2kg Sensitivity 0·1g

As BCJ-355-G but with additional ungraduated tare beam capacity 200g. (F)

BCJ-365-W Balance, 2kg **£58-04**

BALANCE, sliding mass, *OHAUS* **DIAL-O-GRAM 2060**

Capacity 2kg Sensitivity 0·1g

With beam and direct reading dial graduated 0 to 100 × 1g and having a vernier reading to 0·1g. Masses are unnecessary for weighings up to 100g. With ungraduated tare beam capacity 200g, zero adjustment and two flat stainless steel pans 150mm diameter. Magnetically damped beam movement ensures rapid weighing. (F)

BCJ-400-R Balance, 2kg **£87-30**

ACCESSORIES for BCJ-355-G to BCJ-400-R

Scoop, polypropylene, 300 × 150 × 70mm deep, with counterpoise. (F)

BCJ-420-504Y Scoop **£15-44**

Masses See BCJ-280-504S



BCJ-400

Gallenkamp ROTATING MASS BALANCES

Strongly constructed beam balances, capacity 6kg, sensitivity 0·5g. Fitted with one scale graduated 0 to 1,000 × 10g and a rotating mass covering 0 to 10 × 0·5g. Masses are unnecessary for weighings up to 1kg. A rod carrying the rotating mass is threaded on the top only, to allow it to be moved rapidly along the scale by lifting slightly. With flat stove enamelled mass pan.



BCJ-520

BALANCE, rotating mass, double pan, *GALLENKAMP*

Capacity 6kg Sensitivity 0·5g

As specified, with white enamelled flat load pan 250 × 190mm.

BCJ-500-J Balance, 6kg **£78·75**

BALANCE, rotating mass, double pan, *GALLENKAMP*

Capacity 6kg Sensitivity 0·5g

As BCJ-500-J but with white enamelled metal scoop load pan 380 × 250 × 60mm deep.

BCJ-520-S Balance, 6kg **£78·75**

ACCESSORY

Masses for use when weighing above 1kg. Set comprising one 1kg and two 2kg masses.

BCJ-540-504W Masses Set **£5·85**



BCJ-600

OHAUS SINGLE PAN SLIDING MASS BALANCES

BALANCE, single pan, *OHAUS* **CENT-O-GRAM 311**

Capacity 311g Sensitivity 10mg

With four beams each provided with a non-removable slider and graduated 0 to 200 × 100g, 0 to 100 × 10g, 0 to 10 × 1g and 0 to 1g × 10mg respectively. Additional masses are not required. With zero adjustment and polypropylene pan 90mm diameter with two pouring spouts and handle. Height of stirrup 175mm. Magnetically damped beam movement ensures rapid weighing. A platform housed in the base can be used for density determinations. (F)

BCJ-600-B Balance, 311g **£68·91**



BCJ-630

BALANCE, single pan, *OHAUS* **DIAL-O-GRAM 310**

Capacity 310g Sensitivity 10mg

As BCJ-600-B but with two beams graduated 0 to 200 × 100g and 0 to 100 × 10g respectively and a direct reading dial graduated 0 to 10 × 0·1g having a vernier reading to 0·01g. (F)

BCJ-630-D Balance, 310g **£85·50**



BCJ-670

BALANCE, single pan, *OHAUS* **DIAL-O-GRAM 1650**

Capacity 1600g Sensitivity 0·1g

With beam graduated 0 to 500 × 100g and a direct reading dial graduated 0 to 100 × 1g having a vernier reading to 0·1g. Two 500g effective masses, stored in an integral rack, can be applied to the beam by fingertip release levers. Additional masses are not required. With zero adjustment, flat stainless steel pan 150mm diameter and ungraduated tare beam capacity 225g. Magnetically damped beam movement ensures rapid weighing. (F)

BCJ-670-V Balance, 1600g **£84·49**



BCJ-710 + BCJ-790

BALANCE, single pan, *OHAUS* **750S**

Capacity 2610g Sensitivity 0·1g

With three beams graduated 0 to 500 × 100g, 0 to 100 × 10g and 0 to 10 × 0·1g. Masses are unnecessary for weighings up to 610g. With zero adjustment and flat stainless steel pan 150mm diameter. Magnetically damped beam movement ensures rapid weighing. (F)

BCJ-710-J Balance, 2610g **£59·06**

BALANCE, single pan, *OHAUS* **760**

Capacity 2610g Sensitivity 0·1g

As BCJ-710-J but with additional ungraduated tare beam capacity 225g. (F)

BCJ-740-L Balance, 2610g **£71·44**



BCJ-770



BCJ-830

BALANCE, sliding mass, *OHAUS* **730**

Capacity 2610g Sensitivity 0·1g

As BCJ-710-J but with removable perforated aluminium box 230mm diameter × 150mm high with a removable cover, for animal weighing, in place of the flat pan. (F)

BCJ-770-N Balance, 2610g **£77·06**

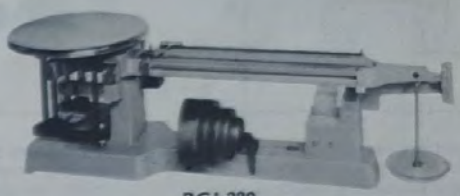
ACCESSORIES for BCJ-710-J to BCJ-770-N

Scoop, polypropylene, 300 × 150 × 70mm deep, with counterpoise. (F)

BCJ-790-504R Scoop **£15·64**

Masses for attachment to beam when weighing above 610g. Set comprising one 500g and two 1000g effective masses. (F)

BCJ-790-514X Masses Set **£13·95**



BCJ-880

BALANCE, sliding mass, *OHAUS* **DEC-O-GRAM 3600**

Capacity 2610g Sensitivity 0·05g

With three beams graduated 0 to 500 × 100g, 0 to 100 × 10g and 0 to 10 × 0·1g respectively. Masses are unnecessary for weighings up to 610g but for weighings above this figure, masses are provided and these can be stored in the base. With zero adjustment and suspended stainless steel pan 150mm diameter. Height of stirrup 190mm. Magnetically damped beam movement ensures rapid weighing. A platform housed in the base can be used for density determinations. (F)

BCJ-830-K Balance, 2610g **£109·13**



BCJ-930

BALANCE, sliding mass, *OHAUS* **1119D**

Capacity 20kg Sensitivity 1g

With two beams graduated 0 to 1000 × 100g and 0 to 100 × 1g respectively. Masses to permit weighings up to 20kg are stored on an integral rack. With zero adjustment, stainless steel pan 280mm diameter and ungraduated tare beam capacity 2270g. Magnetically damped beam movement ensures rapid weighing. (F)

BCJ-880-V Balance, 20kg **£299·81**

BALANCE, sliding mass, single pan

Capacity 2·7lb

With beam carrying counterpoise indicating 0 to 26 × 1lb and 0 to 16 × 0·25oz. Additional masses are not required. With removable chromium plated pan. Overall dimensions 305 × 216 × 90mm high.

BCJ-930-C Balance, 2·7lb **£8·57**



BCJ-970

BALANCE, sliding mass, single pan

Capacity 12·5kg Sensitive to 10g

With beam carrying counterpoises indicating 0 to 12kg × 500g and 0 to 500 × 10g respectively. With zero adjustment, beam locking device and removable chromium plated pan approximately 270 × 145 × 30mm deep. (F)

BCJ-970-U Balance, 12·5kg **£10·74**

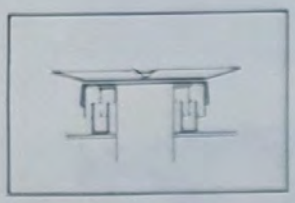
NOTE: As sliding and rotating mass balances have a zero adjustment mass, they do not comply with the Weights and Measures Regulations and are therefore unsuitable for weighing for sale purposes in the United Kingdom.

Gallenkamp

METTLER BALANCES

Gallenkamp are sole distributors for the United Kingdom of Great Britain and Northern Ireland

METTLER balances have had a reputation for precision and reliability since 1945 when they introduced in Switzerland the first single pan analytical balance employing the principle of constant beam loading. The METTLER policy of continuing development has kept them in the forefront of balance technology and resulted in the availability of a wide range of top loading, analytical, mechanical and electronic weighing systems. In addition to the comprehensive range of balances featured in the following pages METTLER can provide specialised systems tailored to meet individual requirements. The combined METTLER and GALLENKAMP resources are available to provide this service.



Dustproof and rugged – Mettler top-loading balances are built to deliver hundreds of thousands of weighings, even when subjected to rugged production-line use. A dust trap prevents foreign matter from reaching the weighing mechanism. Friction clutches protect the balance against damage if control knobs are forced past their stops.



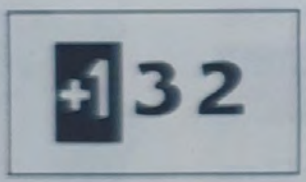
Rapid taring permits you to eliminate container masses. On some analytical models, you can tare up to the full capacity of the balance in just seconds. This eliminates computations, reduces errors.



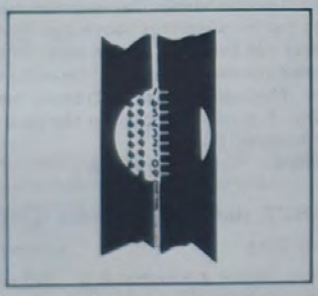
External control knobs – Brightness, focus, and vertical and lateral alignment of the digital readout image can be easily adjusted with external control knobs on the back of the balance.



Low-friction suspension system – High-precision knife-edges reduce friction on the beam to an absolute minimum so you can expect continued reproducibility throughout the long life of your balance.



Automatic preweighing feature gives an instantaneous indication of the approximate mass on the pan over the weighing range of the balance.



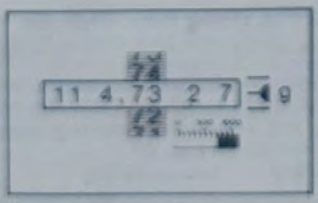
Precise optical scale reticle – The lines on the optical scale reticle of the Mettler readout are positioned with an accuracy of better than one micron to give you precise weighing.



Filling guide on all Mettler analytical models shows the approximate mass on the pan, helps reduce weighing-in time.



Mass-locking feature prevents operating the mass knob for heavier masses when the beam is released. Protects the weighing mechanism from damage, extends the life of the balance.



Digital readout of net mass in large, clear numbers is a standard feature on all new Mettler analytical balances.

METTLER BALANCES SUMMARY

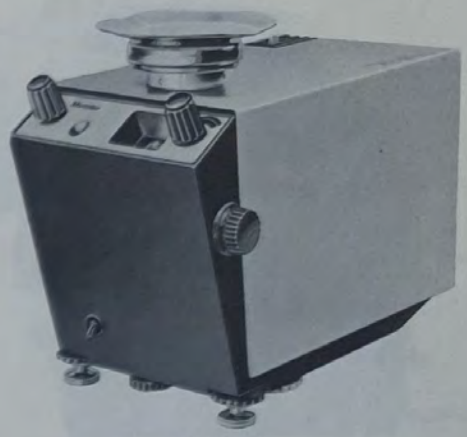
TOP LOADING

Weighing range × readability	Special feature	Model No.	List No.	Page
160 × 0·001 g		P165	BCW-200-S	37
160 × 0·001 g		P163	BCW-340-F	37
160 × 0·001 g		PN163	BCW-380-A	37
320 × 0·001 g	Electronic	PT320	BDF-400-A	39
320 × 0·001 g		PN323	BCW-450-N	37
200 × 0·01 g		E200	BCT-300-R	36
320 × 0·01 g	Electronic	PL300	BDF-460-E	39
320 × 0·01 g	Electronic	PL302	BDF-480-N	39
1200 × 0·01 g		P1200	BCW-490-Y	37
1200 × 0·01 g		P1210	BCW-520-D	37
1200 × 0·01 g		PN1210	BCW-550-F	37
1200 × 0·01 g	Electronic	PT1200	BDF-550-D	40
2200 × 0·01 g		PN2210	BCW-600-J	38
1000 × 0·1 g		E1000	BCT-340-M	36
1200 × 0·1 g	Electronic	PS1200	BDF-580-F	40
1200 × 0·1 g / 120 × 0·01 g	Dual range	PR1200	BDF-230-S	39
2000 × 0·1 g		E2000	BCT-380-H	36
2000 × 0·1 g		P2010	BCW-760-F	38
3200 × 0·1 g	Electronic	PL3000	BDF-650-S	40
3200 × 0·1 g	Electronic	PL3002	BDF-670-E	40
5000 × 0·1 g		P5N	BCX-250-T	38
11000 × 0·1 g		P11N	BCX-290-X	38
3000 × 0·2 g		P3	BCX-340-S	38
10000 × 1 g		P10	BCX-530-J	38
10000 × 1 g		P10N	BCX-560-L	38
15000 × 1 g	Electronic	PS15	BDF-750-K	40
30000 × 1 g	Electronic	PS15/30	BDF-790-F	40
20000 × 2 g		E20	BCT-500-B	36

Spare Parts and Accessories for METTLER top loading balances See page 44

METTLER Automatic Tablet Weigher See page 41

METTLER Data Transfer Systems See page 42



BCW-340



BDF-460

ANALYTICAL

Weighing range × readability	Special feature	Model No.	List No.	Page
2 mg × 0·1 µg / 20 mg × 1 µg / 200 mg × 10 µg	Electronic	ME22	BFM-340-D	50
20 g × 0·001 mg		M5	BFH-200-U	48
20 g × 0·001 mg		M5GD	BFH-230-W	48
20 g × 0·001 mg		M5SA	BFH-270-R	48
160 g × 0·01 mg	Auto release	H51AR	BFE-270-B	48
160 g × 0·01 mg	Auto release	H54AR	BFE-310-M	48
160 g × 0·01 mg		H542	BFE-360-A	48
160 g × 0·01 mg	Electronic	HE20	BFL-340-N	50
160 g × 0·01 mg	Electronic	HE20MV	BFL-380-Y	50
160 g × 0·1 mg		H30	BFB-260-P	46
160 g × 0·1 mg	Auto release	H31AR	BFB-340-V	46
160 g × 0·1 mg	Auto release	H33AR	BFB-430-O	47
160 g × 0·1 mg	Auto release	H35AR	BFB-470-P	47
160 g × 0·1 mg		H72	BFB-300-D	46
160 g × 0·1 mg	Auto release	H78AR	BFB-390-J	46
160 g × 0·1 mg	Electronic	HE10	BFK-220-W	50
160 g × 0·1 mg	Electronic	HE10MV	BFK-260-R	50
240 g × 0·1 mg		H311	BFB-530-M	47
1000 g × 0·1 mg		H315	BFB-570-H	47

Spare Parts and Accessories for METTLER analytical balances See page 51



BFB-260

METTLER BALANCES

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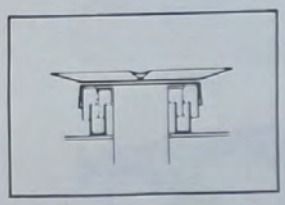
METTLER balances have had a reputation for precision and reliability since 1945 when they introduced in Switzerland the first single pan analytical balance employing the principle of constant beam loading. The METTLER policy of continuing development has kept them in the forefront of balance technology and resulted in the availability of a wide range of top loading, analytical, mechanical and electronic weighing systems. In addition to the comprehensive range of balances featured in the following pages METTLER can provide specialised systems tailored to meet individual requirements. The combined METTLER and GALLENKAMP resources are available to provide this service.



Dustproof and rugged – Mettler top-loading balances are built to deliver hundreds of thousands of weighings, even when subjected to rugged production-line use. A dust trap prevents foreign matter from reaching the weighing mechanism. Friction clutches protect the balance against damage if control knobs are forced past their stops.



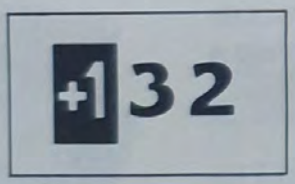
Rapid taring permits you to eliminate container masses. On some analytical models, you can tare up to the full capacity of the balance in just seconds. This eliminates computations, reduces errors.



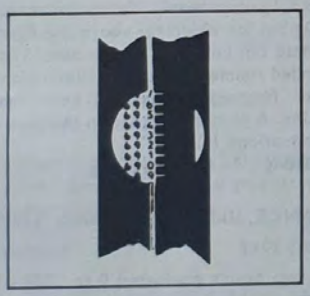
External control knobs – Brightness, focus, and vertical and lateral alignment of the digital readout image can be easily adjusted with external control knobs on the back of the balance.



Low-friction suspension system – High-precision knife-edges reduce friction on the beam to an absolute minimum so you can expect continued reproducibility throughout the long life of your balance.



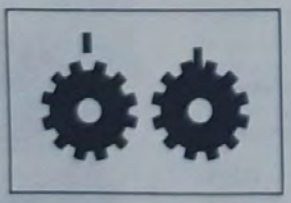
Automatic preweighing feature gives an instantaneous indication of the approximate mass on the pan over the weighing range of the balance.



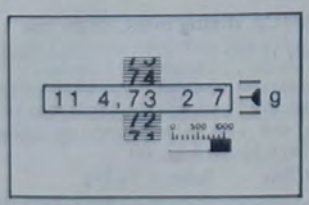
Precise optical scale reticle – The lines on the optical scale reticle of the Mettler readout are positioned with an accuracy of better than one micron to give you precise weighing.



Filling guide on all Mettler analytical models shows the approximate mass on the pan. Helps reduce weighing-in time.



Mass-locking feature prevents operating the mass knob for heavier masses when the beam is released. Protects the weighing mechanism from damage, extends the life of the balance.



Digital readout of net mass in large, clear numbers is a standard feature on all new Mettler analytical balances.

METTLER BALANCES SUMMARY

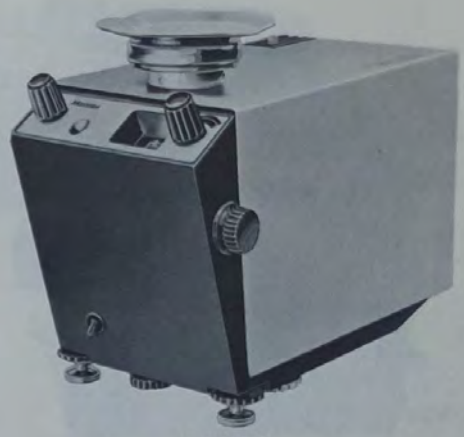
TOP LOADING

Weighing range × readability	Special feature	Model No.	List No.	Page
160 × 0·001 g		P165	BCW-200-S	37
160 × 0·001 g		P163	BCW-340-F	37
160 × 0·001 g		PN163	BCW-380-A	37
320 × 0·001 g	Electronic	PT320	BDF-400-A	39
320 × 0·001 g		PN323	BCW-450-N	37
200 × 0·01 g		E200	BCT-300-R	36
320 × 0·01 g	Electronic	PL300	BDF-460-E	39
320 × 0·01 g	Electronic	PL302	BDF-480-N	39
1200 × 0·01 g		P1200	BCW-490-Y	37
1200 × 0·01 g		P1210	BCW-520-D	37
1200 × 0·01 g		PN1210	BCW-550-F	37
1200 × 0·01 g	Electronic	PT1200	BDF-550-D	40
2200 × 0·01 g		PN2210	BCW-600-J	38
1000 × 0·1 g		E1000	BCT-340-M	36
1200 × 0·1 g	Electronic	PS1200	BDF-580-F	40
1200 × 0·1 g / 120 × 0·01 g	Dual range	PR1200	BDF-230-S	39
2000 × 0·1 g		E2000	BCT-380-H	36
2000 × 0·1 g		P2010	BCW-760-F	38
3200 × 0·1 g	Electronic	PL3000	BDF-650-S	40
3200 × 0·1 g	Electronic	PL3002	BDF-670-E	40
5000 × 0·1 g		P5N	BCX-250-T	38
11000 × 0·1 g		P11N	BCX-290-X	38
3000 × 0·2 g		P3	BCX-340-S	38
10000 × 1 g		P10	BCX-530-J	38
10000 × 1 g		P10N	BCX-560-L	38
15000 × 1 g	Electronic	PS15	BDF-750-K	40
30000 × 1 g	Electronic	PS15/30	BDF-790-F	40
20000 × 2 g		E20	BCT-500-B	36

Spare Parts and Accessories for METTLER top loading balances See page 44

METTLER Automatic Tablet Weigher See page 41

METTLER Data Transfer Systems See page 42



BCW-340



BDF-460

ANALYTICAL

Weighing range × readability	Special feature	Model No.	List No.	Page
2 mg × 0·1 µg / 20 mg × 1 µg / 200 mg × 10 µg	Electronic	ME22	BFM-340-D	50
20 g × 0·001 mg		M5	BFH-200-U	48
20 g × 0·001 mg		M5GD	BFH-230-W	48
20 g × 0·001 mg		M5SA	BFH-270-R	48
160 g × 0·01 mg	Auto release	H51AR	BFE-270-B	48
160 g × 0·01 mg	Auto release	H54AR	BFE-310-M	48
160 g × 0·01 mg		H542	BFE-360-A	48
160 g × 0·01 mg	Electronic	HE20	BFL-340-N	50
160 g × 0·01 mg	Electronic	HE20MV	BFL-380-Y	50
160 g × 0·1 mg		H30	BFB-260-P	46
160 g × 0·1 mg	Auto release	H31AR	BFB-340-V	46
160 g × 0·1 mg	Auto release	H33AR	BFB-430-O	47
160 g × 0·1 mg	Auto release	H35AR	BFB-470-P	47
160 g × 0·1 mg		H72	BFB-300-D	46
160 g × 0·1 mg	Auto release	H78AR	BFB-390-J	46
160 g × 0·1 mg	Electronic	HE10	BFK-220-W	50
160 g × 0·1 mg	Electronic	HE10MV	BFK-260-R	50
240 g × 0·1 mg		H311	BFB-530-M	47
1000 g × 0·1 mg		H315	BFB-570-H	47

Spare Parts and Accessories for METTLER analytical balances See page 51



BFB-260

METTLER BALANCES



BCT-300

TOP LOADING

With spring force compensation

A range of top loading balances, which incorporate springs to eliminate the need for counterpoises.

BALANCE, precision, *METTLER* **E200**
With spring force compensation.

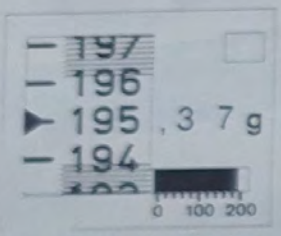
Weighing range 200g — Readability 0·01g
Capacity 300g — Precision ±0·02g

Optical scale range 200g in 1g subdivisions, total mass within weighing range displayed digitally. Optical tare 100g. In two-tone metal housing. For 110–250V 50–60Hz single phase supplies. (F)
BCT-300-R Balance, E200 **£452·54**

BALANCE, precision, *METTLER* **E1000**
With spring force compensation.

Weighing range 1000g — *Readability 0·1g
Capacity 1500g — Precision ±0·1g

Optical scale range 1000g, total mass within weighing range displayed. Scale subdivision 1g. Optical tare 500g. In two-tone metal housing. For 110–250V 50–60Hz single phase supplies. (F)
BCT-340-M Balance, E1000 **£352·11**
*By interpolation.



Readout display, BCT-300

BALANCE, precision, *METTLER* **E2000**
With spring force compensation.

Weighing range 2000g — Readability 0·1g
Capacity 2600g — Precision ±0·2g

Optical scale range 2000g in 10g subdivisions, total mass within weighing range displayed digitally. Optical tare 600g. In two-tone metal housing. For 110–250V 50–60Hz single phase supplies. (F)
BCT-380-H Balance, E2000 **£402·93**

TOP LOADING

With spring compensated bridge weighing mechanism

A high capacity top loading balance incorporating a spring compensated bridge weighing mechanism. The balance is designed to withstand tough working conditions in educational and industrial locations.



BCT-500

BALANCE, precision, bridge, *METTLER* **E20**

Weighing range 20kg — *Readability 2g
Capacity 25kg — Precision ±1g

Optical scale range 20kg in 10g subdivision, total mass within weighing range displayed. Tare 5kg. A filling guide, range 0 to 20kg, for fast filling to the target mass is provided. A large stainless steel weighing pan, 320 x 440mm will accommodate bulky loads and the balance, being less than 20kg net mass, can be moved easily between work locations. For 110–250V 50–60Hz single phase supplies. (F)
BCT-500-B Balance, E20 **£1074·48**
*By interpolation.

METTLER BALANCES

TOP LOADING

BALANCE, precision, *METTLER* **P165**

Weighing range 160g — Readability 1mg
Capacity 160g — Precision ±1mg

Optical scale range 10g, total mass within weighing range displayed digitally. In two-tone housing. For 110–250V 50–60Hz single phase supplies. (F)

BCW-200-S Balance, P165 **£363-00**

BALANCE, precision, *METTLER* **P163**

Weighing range 160g — Readability 1mg
Capacity 170g — Precision ±1mg

Optical scale range 10g, total mass within weighing range displayed digitally. Optical tare 10g. In two-tone housing. For 110–250V 50–60Hz single phase supplies. (F)

BCW-340-F Balance, P163 **£579-59**

BALANCE, precision, *METTLER* **PN163**

Weighing range 160g — Readability 1mg

As BCW-340-F but with automatic compensation for errors caused by changes in balance level. For 110–250V 50–60Hz single phase supplies. (F)

BCW-380-A Balance, PN163 **£742-94**

BALANCE, precision, *METTLER* **PN323**

Weighing range 320g — Readability 1mg
Capacity 330g — Precision ±2mg

Optical scale range 10g, total mass within weighing range displayed digitally. Optical tare 10g. With automatic compensation for errors caused by changes in balance level. In two-tone housing. For 110–250V 50–60Hz single phase supplies. (F)

BCW-450-N Balance, PN323 **£896-61**

BALANCE, precision, *METTLER* **P1200**

Weighing range 1200g — Readability 10mg
Capacity 1300g — Precision ±5mg

Optical scale range 100g, total mass within weighing range displayed digitally. Optical tare 100g. In two-tone metal housing. For 110–250V 50–60Hz single phase supplies. (F)

BCW-490-Y Balance, P1200 **£763-51**

BALANCE, precision, *METTLER* **P1210**

Weighing range 1200g — Readability 10mg
Capacity 1300g — Precision ±5mg

Optical scale range 100g, total mass within weighing range displayed digitally. Optical tare 100g. In two-tone metal housing. For 110–250V 50–60Hz single phase supplies. (F)

BCW-520-D Balance, P1210 **£600-16**

BALANCE, precision, *METTLER* **PN1210**

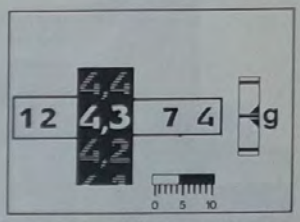
Weighing range 1200g — Readability 10mg

As BCW-520-D but with automatic compensation for errors caused by changes in balance level. For 110–250V 50–60Hz single phase supplies. (F)

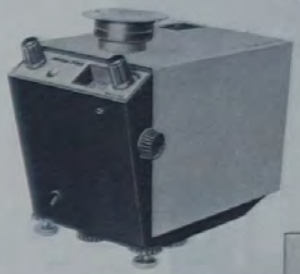
BCW-550-F Balance, PN1210 **£757-46**



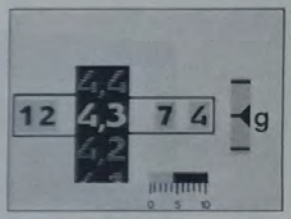
BCW-200



Readout display, BCW-200



BCW-340



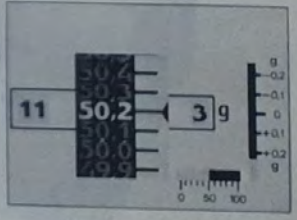
Readout display, BCW-340, BCW-450



BCW-450



BCW-490, BCW-520, BCW-550



Readout display, BCW-490, BCW-520, BCW-550

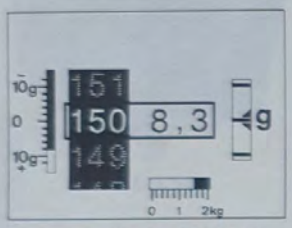
METTLER BALANCES



BCW-600



BCW-760



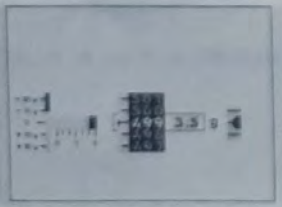
Readout display, BCW-760



BCX-250



BCX-530



Readout display, BCX-530

BALANCE, precision, *METTLER* **PN2210**

Weighing range 2200g — Readability 10mg
Capacity 2300g — Precision ±10mg

Optical scale range 100g, total mass within weighing range displayed digitally. Optical tare 100g. With automatic compensation for errors caused by changes in balance level. In two-tone metal housing. For 110–250V 50–60Hz single phase supplies. (F)

BCW-600-J Balance, PN2210 **£948·64**

BALANCE, precision, *METTLER* **P2010**

Weighing range 2000g — Readability 0·1g
Capacity 2500g — Precision ±0·05g

Optical scale range 2000g, total mass within weighing range displayed digitally. Optical tare 500g. In two-tone metal housing. For 110–250V 50–60Hz single phase supplies. (F)

BCW-760-F Balance, P2010 **£654·61**

BALANCE, precision, *METTLER* **P5N**

Weighing range 5000g — Readability 0·1g
Capacity 6000g — Precision ±0·05g

Optical scale range 500g, total mass within weighing range displayed digitally. Optical tare 1000g. With automatic compensation for errors caused by changes in balance level. In two-tone metal housing. For 110–250V 50–60Hz single phase supplies. (F)

BCX-250-T Balance, P5N **£1114·41**

BALANCE, precision, *METTLER* **P11N**

Weighing range 10000g — Readability 0·1g
Capacity 11000g — Precision ±0·05g

Optical scale range 500g, total mass within weighing range displayed digitally. Optical tare 1000g. With automatic compensation for errors caused by changes in balance level. In two-tone metal housing. For 110–250V 50–60Hz single phase supplies. (F)

BCX-290-X Balance, P11N **£1363·67**

BALANCE, precision, *METTLER* **P3**

Weighing range 3000g — *Readability 0·2g
Capacity 5000g — Precision ±0·05g

Optical scale range 3005g, total mass within weighing range displayed digitally. Optical tare 2000g. In two-tone metal housing. For 110–250V 50–60Hz single phase supplies. (F)

BCX-340-S Balance, P3 **£802·23**

*By Interpolation

BALANCE, precision, *METTLER* **P10**

Weighing range 10000g — Readability 1g
Capacity 13000g — Precision ±0·5g

Optical scale range 10000g, total mass within weighing range displayed. Optical tare 3000g. In two-tone metal housing. For 110–250V 50–60Hz single phase supplies. (F)

BCX-530-J Balance, P10 **£899·03**

BALANCE, precision, *METTLER* **P10N**

Weighing range 10000g — Readability 1g

As BCX-530-J but with automatic compensation for errors caused by changes in balance level. For 110–250V 50–60Hz single phase supplies. (F)

BCX-560-L Balance, P10N **£984·94**

METTLER BALANCES

TOP LOADING ELECTRONIC

MODEL PR

BALANCE, electronic, dual range, *METTLER* **PR1200**

Weighing ranges	120g	1200g
Readability	0·01g	0·1g
Precision	±0·01g	±0·1g
Taring range (by subtraction)	120g	1200g

Single control bar and two buttons for selection of weighing range. Analogue output 0 to 12V. For 110–250V 50–60Hz single phase supplies. (F)

BDF-230-S Balance, PR1200 **£977·68**



BDF-230

MODELS PL, PS AND PT

A range of top loading balances with single control bar operation and in which the weighing system is completely electronic.

BALANCE, precision electronic, *METTLER* **PT320**

Weighing range 320g	Readability 0·001g
Capacity 320g	Precision ±0·0005g
Taring range 0 to 200g (by subtraction)	

Fully automatic, with single control bar operation for weighing, taring and zero resetting. Total mass within weighing range displayed digitally. With automatic stability detector and an adjustable integration time selector which enables accurate weighings to be made in the presence of vibrations, e.g. during animal weighings. The digital system has a BCD output for linking to data processing equipment or a printer. For 110–250V 50–60Hz single phase supplies. (F)

BDF-400-A Balance, PT320 **£1524·60**



BDF-400

BALANCE, precision electronic, *METTLER* **PL300**

Weighing range 320g	Readability 0·01g
Taring range 0 to 320g (by subtraction)	Precision ±0·005g

Fully automatic, with single control bar operation for weighing, taring and zero resetting. Total mass within weighing range displayed digitally. For 110–250V 50–60Hz single phase supplies. (F)

BDF-460-E Balance, PL300 **£880·88**

BALANCE, precision electronic, *METTLER* **PL302**

Weighing range 320g Readability 0·01g

As BDF-460-E but with BCD output. For 110–250V 50–60Hz single phase supplies. (F)

BDF-480-N Balance, PL302 **£983·73**



BDF-460

METTLER BALANCES



BDF-550

BALANCE, precision electronic, *METTLER* **PT1200**

Weighing range 1200g	Readability 0·01g
Capacity 1250g	Precision ±0·005g
Taring range 0 to 1250g (by subtraction)	Over range facility 50g

Fully automatic, with single control bar operation for weighing, taring and zero resetting. Total mass within weighing range displayed digitally. With BCD output. For 110–250V 50–60Hz single phase supplies. (F)

BDF-550-D Balance, PT1200 **£1483·46**

BALANCE, precision electronic, *METTLER* **PS1200**

As BDF-550-D but

Weighing range 1200g	Readability 0·1g
Capacity 1300g	Precision ±0·05g

With over range facility of 100g. For 110–250V 50–60Hz single phase supplies. (F)

BDF-580-F Balance, PS1200 **£1110·78**



BDF-650

BALANCE, precision electronic, *METTLER* **PL3000**

Weighing range 3200g	Readability 0·1g
Taring range 0 to 3200g (by subtraction)	Precision ±0·05g

Fully automatic with single control bar operation for weighing, taring and zero resetting. Total mass within weighing range displayed digitally. For 110–250V 50–60Hz single phase supplies. (F)

BDF-650-S Balance, PL3000 **£1022·45**

BALANCE, precision electronic, *METTLER* **PL3002**

Weighing range 3200g	Readability 0·1g

As BDF-650-S but with BCD output. For 110–250V 50–60Hz single phase supplies. (F)

BDF-670-E Balance, PL3002 **£1125·30**

BALANCE, precision electronic, *METTLER* **PS15**

Weighing range 15kg	Readability 1g
Capacity 15kg	Precision ±0·5g

With single control bar operation, digital readout and BCD output. Taring range by subtraction 15kg. With large 440×320mm weighing platform. For 110–250V 50–60Hz single phase supplies. (F)

BDF-750-K Balance, PS15 **£1904·54**

BALANCE, precision electronic, *METTLER* **PS15/30**

As BDF-750-K but

Weighing range 30kg	Readability 1g
Capacity 30kg	Precision ±1g

For 110–250V 50–60Hz single phase supplies. (F)

BDF-790-F Balance, PS15/30 **£2376·44**



BDF-750

ACCESSORIES FOR METTLER ELECTRONIC BALANCES

DIGITAL COMPARATOR, *METTLER* **GC10,** used with METTLER electronic balances for automatic plus-minus control. Gives visual indication of whether mass is above, below or within preselected limits. (F)

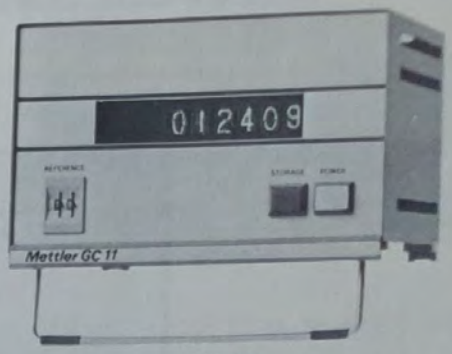
BDK-600-D Digital comparator **£1298·33**

WEIGHT-COUNT CONVERTER, *METTLER* **GC11,** used with METTLER electronic balances to provide rapid counting of small objects such as beads, by simply weighing one object and then weighing the unknown number of similar objects. Has readout capacity up to 999999 objects. (F)

BDK-640-V Weight-count converter **£2130·81**

ACCESSORY for BDK-640-V

BDK-650-502N Manual input unit, *METTLER* 46905. (F) **£185·13**



BDK-640

CALCULATING PRINTER, *METTLER* **GA20,** for automatic recording and processing of weighing data from METTLER electronic balances with BCD-coded output. Weighing data is automatically transferred to the calculator while other information including batch identification and calculation instructions is entered through the keyboard. When the data input is switched off the instrument can be used as a normal office calculator. (F)

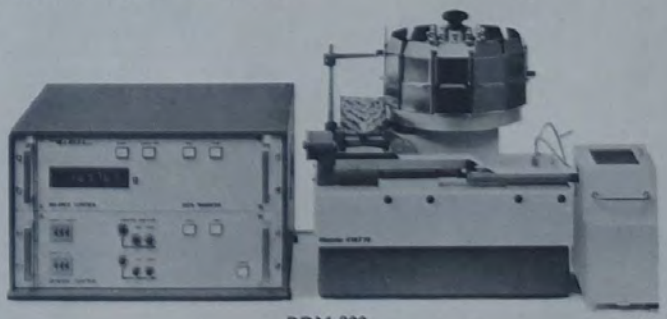
BDK-720-E Calculating printer **£892·98**



BDK-720

METTLER AUTOMATIC TABLET WEIGHER

- **Accepts up to 12 preloaded batches of between 10 and 990 tablets each**
- **Digital weighing data converted to appropriate form for further automatic processing**
- **Alternative feeding channels for large or small tablets**
- **Vibration feeding ensures one-by-one feeding and handling of tablets**
- **Stainless steel batch containers, feeding channel and weighing pan**

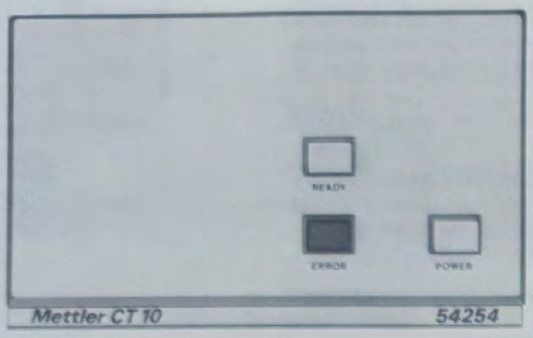


BDM-800

AUTOMATIC TABLET WEIGHER, *METTLER* **KWT10.** Weighing range 10g. Weighs up to 20 tablets/min. (F)

BDM-800-N Automatic tablet weigher **£1899·10**

METTLER DATA TRANSFER SYSTEM



BDT-200



BDT-280

A modular multi-purpose link between data receivers and data sources such as measuring instruments, reader, timer and keyboard.

TRANSFER UNIT, *METTLER* **CT10,** the central module of the METTLER Data Transfer System. Receives information from METTLER measuring instruments and other METTLER series CT modules, and adapts the presentation, codes, levels and controls signals to the specific requirements of the data receiver (e.g. calculator or computer). (F)

BDT-200-X Transfer unit **£2244·55**

INSTRUCTION UNIT, *METTLER* **CT11,** equipped with three preselected codes which are used to organise the data processing sequence. (F)

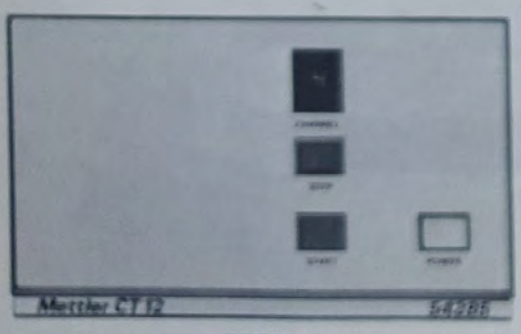
BDT-230-Q Instruction unit **£423·50**

NUMERICAL KEYBOARD, *METTLER* **CT14,** accommodates 8 digits, decimal point and polarity signs. Used for the operator to input dates, clock times, sample identification numbers, test parameters, etc. (F)

BDT-280-E Numerical keyboard from **£1205·16**

MULTIPLEXER, 2-channel, *METTLER* **CT15,** with one input for a data source and the other for the BDT-280-E keyboard or BDT-520-W reader control unit. Transfers data to BDT-200-X transfer unit in a fixed or random sequence. (F)

BDT-330-Y Multiplexer from **£584·43**



BDT-390

MULTIPLEXER, 2-channel, *METTLER* **CT13,** as BDT-330-Y but with two inputs for two data sources. (F)

BDT-360-K Multiplexer from **£1187·00**

MULTIPLEXER, 5-channel, *METTLER* **CT12,** receives information from up to five sources and transfers the data to BDT-200-X transfer unit in a fixed or random sequence. (F)

BDT-390-M Multiplexer from **£2797·52**

TIMER, *METTLER* **CT19,** digital setting, for the periodic triggering of data transference from continuous measurement instruments. Period lengths can be selected in steps of 0·1s within the range of 0·1 to 999·9s. (F)

BDT-430-A Timer from **£1219·68**

METTLER DATA TRANSFER SYSTEM

ANALOGUE/DIGITAL CONVERTER, *METTLER* **CT20,** converts analogue signals of −10 to +10V with a resolution of 1mV. The resultant information is displayed digitally and is available at the digital output in BCD code. (F)

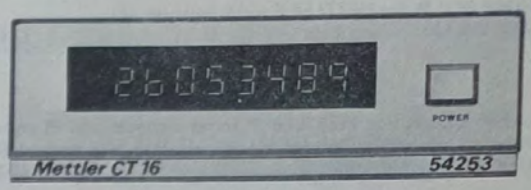
BDT-470-S Analogue/digital converter from **£1571·79**

READER CONTROL UNIT, *METTLER* **CT21,** provides automatic identification of samples, etc. when used with either optical reader BDT-560-R or card reader BDT-590-T. (F)

BDT-520-W Reader control unit from **£804·65**

OPTICAL READER, *METTLER* **CT211,** for non-contact reading of punched cards. (F)

BDT-560-R Optical reader from **£1187·00**



BDT-640

CARD READER, *METTLER* **CT212,** for contact reading of punched cards. (F)

BDT-590-T Card reader from **£1131·35**

VISUAL DISPLAY MODULE, *METTLER* **CT16,** digital, for use with BDT-280-E numerical keyboard and BDT-330-Y multiplexer. (F)

BDT-640-A Visual display module from **£1283·81**

Use of METTLER balance and data transfer system in weighing animals



SPARES AND ACCESSORIES FOR METTLER E AND P SERIES BALANCES

LAMP BULB, for METTLER E series balances. (F)
BDX-200-U Lamp bulb **£3·03**

LAMP BULB, for METTLER P series balances and H series analytical balances (except H3, H4, H5, H6, H15, H16 models). (F)
BDX-240-P Lamp bulb **£3·21**

WORKING COVER, plastics, for METTLER E series balances (except E20 model). (F)
BDX-300-M Working cover **£8·83**

WORKING COVER, plastics, for use with P160, P161, P162, P163, PN163, P165, P203, PN323, P1000, P1200, P1210, PN1210, P2000 and P2010 top loading precision balances. With a transparent window and a cutout through which the pan projects. To protect the balance when in use in dusty locations. (F)
BDX-320-V Working cover **£6·41**

WORKING COVER, plastics, as BDX-320-V but for use with P2210 and PN2210 top loading precision balances. (F)
BDX-340-H Working cover **£7·50**

WORKING COVER, plastics, as BDX-320-V but for use with P3, P5, P6, P10, P10N and P11N top loading precision balances. (F)
BDX-360-Q Working cover **£8·35**

BALANCE PANS

For METTLER P series top loading precision balances

BDX-440-W and BDX-460-Y are interchangeable with the pans supplied with the balances shown in the table.

BDX-480-R, BDX-500-T and BDX-520-F may be used as alternative pans on the balances indicated but tare must be used to compensate for the mass of the pan.

List No.	For balances	Material	Approximate mass g	Approximate capacity ml	Approximate dimensions, diameter × height mm
BDX-440-W	BCW-200-S to BCW-450-N	Stainless steel	70	180	90 × 40
BDX-460-Y	BCW-490-Y to BCW-760-F	Polypropylene	270	1750	160 × 140
BDX-480-R	BCW-490-Y to BCW-760-F, BCX-250-T to BCX-560-L	Stainless steel	300	1000	180 × 70
BDX-500-T	BCW-600-J, BCW-760-F, BCX-250-T to BCX-560-L	Stainless steel	400	2000	230 × 90
BDX-520-F	BCX-250-T to BCX-560-L	Stainless steel	700	5000	280 × 140



BDX-440



BDX-460



BDX-480, BDX-500, BDX-520

BDX-440-W Balance pan, stainless steel (F) **£10·65**
BDX-460-Y Balance pan, polypropylene (F) **£4·66**
BDX-480-R Balance pan, stainless steel (F) **£39·45**
BDX-500-T Balance pan, stainless steel (F) **£41·62**
BDX-520-F Balance pan, stainless steel (F) **£70·18**



BDX-590 + balance



BDX-650

WINDSHIELD, *METTLER* **LP103,** for use with P160, P161, P162, P163, P165, P203, P323, P1000, P1200, P2000, P2010 and P2210 top loading precision balances. Internal dimensions 170 × 170 × 170 mm. (F)
BDX-590-C Windshield **£31·46**

INFRARED DRYER, *METTLER* **LP12,** for use with P163, P165, PN163 and PN323 top loading precision balances. With 50 disposable aluminium foil dishes. Overall dimensions 250 × 280 × 335 mm, mass 4·5 kg. For 200–240 V 50 Hz single phase supplies, power rating max. 170 W. (F)
BDX-650-W Infrared dryer **£378·73**

SPARE PART
BDX-670-010F Dishes, aluminium foil. (F) Pack of 50 **£7·74**

Griffin DOUBLE PAN BALANCES

Suitable for educational and industrial use

- **Solid brass beams 200mm long with poising nuts for zero adjustment**
- **Agate bearings held by positioning screws**
- **Stainless steel pans 100mm diameter, each with single limb support**
- **Curved, inclined scale which rises as beam is raised**
- **All metal parts plated or stove enamelled**
- **Moulded plastics base with levelling feet**



BEW-300

BALANCE, double pan, *GRIFFIN* Minor
Capacity 250g Sensitive to 2mg
As specified, supplied in flat pack with instructions for assembly. Overall dimensions 380 × 170 × 350mm high.
BEW-300-L Balance, 250g **£32·63**



BEW-340

BALANCE, double pan, *GRIFFIN* Chaindial
Capacity 250g Sensitive to 5mg
As BEW-300-L but with oil damped movement and chain drum with dial graduated 0 to 1g × 10mg, readable to 5mg. Fractional grams can be added while the beam is in motion. Supplied in flat pack with instructions for assembly.
BEW-340-G Balance, 250g **£45·84**



BEW-360

BALANCE, double pan, *GRIFFIN* Chaindial
Capacity 250g Sensitive to 5mg
As BEW-340-G but mounted in draught excluding glazed case with slide-up front and right hand control for the chain drum. With instructions.
BEW-360-P Balance, 250g **£65·25**

BALANCE, double pan, *GRIFFIN* Chaindial
Capacity 500g Sensitive to 5mg
As BEW-340-G but with 127mm diameter pans having conventional type supports. With instructions.
BEW-390-R Balance, 500g **£42·75**



BEW-390

HEAVY DUTY DOUBLE PAN BALANCE

- **Strong frame with triangulated pillar support**
- **Bifurcated pointer to eliminate tip vibration**
- **Stainless steel pans 180mm diameter**
- **Hardwood base with levelling feet**

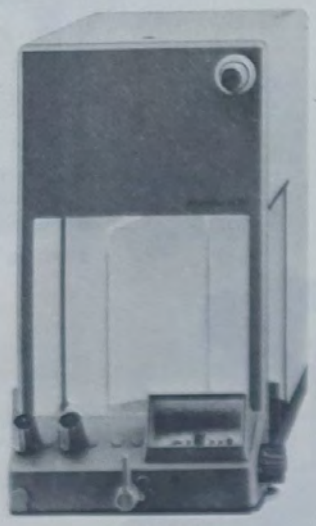


BEW-470

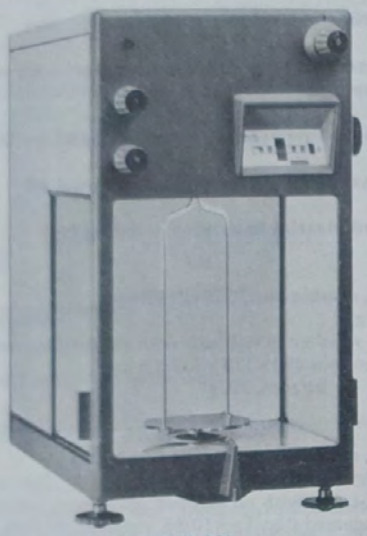
BALANCE, double pan, *GRIFFIN* Heavy Duty
Capacity 2kg Sensitive to 5mg
As specified, on hardwood base with levelling feet. Overall dimensions 610 × 340 × 610mm high.
BEW-470-A Balance, 2kg **£97·88**

METTLER BALANCES

ANALYTICAL



BFB-260



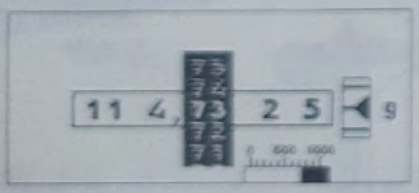
BFB-390
BFB-300 is similar

BALANCE, analytical, *METTLER* **H30,** with digital readout over weighing range. Stainless steel pan 90mm diameter, height of stirrup 180mm. In aluminium alloy housing.

Weighing range 160g — Readability 0·1mg
Capacity 160g — Precision ±0·05mg

With spare lamp bulb and dust cover. For 110–250V 50–60Hz single phase supplies. (F)

BFB-260-P Balance, H30 **£572·33**



Readout display, BFB-390

BALANCE, analytical, *METTLER* **H72,** with digital readout over weighing range. Stainless steel pan 90mm diameter, height of stirrup 180mm. In aluminium alloy housing.

Weighing range 160g — Readability 0·1mg
Capacity 160g — Precision ±0·05mg
Preweigh range 0 to 160g displayed digitally

With spare lamp bulb and dust cover. For 110–250V 50–60Hz single phase supplies. (F)

BFB-300-D Balance, H72 **£442·86**

BALANCE, analytical, *METTLER* **H31AR,** with digital readout over weighing range. Stainless steel pan 90mm diameter, height of stirrup 180mm. In aluminium alloy housing.

Weighing range 160g — Readability 0·1mg
Capacity 161g — Precision ±0·05mg
Optical tare 1g — Optical scale range 1g

With spare lamp bulb and dust cover. For 110–250V 50–60Hz single phase supplies. (F)

BFB-340-V Balance, H31AR **£640·00**

BALANCE, analytical, *METTLER* **H78AR,** as BFB-300-D but with automatic release. For 110–250V 50–60Hz single phase supplies. (F)

BFB-390-J Balance, H78AR **£617·10**

METTLER BALANCES

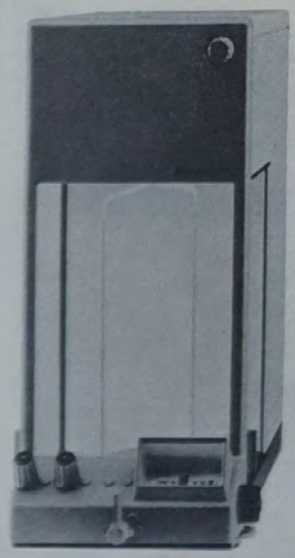
BALANCE, analytical, *METTLER* **H33AR,** with digital readout over weighing range. Stainless steel pan 90mm diameter, height of stirrup 180mm. In aluminium alloy housing.

Weighing range 160g	Readability 0·1mg
Capacity 161g	Precision ±0·05mg
Optical tare 1g	Optical scale range 1g

Preweigh range 0 to 160g displayed digitally

With spare lamp bulb and dust cover. For 110–250V 50–60Hz single phase supplies. (F)

BFB-430-U Balance, H33AR **£722·37**



BFB-530

BALANCE, analytical, *METTLER* **H35AR** with digital readout over weighing range. Stainless steel pan 90mm diameter, height of stirrup 180mm. In aluminium alloy housing.

Weighing range 160g	Readability 0·1mg
Capacity 161g	Precision ±0·05mg

Preweigh range 0 to 160g displayed digitally

Optical tare 1g	Optical scale range 1g

Mechanical tare 159g with separate indication

With spare lamp bulb and dust cover. For 110–250V 50–60Hz single phase supplies. (F)

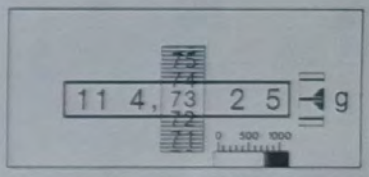
BFB-470-P Balance, H35AR **£813·12**

BALANCE, analytical, *METTLER* **H311,** with digital readout over weighing range. Stainless steel pan 90mm diameter, height of stirrup 260mm. In aluminium alloy housing.

Weighing range 240g	Readability 0·1mg
Capacity 241g	Precision ±0·05mg
Optical tare 1g	Optical scale range 1g

With spare lamp bulb and dust cover. For 110–250V, 50–60Hz single phase supplies. (F)

BFB-530-M Balance, H311 **£917·18**



Readout display, BFB-530

BALANCE, analytical, *METTLER* **H315,** with digital readout over weighing range. Stainless steel pan 135mm diameter, height of stirrup 190mm. In aluminium alloy housing.

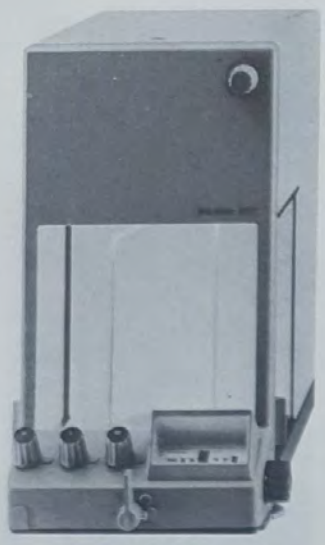
Weighing range 1000g	Readability 0·1mg
Capacity 1001g	Precision ±0·1mg
Optical tare 1g	Optical scale range 1g

With spare lamp bulb and dust cover. For 110–250V 50–60Hz single phase supplies. (F)

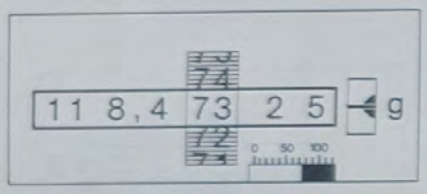
BFB-570-H Balance, H315 **£1201·53**



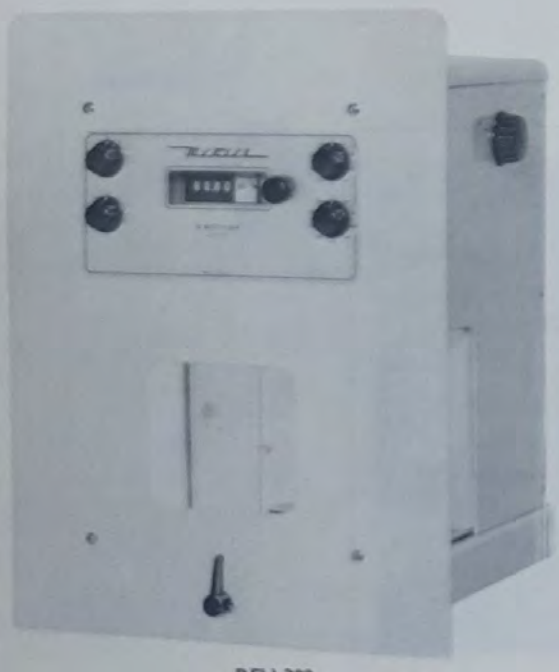
METTLER BALANCES



BFE-270



Readout display, BFE-270



BFH-200

SEMI-MICRO ANALYTICAL

BALANCE, semi-micro analytical, *METTLER* **H51AR,** with digital readout over weighing range. Stainless steel pan 90mm diameter, height of stirrup 180mm. In aluminium alloy housing.

Weighing range 160g	Readability 0·01 mg
Capacity 160·1g	Precision ±0·01 mg
Optical tare 0·1g	Optical scale range 125mg

With spare lamp bulb and dust cover. For 110–250V 50–60Hz single phase supplies. (F)

BFE-270-B Balance, H51AR **£792·55**

BALANCE, semi-micro analytical, *METTLER* **H54AR,** with digital readout over weighing range. Stainless steel pan 90mm diameter, height of stirrup 180mm. In aluminium alloy housing.

Weighing range 160g	Readability 0·01 mg
Capacity 160·1g	Precision ±0·01 mg
Optical tare 0·1g	Optical scale range 125mg

Mechanical tare 159·9g with separate indication

With spare lamp bulb and dust cover. For 110–250V 50–60Hz single phase supplies. (F)

BFE-310-M Balance, H54AR **£919·60**

BALANCE, semi-micro analytical *METTLER* **H542,** with digital readout over weighing range. Stainless steel pan 90mm diameter, height of stirrup 260mm. In aluminium alloy housing.

Weighing range 160g	Readability 0·01 mg
Capacity 160·1g	Precision ±0·01 mg
Optical tare 0·1g	Optical scale range 125mg

Mechanical tare 159·9g with separate indication

With spare lamp bulb and dust cover. For 110–250V 50–60Hz single phase supplies. (F)

BFE-360-A Balance, H542 **£1060·00**

MICRO ANALYTICAL

BALANCE, micro analytical, *METTLER* **M5,** stainless steel pan diameter 40mm, height of stirrup 110mm. In white finished alloy housing.

Weighing range 20g	Readability 0·001 mg
Capacity 20g	Precision ±0·001 mg

With spare lamp bulb and dust cover. For 110–250V 50–60Hz single phase supplies. (F)

BFH-200-U Balance, M5 **£2135·65**

BALANCE, micro analytical, *METTLER* **M5GD,** as BFH-200-U but with removable attachment for weighing below the balance. For 110–250V 50–60Hz single phase supplies. (F)

BFH-230-W Balance, M5GD **From £2178·00**

BALANCE, micro analytical, *METTLER* **M5SA,** as BFH-200-U but with swing-out pan, diameter 30mm for simplified loading. For 110–250V 50–60Hz single phase supplies. (F)

BFH-270-R Balance, M5SA **£2306·26**



Readout display, BFH-200

BALANCE SERVICING IN THE UNITED KINGDOM

Your Balance – A Vital Instrument

Your laboratory balance is one of the most precise instruments which you have at your disposal. To keep it in perfect working order it must be checked regularly and expertly. This kind of maintenance is a job which only a competent qualified technician should be allowed to carry out.

The Balance Engineer

As with most occupations members of the balance servicing profession offer many levels of skill. Among the most skilful in the world are Gallenkamp engineers trained at the Mettler International School, Zurich. There potential engineers, many of whom already have some practical background in instrument engineering, meet for training to enable them to carry out either minor field or major workshop repairs. Provided the trainees achieve a sufficiently high standard they are awarded diplomas.

Each year these diplomas are renewed ONLY if the engineer maintains his updating training on new models and his efficiency. The engineer always has with him his current CERTIFICATION CARD; you should ask to see this to ensure that you are fully protected by a competent and highly qualified engineer.

Preventative Maintenance

Much importance is placed by Mettler on the role of preventative maintenance. A qualified Mettler balance engineer looks for potential faults and corrects them before they become apparent to the balance user. In this way a little more care taken on each routine service visit can often eliminate a much more costly repair later on.

Gallenkamp will provide the Service you require

Our approach to balance maintenance is flexible. We realise that some balances are used so infrequently and with such care that full preventative maintenace is unnecessary.

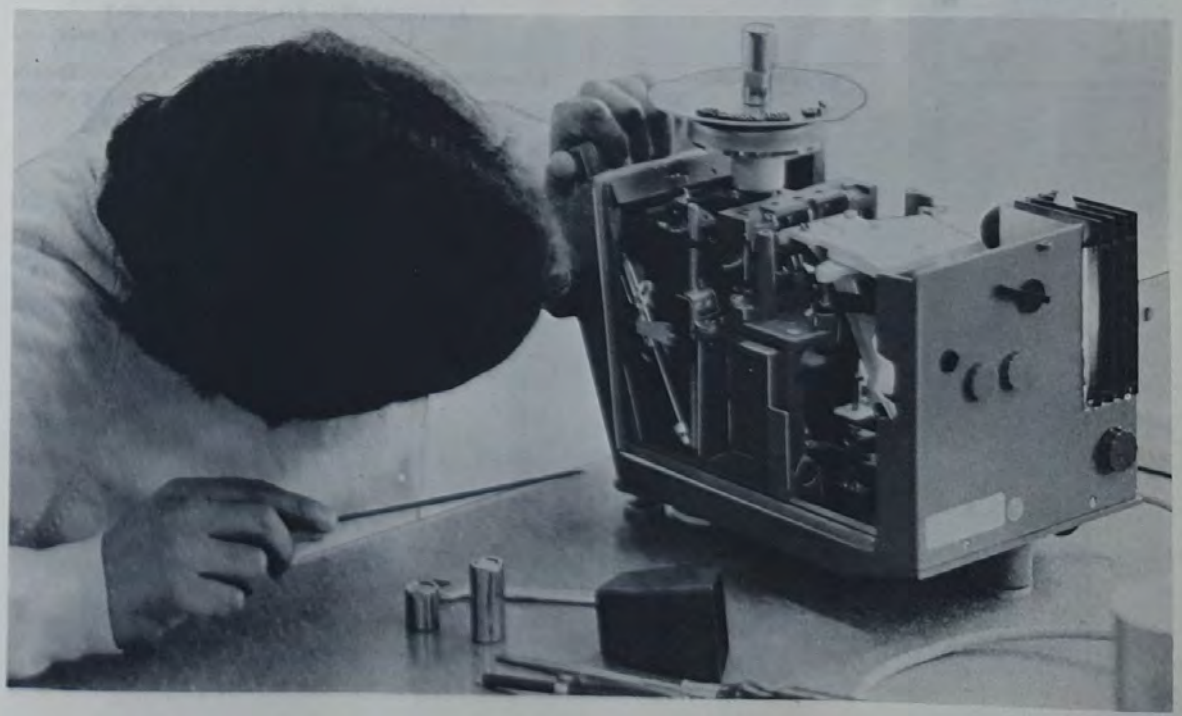
Even with balances which are used frequently their conditions of use can vary considerably, making the choice between quarterly, twice yearly and annual maintenance an important and difficult one.

The training which Mettler provides, supplemented by Gallenkamp training courses, enables Gallenkamp Mettler balance engineers to maintain not only Mettler balances but also balances of other makes. This can save money because on one service call an engineer can attend to all your balances, lowering the overhead cost per unit.

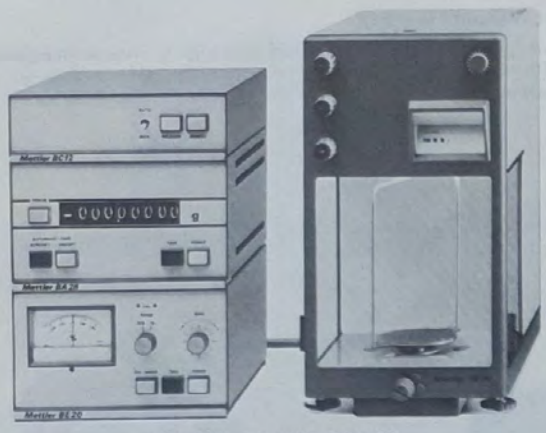
What should you do?

Our recommendation is that you discuss your balance service needs with us and allow us to advise the most economical form of service in view of your conditions of use and if necessary your budgets.

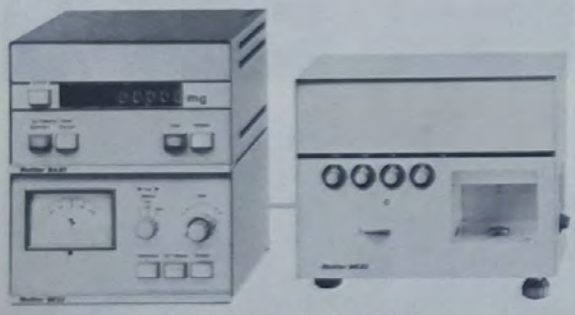




METTLER BALANCES



BFL-340 with BFL-410-506



BFM-340 with BFM-360-514

ANALYTICAL ELECTRONIC

BALANCE, analytical electronic, *METTLER* **HE10.**

Weighing ranges	−1 to +160g	±10g
Readability	0·1mg	1mg

With separate control box BE10. For 110–250V 50–60Hz single phase supplies. (F)

BFK-220-W Balance, HE10 **From £2150·17**

BALANCE, analytical electronic, *METTLER* **HE10MV.** As BFK-220-W but with motorised pushbutton release and arrest facility and cycle control unit BC12. For 110–250V 50–60Hz single phase supplies. (F)

BFK-260-R Balance, HE10MV **From £3091·55**

ACCESSORIES for BFK-220-W and BFK-260-R

Electronic 5-digit indicator with tare *See BFM-360-514H*
Electronic 8-digit indicator with tare *See BFL-410-516X*

BALANCE, semi-micro analytical electronic, *METTLER* **HE20.**

Weighing ranges	−0·1 to +160g	±1g
Readability	0·01mg	0·1mg

With separate control box BE20. For 110–250V 50–60Hz single phase supplies. (F)

BFL-340-N Balance, HE20 **From £2180·42**

BALANCE, semi-micro analytical electronic, *METTLER* **HE20MV.** As BFL-340-N but with motorised pushbutton release and arrest facility and cycle control unit BC12. For 110–250V 50–60Hz single phase supplies. (F)

BFL-380-Y Balance, HE20MV **From £3126·64**

ACCESSORIES for BFL-340-N and BFL-380-Y

Electronic 8-digit indicator, METTLER BA28 with automatic tare facility. (F)
BFL-410-516X Electronic indicator **£2739·44**
Electronic 5-digit indicator with tare *See BFM-360-514E*

BALANCE, micro analytical electronic, *METTLER* **ME22** bench model. Total capacity 3g

Weighing ranges	±1	±10	±100mg
Readability	0·1	1	10μg

Complete with separate control box BE22. For 110–250V 50Hz single phase supplies. (F)

BFM-340-D Balance. ME22 **From £3117·00**

ACCESSORIES

Electronic 5-digit indicator, *METTLER* BA25, with 1248 BCD output with automatic tare facility. (F)
BFM-360-514E Electronic indicator **From £2180·42**

SPARE PART AND ACCESSORIES FOR METTLER ANALYTICAL BALANCES

DUST COVER, plastics, for *METTLER* H series balances. (F)

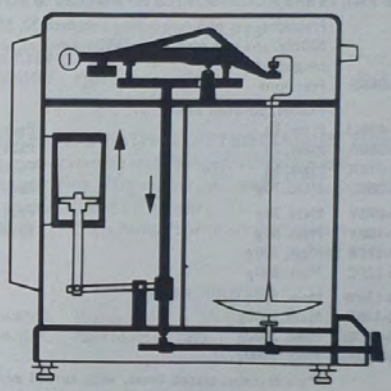
BFX-300-N	Dust cover	**£4·30**
	Lamp bulb	*See BDX-240-P*

WATCH GLASSES, tared to a predetermined mass with a tolerance of ± 1 mg. (F)

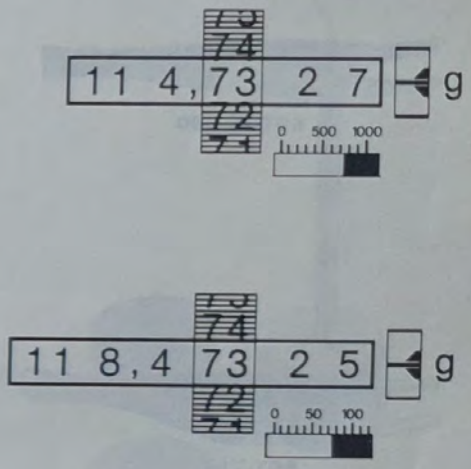
Mass, g	10	20	
Diameter, mm	50	70	
BFX-460-030A	Watch glass, 10g		**£6·17**
BFX-460-050R	Watch glass, 20g		**£8·54**

WEIGHING SCOOPS, nickel, tared to a predetermined mass with a tolerance of ± 1 mg. (F)

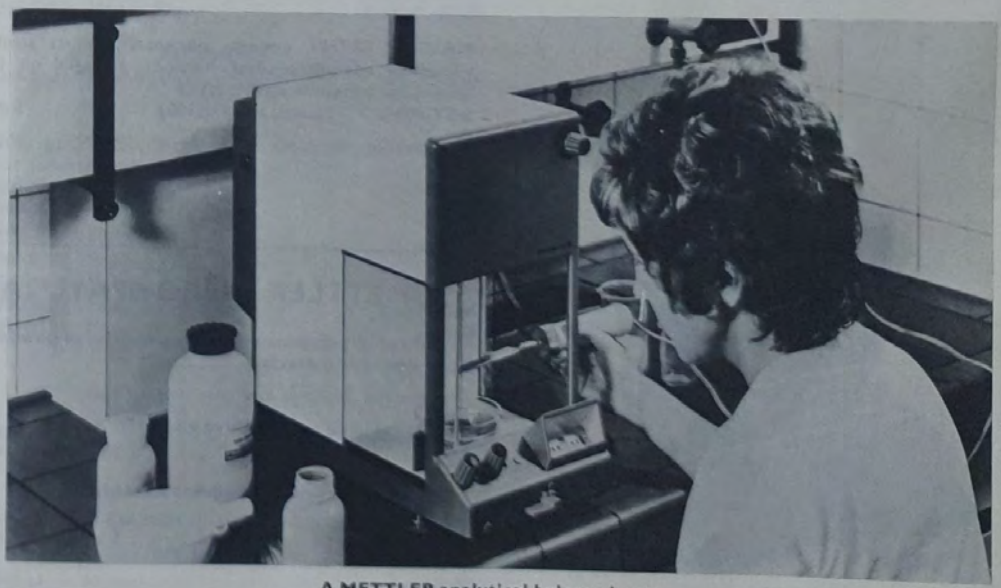
Mass, g	10	20	
Length × width, mm	75 × 25	105 × 35	
BFX-490-030C	Weighing scoop, 10g		**£18·63**
BFX-490-050T	Weighing scoop, 20g		**£19·72**



A typical weighing system used on METTLER mechanical analytical balances



Typical readout displays on METTLER analytical balances



A METTLER analytical balance in use

BALANCE ACCESSORIES



BGT-200

GRIFFIN SETS OF MASSES

In accordance with the recommendations of the Conférence Générale des Poids et Mesures and the change to SI units, the term 'weight' is no longer used and is replaced by 'mass', a coherent unit independent of g.

MASSES, *GRIFFIN,* **general purpose,** polished brass, arranged on 1–2–2–5 system. Sets BGT-200 and BGT-240 have aluminium and nickel-silver fractions, and forceps. In polished hardwood case except sets BGT-200 which are in plastics case.

BGT-200-030S	Masses, 1 mg to 100 g	Set **£9·62**
BGT-200-050M	Masses, 1 mg to 200 g	Set **£14·06**
BGT-240-030N	Masses, 10 mg to 500 g	Set **£19·80**
BGT-240-050H	Masses, 10 mg to 1 kg	Set **£28·41**
BGT-280-030Y	Masses, 1 g to 2 kg	Set **£42·64**
BGT-280-050C	Masses, 1 g to 5 kg	Set **£102·38**



BGT-310-280D



BGT-310-290A

SPARE PARTS and ACCESSORIES for BGT-200 to BGT-280

	Fractions, set of 8 comprising one each 20, 50, 200 and 500 mg, and two each 10 and 100 mg masses, in box with hinged lid.	
BGT-300-050E	Fractions	Set **£2·19**
	Masses, polished brass.	
BGT-310-050U	Mass, 1 g	Pack of 5 **£1·45**
BGT-310-060R	Mass, 2 g	Pack of 5 **£2·03**
BGT-310-070X	Mass, 5 g	Pack of 5 **£2·36**
BGT-310-080L	Mass, 10 g	Pack of 5 **£2·70**
BGT-310-090Y	Mass, 20 g	Pack of 5 **£3·38**
BGT-310-100Y	Mass, 50 g	Pack of 5 **£4·05**
BGT-310-110F	Mass, 100 g	**£1·19**
BGT-310-120C	Mass, 200 g	**£2·31**
BGT-310-130W	Mass, 500 g	**£3·83**
BGT-310-140T	Mass, 1000 g	**£7·20**
BGT-310-150Q	Mass, 2000 g	**£13·73**
BGT-310-160N	Mass, 5000 g	**£33·28**
	Mass forceps, plated brass, with curved ends. Length 90 mm.	
BGT-310-280D	Mass forceps, brass	Pack of 3 **£0·91**
	Mass forceps, stainless steel, with curved ivory tips. Length 90 mm	
BGT-310-290A	Mass forceps, stainless steel	**£2·91**

MASSES, *GRIFFIN,* **general purpose,** stainless steel, with aluminium and nickel-silver fractions, arranged on 1–2–2–5 system, and forceps in plastics case.

BGT-400-L	Masses, 10 mg to 100 g	Set **£30·38**



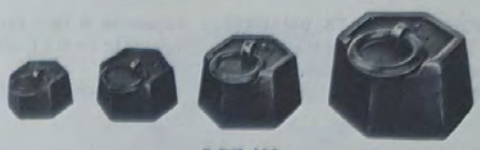
BGT-400

METTLER VIBRO-SPATULA

For rapidly dispensing small quantities of powdered or granular material.

- **Variable amplitude of vibration**
- **Interchangeable stainless steel blades**

See SMK-750



BGT-600

MASSES, iron, hexagonal shape, with lifting ring.

BGT-600-050D	Mass, 50g	£0·69
BGT-600-060A	Mass, 100g	£0·75
BGT-600-070U	Mass, 200g	£1·00
BGT-600-080R	Mass, 500g	£1·60
BGT-600-090X	Mass, 1kg	£2·22
BGT-600-100X	Mass, 2kg	£3·69
BGT-600-110L	Mass, 5kg	£6·75
BGT-600-120Y	Mass, 10kg	£9·68

MASS HANGERS WITH SLOTTED MASSES, 10g, comprising 10g steel wire mass hanger with hook and nine cast light alloy 10g masses, accuracy ±5%. Slot designed to prevent masses sliding off hanger.

BGT-650-G Mass hangers with slotted masses — Pack of 4 sets £5·48

SPARE PARTS

BGT-660-030N	Masses, 10g	Pack of 10 £1·09
BGT-660-050H	Mass hangers, 10g	Pack of 10 £1·90

MASS HANGERS WITH SLOTTED MASSES, 100g, comprising 100g steel-stemmed mass hanger with hook and cast alloy base, and nine light alloy 100g masses, accuracy ±5%. Slot designed to prevent masses sliding off hanger.

BGT-700-K Mass hangers with slotted masses — Pack of 4 sets £15·64

SPARE PARTS

BGT-710-030R	Masses, 100g	Pack of 5 £3·02
BGT-710-050L	Mass hangers, 100g	Pack of 5 £8·16

MASSES, SLOTTED, small form, flat, with large central hole and small slot designed to prevent masses sliding off hanger. 5g mass is of plastics, accuracy ±2%, the other sizes are of cast alloy, accuracy ±1%.

BGT-750-030M	Masses, 5g	Pack of 3 £0·45
BGT-750-040J	Masses, 10g	Pack of 3 £0·84
BGT-750-050G	Masses, 20g	Pack of 3 £0·90
BGT-750-060D	Masses, 50g	Pack of 3 £1·29

ACCESSORY

BGT-750-506M	Mass hangers, alloy, 50g	Pack of 3 £1·89

MASSES, SLOTTED, large form, iron, interlocking, with synthetic hammer finish. Accuracy ±1%.

BGT-800-050K	Mass, 100g	£0·62
BGT-800-060H	Mass, 200g	£0·68
BGT-800-070E	Mass, 500g	£1·29
BGT-800-080B	Mass, 1kg	£1·61
BGT-800-090V	Mass, 2kg	£2·54
BGT-800-100V	Mass, 5kg	£5·51
BGT-800-110S	Mass, 10kg	£9·28

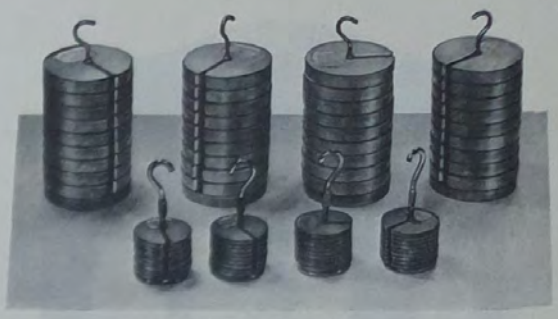
ACCESSORIES

Mass hangers iron, with synthetic hammer finish. Accuracy ±1%.

BGT-820-506C	Mass hanger, 0·5kg	£2·81
BGT-820-514W	Mass hanger, 1kg	£3·38

MASSES, SLOTTED, iron, 12kg set comprising masses BGT-800, 0·1, 0·2, 0·2, 0·5, 1, 2, 2, and 5kg, and one 1kg hanger BGT-820-514W.

BGT-840-U Masses — Set £19·58



BGT-650, BGT-700



BGT-750



BGT-800



BGW-260

WEIGHING BOATS, polystyrene, disposable. A light paper-thin boat which can be shaped with the fingers to form a pouring funnel. Capacity approximately 20ml.

BGW-260-B	Weighing boats	Pack of 500 **£6·99**

WEIGHING BOTTLES, glass, tall form, with ground-in hollow blown stopper. Dimensions given are height × diameter.

BGW-310-030T	Weighing bottles, 40 × 20mm	Pack of 5 **£2·66**
BGW-310-050N	Weighing bottles, 50 × 25mm	Pack of 5 **£2·87**
BGW-310-070H	Weighing bottles, 60 × 30mm	Pack of 5 **£3·71**
BGW-310-090B	Weighing bottles, 80 × 40mm	Pack of 5 **£5·51**
BGW-310-110V	Weighing bottle, 100 × 50mm	Each **£2·14**

WEIGHING BOTTLES, glass, tall form, with flat cap. Bottle ground on outside below the rim. Dimensions given are height × diameter.

BGW-350-050Y	Weighing bottle, 50 × 25mm	**£0·82**
BGW-350-070C	Weighing bottle, 60 × 30mm	**£0·92**
BGW-350-090T	Weighing bottle, 80 × 40mm	**£2·15**



BGW-310



BGW-350

WEIGHING BOTTLES, glass, squat form, with ground-in hollow blown stopper. Dimensions given are height × diameter.

BGW-390-030J	Weighing bottle, 30 × 40mm	**£2·21**
BGW-390-050D	Weighing bottle, 30 × 50mm	**£2·64**
BGW-390-070U	Weighing bottle, 30 × 60mm	**£3·04**

WEIGHING BOTTLES, polystyrene, squat form with snap-on polystyrene cap. Useful for weighing deliquescent substances. Dimensions given are height × diameter. (F)

BGW-460-030W	Weighing bottles, 32 × 32mm	Pack of 20 **£1·73**
BGW-460-050Q	Weighing bottles, 41 × 51mm	Pack of 20 **£2·95**

WEIGHING SCOOP, glass, length 65mm

BGW-520-F	Weighing scoop	**£2·42**



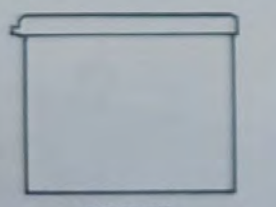
BGW-390

WEIGHING FUNNELS, glass, for use in the preparation of standard solutions for volumetric analysis. Solid material is weighed in the funnel, then transferred to a volumetric flask via the spout and washed down with solvent. Combines the functions of a weighing boat and funnel with improved convenience and accuracy.

Body length × diameter, mm	45 × 20	65 × 30
Overall length, mm	65	95
BGW-580-050R Weighing funnel, 45 × 20mm		**£0·70**
BGW-580-070L Weighing funnel, 65 × 30mm		**£1·21**

WEIGHING PIPETTE, Lunge-Rey, BS 2058, for weighing corrosive acids. With reservoir and two straight bore stopcocks, capacity approximately 5ml.

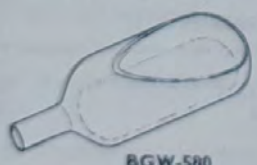
BGW-620-U	Weighing pipette	**£8·03**



BGW-460



BGW-520



BGW-580



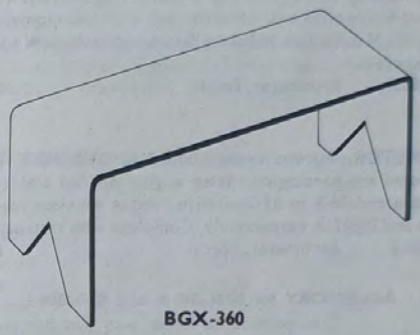
BGW-620



BGX-310



BGX-410

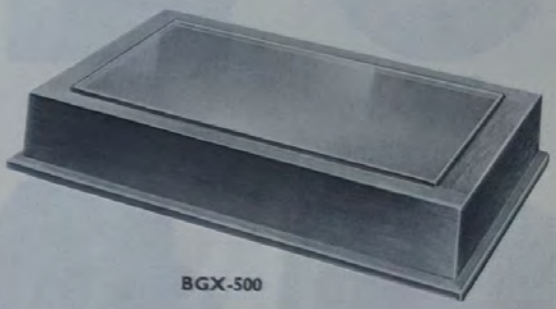


BGX-360

DESICCANT CAPSULE, silica gel, in perforated metal container. Suitable for use in balance cases and desiccator cabinets. Diameter 63mm, height 13mm.

BGX-310-S Desiccant capsule **£2·46**

Silica gel *See DES-710-L*



BGX-500

DENSITY STOOL, aluminium, for density determinations, using a beam balance with the pan and stirrup retained in position. Dimensions 130 × 50 × 50mm high.

BGX-360-G Density stool **£0·63**

BALANCE CASE, for 250g balances. Polished hardwood, fully glazed, with sidestop and release catch for front slide. Internal dimensions 370mm high × 405mm wide × 185mm deep, overall height approximately 400mm.

BGX-410-K Balance case **£25·31**

BALANCE PLATFORM, *GALLENKAMP*, bench mounting, to provide a working surface for balances and other sensitive instruments by damping virtually all vibration. The platform 450 × 300mm is enclosed in a polished wood case and has a flush top surface of laminated plastics sheet on a heavy cast metal plate which is suspended from a system of shock absorbers. With instructions. Overall dimensions 570 × 410 × 90mm high, mass 30kg.

BGX-500-J Balance platform **£81·56**



BGX-550

BALANCE TABLE, floor mounting, to provide a working surface for mounting analytical balances, galvanometers, optical levers and other vibration sensitive instruments. Comprises robust stone top, two stone side members, 80mm thick and drilled to accept a bracing bar, bracing bar washers, flanges and set of vibration absorbing rubber pads. With instructions for assembly. Overall height 760mm, working surface 900 × 760mm, net mass approximately 300kg.

BGX-550-U Balance table **£189·00**

BAROMETERS



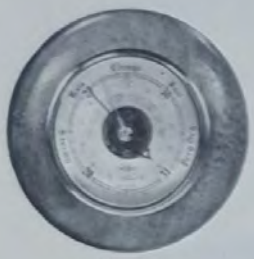
BHL-300



BHL-340



BHL-380



BHL-500



BHL-460



BHL-660



BHL-540

DESPATCH OF DIRECT READING AND FORTIN TYPE BAROMETERS

United Kingdom Destinations

The barometer will usually be delivered by our own transport or representative. Where this is not possible, customers will be advised in advance of our alternative delivery arrangements.

Overseas Destinations

Transportation of barometers by air is not recommended. We usually forward by sea transport and arrange for special cabin stowage. It is customers responsibility to arrange for collection from the point of discharge.

With regard to damage in transit and insurance, please refer to our Conditions of Sale.

BAROMETER, direct reading, mercury type, with compensated silvered metal scales 585 to 790 × 1 mm and 23 to 31 × 0·05 in. on metal reflector and with thermometer −10 to 50 × 1 °C. Mounted on polished hardwood backboard complete with instructions.

BHL-300-T Barometer, direct reading **£43·54**

BAROMETER, Fortin type, for school and college laboratories and for amateur meteorologists. Nominal 6 mm bore tube with silvered metal scales 660 to 810 × 1 mm and 26 to 32 × 0·05 in. having verniers reading to 0·05 mm and 0·002 in. respectively, on black enamelled frame with opal reflector and with thermometer −10 to 50 × 1 °C. Mounted on polished hardwood backboard complete with instructions.

BHL-340-X Barometer, Fortin **£110·06**

BAROMETER, Fortin type, similar to BHL-340-X but for professional meteorologists. With engine divided scales 675 to 820 × 1 mm and 26·5 to 32·5 × 0·05 in. having verniers reading to 0·05 mm and 0·002 in. respectively. Complete with instructions.

BHL-380-J Barometer, Fortin **£125·78**

ACCESSORY for BHL-340-X and BHL-380-J

Case, polished hardwood, with glass side panels and front opening door having lock and key.

BHL-400-502K Case **£41·12**

BAROMETER, aneroid, for use at up to 600 m above sea level. Open face, with 114 mm diameter dial having scales 935 to 1065 × 1 mb and 27·6 to 31·4 × 0·2 in. Mounted on plastics backboard approximately 140 mm square with hinged support. Can be placed on a pump plate under a bell jar, 150 mm diameter, such as BNX-340-010J to allow the action to be demonstrated.

BHL-460-P Barometer, aneroid **£18·17**

BAROMETER, aneroid, wall mounting. With 100 mm diameter dial having scales 940 to 1060 × 2 mb and 27·5 to 31·5 × 0·1 in. Mounted in polished hardwood frame 165 mm diameter.

BHL-500-D Barometer, aneroid **£10·13**

BAROMETER, aneroid, watch type with 45 mm diameter dial having compensated silvered metal scale 550 to 790 × 20 mm and rotatable altitude scale 0 to 3000 × 25 m. (F)

BHL-540-V Barometer, aneroid **£21·94**

BAROGRAPH, aneroid, giving a continuous record of pressures in the range 710 to 810 mm by a pen moving over a chart attached to a drum driven by a 7-day clockwork movement. Housed in metal case approximately 266 × 200 × 150 mm high having a glass front. With ink and 52 charts.

BHL-600-S Barograph **£103·13**

SPARE PARTS

BHL-620-010B Charts Pack of 52 **£1·09**

BAROTHERMOGRAPH, aneroid and bimetallic element, giving continuous records in two colours of pressures and temperatures in the ranges 950 to 1050 mb and 0 to 50 °C on a single chart attached to a drum driven by a 7-day clockwork movement. Housed in metal case approximately 260 × 125 × 190 mm high. With two bottles of ink and 52 charts.

BHL-660-W Barothermograph **£108·08**

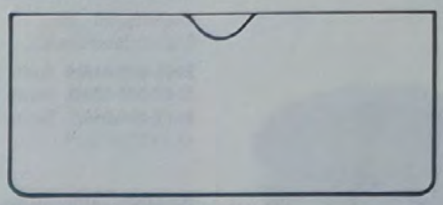
SPARE PARTS

BHL-680-010F Charts Pack of 52 **£1·63**

BASINS

GLASS BASINS

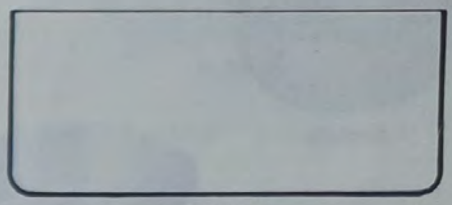
All capacities and dimensions quoted are nominal



BHT-300

BASIN, crystallising, borosilicate glass, flat bottom with spout, capacity 60ml, 50mm diameter × 33mm deep.

BHT-300-Y Basin, 60ml **£0·61**

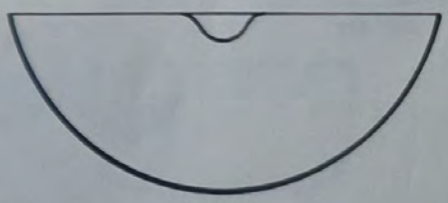


BHT-340

BASINS, crystallising, *PYREX* glass, flat bottom, without spout.

Capacity, ml	150	175	250	375
Diameter, mm	70	80	94	102
Depth, mm	50	40	50	50
Capacity, ml	650	1200	1850	2500
Diameter, mm	125	150	170	190
Depth, mm	65	75	90	100

BHT-340-010A	Basin, 150ml	**£0·51**
BHT-340-012T	Basins, 150ml	Pack of 24 **£9·66**
BHT-340-030R	Basin, 175ml	**£0·67**
BHT-340-032N	Basins, 175ml	Pack of 24 **£12·59**
BHT-340-050L	Basin, 250ml	**£0·63**
BHT-340-052H	Basins, 250ml	Pack of 18 **£9·09**
BHT-340-070F	Basin, 375ml	**£0·68**
BHT-340-072B	Basins, 375ml	Pack of 18 **£9·66**
BHT-340-090W	Basin, 650ml	**£0·91**
BHT-340-092S	Basins, 650ml	Pack of 12 **£9·09**
BHT-340-110T	Basin, 1200ml	**£1·20**
BHT-340-112P	Basins, 1200ml	Pack of 8 **£8·28**
BHT-340-130N	Basin, 1850ml	**£1·66**
BHT-340-132J	Basins, 1850ml	Pack of 8 **£12·08**
BHT-340-150H	Basin, 2500ml	**£1·97**
BHT-340-152D	Basins, 2500ml	Pack of 6 **£10·70**



BHT-370

BASINS, evaporating, *PYREX* glass, round bottom with spout.

Capacity, ml	40	75	100
Diameter, mm	65	78	90
Depth, mm	30	40	45

BHT-370-010C	Basin, 40ml	**£0·52**
BHT-370-012V	Basins, 40ml	Pack of 36 **£14·89**
BHT-370-030T	Basin, 75ml	**£0·63**
BHT-370-032P	Basins, 75ml	Pack of 36 **£18·29**
BHT-370-050N	Basin, 100ml	**£0·64**
BHT-370-052J	Basins, 100ml	Pack of 36 **£18·46**

BASINS, evaporating, *PYREX* glass, flattened bottom with spout.

Capacity, ml	25	100	150	200	350
Diameter, mm	60	80	90	105	125
Depth, mm	25	45	50	55	65

BHT-400-010U	Basin, 25ml	**£0·53**
BHT-400-012Q	Basins, 25ml	Pack of 36 **£15·47**
BHT-400-030X	Basin, 100ml	**£0·64**
BHT-400-032K	Basins, 100ml	Pack of 72 **£37·66**
BHT-400-050Y	Basin, 150ml	**£0·67**
BHT-400-052E	Basins, 150ml	Pack of 72 **£37·78**
BHT-400-070C	Basin, 200ml	**£0·69**
BHT-400-072V	Basins, 200ml	Pack of 48 **£26·39**
BHT-400-090T	Basin, 350ml	**£0·89**
BHT-400-092P	Basins, 350ml	Pack of 36 **£26·57**



BHT-400

Gallenkamp

METAL BASINS

All capacities and dimensions quoted are nominal



BHT-500



BHT-530



BHT-570



BHT-600



BHT-630



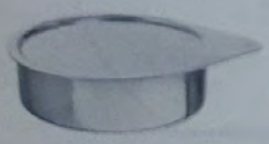
BHT-670



BHT-710



BHT-740



BHT-770

BASINS, aluminium, round bottom, with spout.

Capacity, ml	55	135	260	
Dia. × depth, mm	60 × 30	80 × 40	100 × 50	
BHT-500-010M	Basin, 55 ml			**£0·88**
BHT-500-030G	Basin, 135 ml			**£0·95**
BHT-500-050A	Basin, 260 ml			**£1·22**

BASINS, aluminium, flat bottom, with lid, for the determination of moisture in coal as specified in BS 1016 Part 1.

Capacity, ml	13	45	
Dia. × depth, mm	35 × 14	65 × 14	
BHT-530-010X	Basin, 13 ml		**£1·46**
BHT-530-030Y	Basin, 45 ml		**£1·52**

BASIN, nickel, flat bottom, capacity 100 ml, 75 mm diameter × 33 mm deep, with large spout.

BHT-570-M	Basin, 100 ml	**£4·50**

BASINS, nickel, flat bottom, without spout, for milk analysis, etc.

Capacity, ml	45	70	170	
Dia. × depth, mm	55 × 19	70 × 19	85 × 30	
BHT-600-010E	Basin, 45 ml			**£1·46**
BHT-600-030V	Basin, 70 ml			**£1·86**
BHT-600-050P	Basin, 170 ml			**£2·87**

BASINS, nickel, flat bottom, with drop-on cover with knob.

Capacity, ml	45	100	
Dia. × depth, mm	60 × 16	90 × 16	
BHT-630-010G	Basin, 45 ml		**£2·70**
BHT-630-030A	Basin, 100 ml		**£4·05**

BASINS, platinum, flat bottom, with spout.

Capacity, ml	35	50	100	
Diameter, mm	50	53	70	
Mass, approx. g	14	18	37	
BHT-670-010B	Basin, 35 ml			**£103·69**
BHT-670-030S	Basin, 50 ml			**£126·17**
BHT-670-050M	Basin, 100 ml			**£230·12**

BASINS, stainless steel, round bottom, with spout.

Capacity, ml	80	250	
Dia. × depth, mm	70 × 35	100 × 50	
BHT-710-010M	Basin, 80 ml		**£2·14**
BHT-710-050A	Basin, 250 ml		**£2·64**

BASIN, stainless steel, polished, for milk analysis. Flat bottom, capacity 55 ml, 70 mm diameter × 15 mm deep.

BHT-740-R	Basin, 55 ml	**£2·31**

BASIN, stainless steel, polished, for condensed milk analysis. Flat bottom, capacity 120 ml, 85 mm diameter × 22 mm deep, with drop-in lid and handle.

BHT-770-T	Basin, 120 ml	**£2·79**

PLASTICS BASINS

All capacities and dimensions quoted are nominal

BASINS, polypropylene, flat bottom, **without** spout.

Capacity, ml	200	700	1500	3000
Dia. × depth, mm	100 × 45	150 × 60	200 × 85	250 × 105

BHT-900-010D	Basins, 200 ml	Pack of 10 **£1·16**
BHT-900-030U	Basins, 700 ml	Pack of 10 **£2·18**
BHT-900-050X	Basins, 1500 ml	Pack of 10 **£3·34**
BHT-900-070Y	Basins, 3000 ml	Pack of 10 **£4·73**



BHT-900

BASIN, polypropylene, rectangular shape with tapered sides. Suitable for use as an instrument tray. Internal dimensions 300 × 250 × 50 mm deep. Capacity 3500 ml.

BHT-930-Y	Basin, 3500 ml	**£1·83**



BHT-930

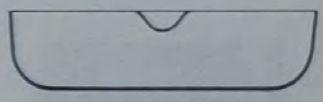
PORCELAIN BASINS

All capacities and dimensions quoted are nominal

BASINS, evaporating, porcelain, flat bottom, shallow form, with spout, glazed. (F)

Capacity, ml	20	45	60	100
Dia. × depth, mm	60 × 14	80 × 20	90 × 22	100 × 25
Capacity, ml	160	220	260	520
Dia. × depth, mm	105 × 30	120 × 32	130 × 30	160 × 40

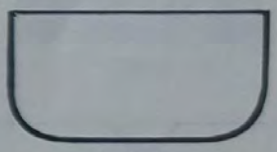
BHW-300-010V	Basin, 20 ml	**£0·57**
BHW-300-030P	Basin, 45 ml	**£0·82**
BHW-300-050J	Basin, 60 ml	**£1·04**
BHW-300-070D	Basin, 100 ml	**£1·11**
BHW-300-090U	Basin, 160 ml	**£1·24**
BHW-300-110R	Basin, 220 ml	**£1·53**
BHW-300-130L	Basin, 260 ml	**£1·91**
BHW-300-170W	Basin, 520 ml	**£2·25**



BHW-300

BASIN, evaporating (capsule), porcelain, flat bottom, deep form, **without** spout. Capacity 25 ml, 44 mm diameter × 23 mm deep, glazed inside and partly glazed outside. (F)

BHW-340-T	Basin, 25 ml	**£0·47**

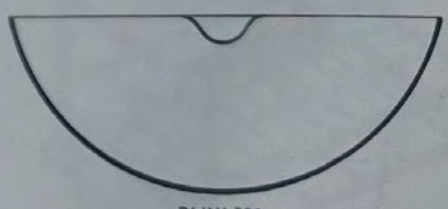


BHW-340

BASINS, evaporating, porcelain, round bottom, shallow form, with spout, glazed. (F)

Capacity, ml	35	50	75	95	115
Dia. × depth, mm	60 × 25	70 × 28	80 × 30	85 × 35	95 × 38
Capacity, ml	170	225	285	420	
Dia. × depth, mm	105 × 40	110 × 45	120 × 48	150 × 45	
Capacity, ml	580	1000	1225	2000	
Dia. × depth, mm	160 × 45	200 × 55	210 × 60	255 × 75	

BHW-380-010L	Basin, 35 ml	**£0·51**
BHW-380-030F	Basin, 50 ml	**£0·70**
BHW-380-050W	Basin, 75 ml	**£0·82**
BHW-380-070Q	Basin, 95 ml	**£0·86**
BHW-380-090K	Basin, 115 ml	**£1·00**
BHW-380-110H	Basin, 170 ml	**£1·35**
BHW-380-130B	Basin, 225 ml	**£1·40**
BHW-380-150S	Basin, 285 ml	**£1·77**
BHW-380-170M	Basin, 420 ml	**£2·25**
BHW-380-190G	Basin, 580 ml	**£2·59**
BHW-380-210D	Basin, 1000 ml	**£3·56**
BHW-380-230U	Basin, 1225 ml	**£4·05**
BHW-380-250X	Basin, 2000 ml	**£6·75**



BHW-380

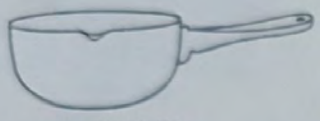


BHW-420

BASINS, evaporating, porcelain, round bottom, deep form, with spout, glazed. (F)

Capacity, ml	10	50	150	250
Dia. × depth, mm	40 × 20	70 × 34	97 × 50	110 × 52
Capacity, ml	350		700	900
Dia. × depth, mm	125 × 55		150 × 68	167 × 75

BHW-420-010W	Basin, 10ml	£0·60
BHW-420-030Q	Basin, 50ml	£1·01
BHW-420-070E	Basin, 150ml	£1·83
BHW-420-090V	Basin, 250ml	£2·13
BHW-420-110S	Basin, 350ml	£2·39
BHW-420-150G	Basin, 700ml	£3·09
BHW-420-170A	Basin, 900ml	£3·83

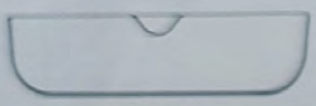


BHW-460

BASINS (casseroles), porcelain, with handle and spout, glazed except rim. (F)

Capacity, ml	120	155	225	450	800
Diameter, mm	75	85	95	115	135
Depth, mm	45	45	50	65	80

BHW-460-010R	Basin, 120ml	£1·01
BHW-460-030L	Basin, 155ml	£1·46
BHW-460-050F	Basin, 225ml	£1·70
BHW-460-070W	Basin, 450ml	£2·70
BHW-460-110N	Basin, 800ml	£3·83



BHW-700

SILICA BASINS

All capacities and dimensions quoted are nominal

BASINS, evaporating, silica, translucent, flat bottom, shallow form, with spout, glazed.

Capacity, ml	20	25	60	75	125
Diameter, mm	69	78	94	100	130
Depth, mm	15	15	24	20	23

BHW-700-010M	Basin, 20ml	£2·68
BHW-700-030G	Basin, 25ml	£2·81
BHW-700-050A	Basin, 60ml	£3·16
BHW-700-070R	Basin, 75ml	£3·44
BHW-700-090L	Basin, 125ml	£4·75



BHW-730

BASINS, evaporating, silica, translucent, round bottom, shallow form, with spout, glazed.

Capacity, ml	20	45	70	100	200
Diameter, mm	55	75	87	100	113
Depth, mm	23	27	33	38	47

BHW-730-010X	Basin, 20ml	£2·33
BHW-730-030Y	Basin, 45ml	£2·68
BHW-730-050C	Basin, 70ml	£2·81
BHW-730-070T	Basin, 100ml	£3·77
BHW-730-090N	Basin, 200ml	£4·37



BHW-760

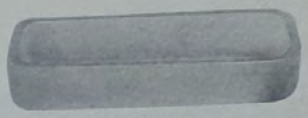
BASINS, evaporating, silica, translucent, round bottom, deep form, with spout, glazed inside only.

Capacity, ml	400	500
Dia. × depth, mm	142 × 62	142 × 66

BHW-760-010G	Basin, 400ml	£8·99
BHW-760-030K	Basin, 500ml	£9·60

BASIN (ignition capsule), silica, translucent, rectangular shallow form, capacity 35ml, 52 × 42 × 18mm deep, glazed.

BHW-800-H	Basin, 35ml	£2·33



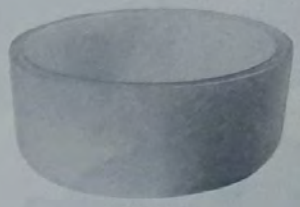
BHW-800

BASINS (ignition capsules), silica, translucent, circular, shallow form, glazed.

Capacity, ml	10	15	20	50
Dia. × depth, mm	39 × 15	48 × 15	54 × 15	78 × 18
BHW-830-010G	Basin, 10ml			£1·47
BHW-830-030A	Basin, 15ml			£1·47
BHW-830-050R	Basin, 20ml			£1·99
BHW-830-070L	Basin, 50ml			£2·81

BASINS (ignition capsules), silica, translucent, circular, deep form, glazed.

Capacity, ml	45	80	100
Dia. × depth, mm	56 × 28	75 × 28	87 × 28
BHW-860-010Y	Basin, 45ml		£2·81
BHW-860-030C	Basin, 80ml		£3·44
BHW-860-050T	Basin, 100ml		£3·90



BHW-860

BASKETS

BASKET, test tube, cylindrical, nylon coated metal wire with handle. Diameter × depth 180 × 160mm. (F)

BIR-300-R	Basket	£3·54

BASKETS, test tube, cubical, nylon coated metal wire.

BIR-340-010J	Basket, 100mm cube	£2·52
BIR-340-030D	Basket, 150mm cube	£3·11
BIR-340-050U	Basket, 200mm cube	£5·04



BIR-300



BIR-340

TEST TUBE RACKS

Nylon coated steel wire

- **Suitable for steam sterilisation up to 120°C**
- **Range of sizes and capacities suitable for test tubes from 10 to 21 mm diameter**



See STK-640

Other test tube racks See STK-440 et seq.

BATHS

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BJE-200



BJE-400



BJE-440



BJE-500

SINGLE PLACE CIRCULAR WATER BATHS

For use on electric hotplate or on tripod stand with gas burner

WATER BATH, aluminium, 125mm diameter × 90mm deep, with two handles and set of aluminium rings.

BJE-200-G Water bath **£2·96**

WATER BATH, anodised aluminium, 200mm diameter × 115mm deep, with two heat resisting plastics handles and set of aluminium rings.

BJE-250-R Water bath **£5·63**

ACCESSORY for BJE-250-R

BJE-270-504V Tripod stand, with positioning rim **£4·16**

SINGLE PLACE CIRCULAR WATER BATHS

With built-in electric heating

WATER BATH, *GALLENKAMP*, anodised aluminium, 200mm diameter × 115mm deep, with integral constant level device, set of aluminium rings, heat resisting plastics feet and 1kW heater which incorporates an overheat protection device. With connector and 3-core cable. For 220–240V a.c. single phase supplies.

BJE-400-N Water bath **£16·65**

SPARE PART

Heating element, with connector and cable. For 220–240V a.c. supplies.

BJE-420-010T Heating element **£4·95**

WATER BATH, *GALLENKAMP*, cast aluminium alloy with stove enamelled exterior, 200mm diameter × 145mm deep, integral constant level device, set of stainless steel rings and 750W heater which incorporates an overheat protection device. With connector and 3-core cable. For 220–240V a.c. single phase supplies.

BJE-440-Y Water bath **£34·88**

SPARE PARTS

Heating element *See BJE-670-010X*

Set of rings *See BJE-970*

WATER BATH, *GALLENKAMP*, stainless steel, 250mm diameter × 150mm deep × 180mm overall height, with integral constant level device, set of stainless steel rings and 1kW heater which incorporates an overheat protection device. With connector and 3-core cable. For 220–240V a.c. single phase supplies.

BJE-500-F Water bath **£59·06**

SPARE PART

Heating element *See BJE-420-010T*

MULTIPLE PLACE RECTANGULAR WATER BATHS

With built-in electric heating

WATER BATH, *GALLENKAMP,* **5-place,** stove enamelled aluminium alloy, 270 × 200 × 100 mm deep, with integral constant level device and 750 W heater which incorporates an overheat protection device. Stainless steel cover has two circular holes of 53 mm and one each of 69, 85 and 101 mm diameter, each fitted with a set of stainless steel rings. With connector and 3-core cable. For a.c. single phase supplies.

BJE-650-010F	Water bath, 220–240 V	**£37·13**
BJE-650-030W	Water bath, 110–120 V	**£37·13**



BJE-650

SPARE PARTS

	Heating elements, with connector and cable. For a.c. supplies.	
BJE-670-010X	Heating element, 220–240 V	**£7·20**
BJE-670-030Y	Heating element, 110–120 V	**£7·20**
	Set of rings	*See BJE-970*

WATER BATH, *GALLENKAMP,* **6-place,** aluminium, 410 × 270 × 100 mm deep, with integral constant level device and 1 kW heater which incorporates an overheat protection device. Removable cover has six 85 mm diameter holes each fitted with a set of aluminium rings. With connector and 3-core cable. For 220–240 V a.c. single phase supplies.

BJE-750-A	Water bath	**£20·81**

SPARE PARTS

Heating element	*See BJE-420-010T*



BJE-750

WATER BATH, *GALLENKAMP,* **6-place,** stainless steel, 330 × 230 × 100 mm deep, with integral constant level device and 750 W heater which incorporates an overheat protection device. Removable cover has six 85 mm diameter holes each fitted with a set of stainless steel rings. With connector and 3-core cable. For a.c. single phase supplies.

BJE-800-010B	Water bath, 220–240 V	**£49·50**
BJE-800-030S	Water bath, 110–120 V	**£49·50**

SPARE PARTS

Heating element, 220–240 V	*See BJE-670-010X*
Heating element, 110–120 V	*See BJE-670-030Y*
Set of rings	*See BJE-970*

WATER BATH, *GALLENKAMP,* **12-place,** stainless steel, 460 × 300 × 100 mm deep, with integral constant level device and 1·5 kW heater which incorporates an overheat protection device. Removable cover has twelve 85 mm diameter holes each fitted with a set of stainless steel rings. With connector and 3-core cable. For a.c. single phase supplies.

BJE-900-010Q	Water bath, 220–240 V	**£65·25**
BJE-900-030K	Water bath, 110–120 V	**£65·25**

SPARE PARTS

	Heating elements, with connector and cable. For a.c. supplies.	
BJE-920-010C	Heating element, 220–240 V	**£12·60**
BJE-920-030T	Heating element, 110–120 V	**£12·60**
	Set of rings	*See BJE-970*



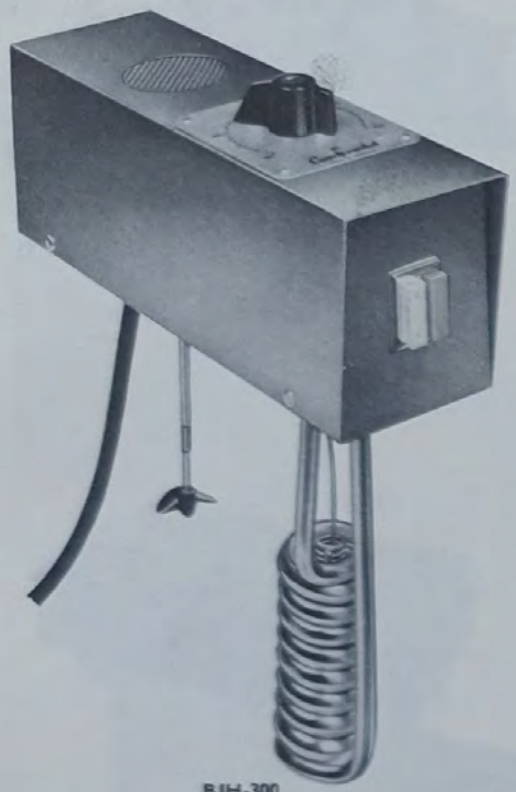
BJE-800
BJE-900 is similar in design

SPARE RINGS for BJE-440, BJE-650, BJE-800 and BJE-900

	Water bath rings, *GALLENKAMP.* BJE-970-030H is a central cover with a knob. Dimensions given for other sizes are internal × external diameter.	
BJE-970-030H	Ring, central, 51 mm diameter	**£0·35**
BJE-970-050B	Ring, 38 × 66 mm	**£0·35**
BJE-970-070S	Ring, 53 × 82 mm	**£0·41**
BJE-970-090M	Ring, 69 × 99 mm	**£0·45**
BJE-970-110J	Ring, 85 × 115 mm	**£0·57**
BJE-970-130D	Ring, 101 × 133 mm	**£0·57**
BJE-970-150U	Ring, 119 × 151 mm	**£0·83**
BJE-970-170X	Ring, 131 × 171 mm	**£0·92**

Gallenkamp THERMO STIRRERS

For converting suitable tanks into temperature controlled water baths. Both models incorporate heaters, thermostats and efficient stirrers which can be converted into pumps for the external circulation of water at controlled temperatures



BJH-300

- **Temperature range from ambient plus 5°C to 100°C**
- **Quiet and reliable operation**
- **Suitable for a wide range of water bath sizes**
- **Direct reading thermostats**

THERMO STIRRER I

- **COMPENSTAT temperature controller**
- **Stainless steel outer case**
- **1·5 kW sheathed immersion heater**

PERFORMANCE

The powerful stirrer and heater combine with the sensitive COMPENSTAT controller to provide good performance to even the simplest bath. For example, glass tanks filled with liquid can be controlled over a wide range of temperature with a fluctuation of ±0·4°C or less and a variation of 0·3°C or less in the working space.

Technical data

Power rating, maximum	1·5 kW				
Minimum essential depth of bath	180 mm				
Clearance between underside of case and liquid level	15 mm (minimum) to 50 mm (maximum)				
	Length		Width		Depth
Dimensions of case	280	×	80	×	120 mm
Overall dimensions	280	×	80	×	300 mm
Mass	3 kg				

OPERATION

Can be mounted on a filled water bath by means of either the retort rod mount or the adjustable clamp accessory. The required temperature is set on the COMPENSTAT scale, the mains supply is switched on and the THERMO STIRRER agitates the bath liquid continuously and heats it to the control temperature. An indicator lamp shows operation of the heater. An accessory pump, which can be mounted on the motor drive shaft, is available for circulating water to external apparatus.

BATH DESIGN

For optimum performance, the following points are relevant when selecting the bath:

(*a*) The bath should be regular in shape with comparable length, width and depth.

(*b*) It should be large enough to allow free circulation of the bath liquid around the load. In this connection, it is often useful to incorporate a 'false floor'.

(*c*) For use above 50°C, it should be insulated and fitted with a cover to reduce evaporation losses.

(*d*) For operation at or near ambient temperature, a cooling coil should be used.

THERMO STIRRER I, *GALLENKAMP*, as specified, with COMPENSTAT temperature controller, motor driven stirrer and sheathed heater but **without** retort rod mount or adjustable clamp. For single phase supplies.

BJH-300-010L	Thermo Stirrer, 220–240 V 50 Hz	**£78·75**
BJH-300-030F	Thermo Stirrer, 110–120 V 60 Hz	**£79·88**

ACCESSORIES

Retort rod mount, to enable the THERMO STIRRER to be mounted on a retort stand or scaffold by means of a bosshead.

BJH-320-502W Retort rod mount **£2·14**

Clamp, to enable the THERMO STIRRER to be mounted on the rim of a bath. Adjustable for bath wall thickness of 5 to 30 mm

BJH-320-510A Clamp **£3·21**

Constant level device, for clamping to bath.

BJH-320-522Q Constant level device **£9·56**

Pump, for circulating water from the bath to external apparatus. Fits to stirrer motor drive shaft. Maximum flow 4 litres/min at zero head, maximum head 600 mm. With nozzles for 10 mm bore flexible tubing and instructions.

BJH-320-528E Pump **£1·74**

Tanks *See TAJ-200*

THERMO STIRRER 2

- **Temperature controlled by contact thermometer and solid state relay**
- **Stainless steel outer case**
- **1kW sheathed immersion heater**

PERFORMANCE

Will provide high performance in simple baths. For example, a glass tank filled with liquid can be controlled from ambient to 90°C with a fluctuation of ±0·05°C or less and a temperature variation of 0·3°C or less. Long term stability is excellent.

Technical data

Power rating, maximum	1kW			
Minimum essential depth of bath	160mm			
Clearance between underside of case and water level	30mm (minimum) to 70mm (maximum)			
	Length		Width	Depth
Overall dimensions, without contact thermometer	210	×	120	× 260mm
Overall dimensions, with contact thermometer fitted	210	×	120	× 330mm
Mass	2kg			

OPERATION

Can be mounted on a filled water bath using the retort rod mount accessory. The required temperature is set on the contact thermometer and a choice of three heater powers and switching modes is provided to allow adjustment for minimum temperature fluctuation. The three settings are:

(i) Full power switched on and off by the contact thermometer and relay.
(ii) Half power switched on and off by the contact thermometer and relay.
(iii) Half power on continuously and the other half switched on and off by the contact thermometer and relay.

An indicator lamp shows operation of the heater. An accessory pump, which can be mounted on the motor drive shaft, is available for circulating water to external apparatus.

BATH DESIGN

For optimum performance, the points regarding bath design for THERMO STIRRER 1 are also applicable.

THERMO STIRRER 2, *GALLENKAMP*, as specified, with contact thermometer 0 to 100°C, solid state electronic relay, motor driven stirrer, sheathed heater and instructions but **without** retort rod mount. For single phase supplies.

BJH-400-010D	Thermo Stirrer, 220–240V 50Hz	£108·00
BJH-400-030U	Thermo Stirrer, 110–120V 60Hz	£109·13

SPARE PARTS

BJH-420-070R	Contact thermometer, with instructions	£27·23

ACCESSORIES

BJH-420-504K	Cooling coil, with fixing plate	£9·34
	NOTE: This accessory increases the minimum essential depth of the bath to 200mm.	
	Retort rod mount	See *BJH-320-502W*
	Constant level device	See *BJH-320-522Q*
	Pump, for circulating water to external apparatus	See *BJH-320-528E*
	Tanks, PYREX glass	See *TAJ-200*



BJH-400 with cooling coil and pump

Gallenkamp WATER BATH

20 LITRES CAPACITY

An inexpensive stainless steel bath with accessory thermocontroller module

- High quality stainless steel seamless tank
- Rounded inner corners for ease of cleaning
- One-piece outer case
- Clip-on thermocontroller module accessory
- Temperature range 5°C above ambient to 80°C
- Temperature fluctuation less than ±0·2°C



BJL-220 with BJL-250

Technical data

Temperature range 5°C above ambient to 80°C

For operation above 50°C, a floating lid of insulating spheres BKA-390-K should be used to minimise evaporation and heat losses.

Temperature fluctuation when fitted with BJL-250 ±0·2°C

Temperature variation when fitted with BJL-250 0·2°C

Power rating, maximum 1 kW

	Length		Width		Depth
Internal dimensions of bath	500	×	295	×	150 mm
Overall dimensions of bath	530	×	325	×	190 mm
Internal dimensions of bath when fitted with BJL-250	450	×	295	×	150 mm
Overall dimensions of bath when fitted with BJL-250	565	×	325	×	265 mm

WATER BATH

A polished, seamless stainless steel tank with rounded corners is mounted in a glass reinforced plastics outer case from which it may be removed for emptying or cleaning. An air space between the tank and the outer case provides thermal insulation.

THERMOCONTROLLER

Comprises a control box with an integral metal sheathed heater, direct reading hydraulic thermostat and mains and heater indicator lamps. The control box clips over one end of the bath with the heater resting on the floor of the inner tank.

TEST TUBE RACKS

Will accommodate up to 5 racks BKA-360 which may be stood directly astride the heater.

WATER BATH, *GALLENKAMP*, 20 litres capacity, as specified. With polished, seamless stainless steel inner tank having rounded corners, mounted in glass reinforced plastics outer case. **Without** thermocontroller.

BJL-220-X Water bath **£23·96**

THERMOCONTROLLER, *GALLENKAMP*, as specified, comprising control box, metal sheathed heater, direct reading hydraulic thermostat, mains and heater indicator lamps, clip for fitting over the end of the bath and instructions. For a.c. single phase supplies.

BJL-250-010N Thermocontroller, 220–240 V **£36·00**

BJL-250-030H Thermocontroller, 110–120 V **£39·38**

ACCESSORIES

Insulating spheres (3 packs required) *See BKA-390-K*

Test tube racks *See BKA-360*

NOTE: Thermo Stirrer BJH-400 can be used with BJL-220-K and is recommended when the bath is to be heavily loaded.

Griffin STUDENT WATER BATH

13·5 LITRES CAPACITY

An economical and reliable bath especially suitable for student use



BJL-420

- **Corrosion resistant polypropylene inner tank**
- **Sensitive hydraulic thermostat**
- **Temperature range 5°C above ambient to 80°C**
- **Range extended to 100°C by the use of insulating spheres**
- **Fluctuation ±1°C**
- **Thermal fuse overheat protection**

Technical data

Temperature range	5°C above ambient to 80°C				
For operation above 50°C, it is advisable to fit a constant level device BJL-440-502G to compensate for evaporation losses and a floating lid of insulating spheres BKA-390-K should be used to minimise these losses.					
Temperature fluctuation	±1°C				
Power rating, maximum	1kW				
	Length		Width		Depth
Working space	362	×	300	×	127mm
Overall dimensions	387	×	325	×	227mm
Mass	5·6kg				

CONSTRUCTION

A polypropylene inner tank, fitted with a 1kW heater and a thermostat, is mounted in a stove enamelled steel outer case. The thermostat sensor and heating element are mounted below a perforated stainless steel tray so that the volume of water may be varied to give the desired working depth. They are clipped together to ensure optimum control and to provide greater protection in the event of the water level falling below the safe minimum.

CONTROLS

Comprise a temperature selector, calibrated 20 to 100°C, combined mains switch and indicator lamp and separate indicator lamp to show operation of the heater.

TEST TUBE RACKS

Will accommodate up to 5 racks BKA-360.

WATER BATH, *GRIFFIN* **Student,** 13·5 litres capacity, as specified, with hydraulic thermostat, thermal fuse and instructions. For 220–240V a.c. single phase supplies.

BJL-420-V	Water bath	**£57·20**

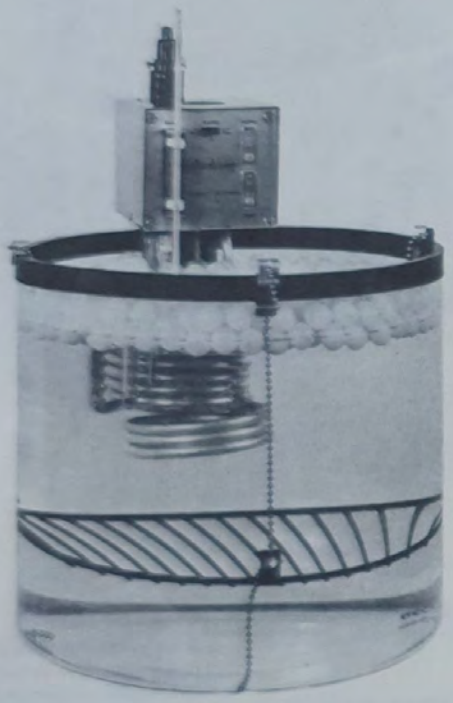
ACCESSORIES

BJL-440-502G	Constant level device	**£12·21**
	Insulating spheres	*See BKA-390-K*
	Test tube racks	*See BKA-360*

Gallenkamp THERMOSTATIC WATER BATH

20 LITRES CAPACITY

- Borosilicate glass tank
- Maximum temperature 90°C
- Internal depth 300mm
- Control by THERMO STIRRER with contact thermometer and solid state relay
- Vigorous agitation without vortexing
- Accessories include adjustable shelf, scaffold rod fixings, equipment for viscometry and circulating pump



BJP-350

Technical data

Temperature range	Ambient to 90°C

For operation above 50°C, a floating lid of spheres BKA-390-K should be used.

For use at or near to ambient temperature, cooling coil BJH-420-504K should be fitted and connected to a cold water supply.

Temperature fluctuation	±0·05°C
Temperature variation	0·1°C
Internal dimensions of tank	340mm diameter x 300mm deep
Overall dimensions (with THERMO STIRRER and contact thermometer fitted)	500mm high x 420mm wide x 430mm deep

CONSTRUCTION

The water bath is an assembly comprising:

BJP-370-010U	Borosilicate glass tank with rubber covered rim.
BJH-400	THERMO STIRRER with contact thermometer 0 to 100°C, solid state relay, sheathed heater, three-heat switch and motor driven stirrer.

WATER BATH, *GALLENKAMP*, 20 litres capacity, comprising glass tank and THERMO STIRRER, as specified. For single phase supplies.

BJP-350-010L	Water bath, 220–240V 50Hz	**£184·50**
BJP-350-030F	Water bath, 110–120V 60Hz	**£185·63**

SPARE PARTS

BJP-370-010U	Tank, with rubber covered rim	**£76·50**
	Contact thermometer	*See BJH-420-070R*

ACCESSORIES

Adjustable shelf, plastics coated metal wire, with three ball chains and fittings.

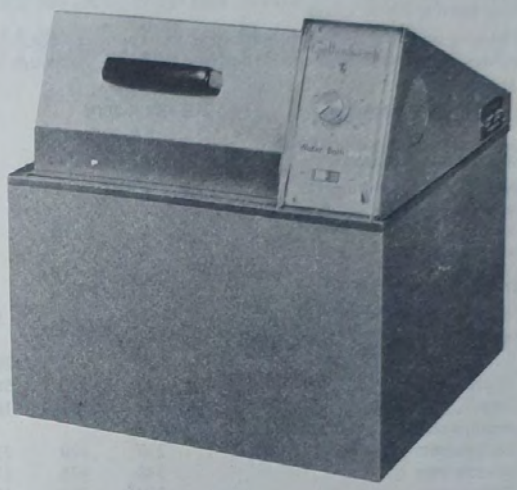
BJP-370-506X	Adjustable shelf	**£11·93**
	Cooling coil	*See BJH-420-504K*
	Insulating spheres (2 packs required)	*See BKA-390-K*
	Pump, for circulating water to external apparatus	*See BJH-320-528E*
	Retort rod mount	*See BJH-320-502W*
	Thermometer, BS 1704, GP 105C/0.5/100	*See THM-300-090T*

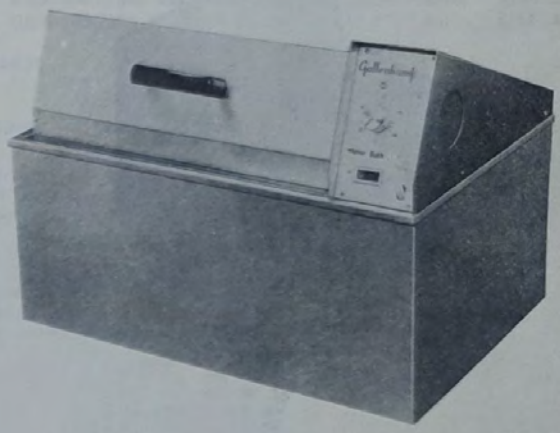
BJP-350 with accessories and spheres BKA-390

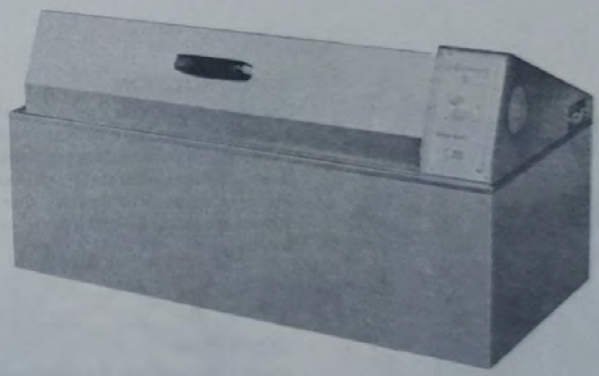
Gallenkamp MODULAR WATER BATHS

12, 20 AND 30 LITRES CAPACITIES

A range of three baths with alternative control options and incorporating many innovations for improved convenience in use

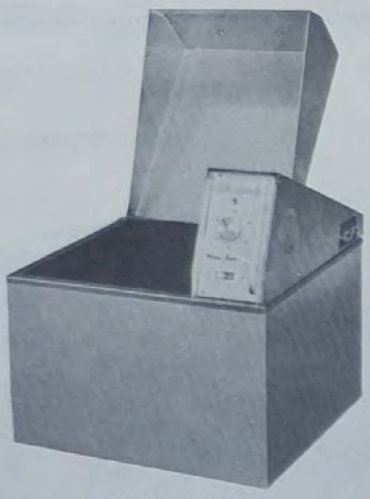






- Maximum temperature 100°C
- Controls mounted in a compact module above one end of bath
- Two control options:
  Hydraulic thermostat – for moderate precision at an economic price
  Solid state thermostat – for highest precision. Includes thermal safety cutout for additional security
- Thermometer standard on all models
- Clear, hinged plastics cover protects control settings against accidental alteration
- Long life, stainless steel bath
- High efficiency fibreglass thermal insulation for operating economy
- Fitted drain cock for easy emptying
- Gabled cover available, attached by drop-in hinges
- Other accessories include:
  Cooling coil, for working near to or below ambient temperature
  Pump, for circulating water to external, water jacketed temperature controlled apparatus such as fermenters, polarimeters, refractometers, etc.
  Constant level device
  Test tube racks

Gallenkamp MODULAR WATER BATHS



BKA-200 with cover

Technical data

Temperature range	
Without cover	Ambient to 50°C
With cover	Ambient to 100°C

For use near to or just below ambient temperature, cooling coil BKA-340 should be fitted and connected to a cold water supply.

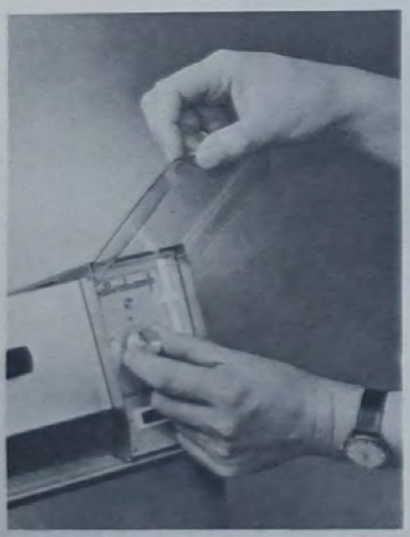
For operation above 50°C, a gabled cover BKA-340 or a floating lid of insulating spheres BKA-390-K should be used to minimise evaporation and heat losses.

For long term work, especially at higher temperatures, constant level device BKA-340-502V should be fitted to replace water lost by evaporation.

Temperature fluctuation	±0·2°C (BKA-200) ±0·1°C (BKA-300)
Temperature variation	0·1°C
Power rating, maximum	1·5kW

DIMENSIONS

Working volume, litres	12	20	30
Working space			
Length, mm	290	290	290
Width, mm	230	375	580
Depth, mm	160	160	160
Overall, excluding drain cock			
Length, mm	320	320	320
Width, mm	340	485	690
Depth, mm	350	350	350



Control panel showing hinged cover

CONSTRUCTION

The bath is of stainless steel with welded seams and is fitted in a stove enamelled outer case with the interspace packed with glass fibre insulation. A powerful stirrer drives the bath liquid through a duct formed by a stainless steel false floor and uniformly back across the working space. The heater, thermostat, sensing elements and stirrer are all suspended from a control bridge over one end of the bath.

CONTROLS

Models are available fitted with either hydraulic thermostat or COMPENSTAT solid state thermostat, each being directly calibrated. All models have a combined mains switch and indicator lamp, heater indicator lamp and a built-in thermometer. In addition, the COMPENSTAT controlled model has a fixed temperature, manually reset safety cutout. On both models, a transparent hinged plastics cover over the control panel protects the thermometer from breakage and the control settings from accidental alteration.

TEST TUBE RACKS

No. of test tube racks BKA-360 which can be accommodated:

12 litre bath – 3 racks
20 litre bath – 5 racks
30 litre bath – 8 racks

INSULATING SPHERES

To cover the working space with a single layer, the following quantities of spheres BKA-390-K are required:

12 litre bath – 3 packs
20 litre bath – 5 packs
30 litre bath – 8 packs

Gallenkamp MODULAR WATER BATHS

WATER BATHS, *GALLENKAMP*, stainless steel interior, as specified. With direct reading hydraulic thermostat, sheathed heater, combined mains switch and indicator lamp, heater indicator lamp, motor driven stirrer, built-in thermometer and stainless steel false floor. For single phase supplies.

BKA-200-010J	Water bath, 12 litre, 220–240V 50Hz	**£102·38**
BKA-200-030D	Water bath, 12 litre, 110–120V 60Hz	**£103·50**
BKA-200-110F	Water bath, 20 litre, 220–240V 50Hz	**£112·50**
BKA-200-130W	Water bath, 20 litre, 110–120V 60Hz	**£113·63**
BKA-200-210B	Water bath, 30 litre, 220–240V 50Hz	**£128·25**
BKA-200-230S	Water bath, 30 litre, 110–120V 60Hz	**£129·38**

WATER BATHS, *GALLENKAMP*, stainless steel interior, as specified. With direct reading COMPENSTAT solid state thermostat, safety cutout, sheathed heater, combined mains switch and indicator lamp, heater indicator lamp, motor driven stirrer, built-in thermometer and stainless steel false floor. For single phase supplies.

BKA-300-010B	Water bath, 12 litre, 220–240V 50Hz	**£128·25**
BKA-300-030S	Water bath, 12 litre, 110–120V 60Hz	**£130·50**
BKA-300-110U	Water bath, 20 litre, 220–240V 50Hz	**£141·75**
BKA-300-130X	Water bath, 20 litre, 110–120V 60Hz	**£144·00**
BKA-300-210Q	Water bath, 30 litre, 220–240V 50Hz	**£154·13**
BKA-300-230K	Water bath, 30 litre, 110–120V 60Hz	**£156·38**

SPARE PARTS

BKA-340-010T	Thermometer	**£3·09**

ACCESSORIES

BKA-340-502V	Constant level device	**£12·94**
	Cooling coils, for operation of bath near to or just below ambient temperature. Clip to bath rim. With nozzles for connection to cold water supply using 8mm bore flexible tubing.	
BKA-340-512S	Cooling coil, 12 litre bath	**£12·94**
BKA-340-518G	Cooling coil, 20 litre bath	**£15·75**
BKA-340-524L	Cooling coil, 30 litre bath	**£20·81**
	Covers, stainless steel, gabled to direct condensation to sides of bath. Must be used for operation above 50°C.	
BKA-340-540N	Cover, 12 litre bath	**£15·19**
BKA-340-548U	Cover, 20 litre bath	**£18·00**
BKA-340-556V	Cover, 30 litre bath	**£26·44**
	Water pump	*See BJH-320-528E*



BKA-360-150



BKA-360-270

TEST TUBE RACKS, stainless steel. Supplied in kit form. Spacers are provided to enable the top plate to be set at heights of 40, 60 or 80mm above the base plate. Overall dimensions of each rack when assembled 270 × 70 × 130mm high.

No. of holes	16	18	26	36
For tube diameter, mm	25	19	16	12

BKA-360-030W	Test tube rack, 16 hole	**£5·29**
BKA-360-070K	Test tube rack, 18 hole	**£5·29**
BKA-360-110B	Test tube rack, 26 hole	**£5·29**
BKA-360-150M	Test tube rack, 36 hole	**£5·29**

TEST TUBE RACK, stainless steel, as BKA-360-150M but supplied assembled and with a shelf which can be raised or lowered to allow the immersion depth of the tubes to be varied. The distance between the top plate and the shelf can be adjusted from 35 to 60mm. With 36 holes for 12mm diameter tubes.

BKA-360-270C Test tube rack **£10·00**

INSULATING SPHERES, polyolefin, 20mm diameter. Used as a floating lid to minimise evaporation and heat losses. (F)

BKA-390-K Insulating spheres Pack of 200 **£3·49**

Gallenkamp GENERAL PURPOSE WATER BATH

15 LITRES CAPACITY

- Stainless steel interior
- Stove enamelled outer case
- High efficiency glass fibre insulation
- Maximum temperature 100°C
- COMPENSTAT solid state temperature controller
- Sheathed heater outside working space
- Accessories include test tube racks, gabled cover, adjustable shelf and cooling coil



BKM-250 with cover

Technical data

Temperature range	
Without cover	Ambient to 50°C
With cover	Ambient to 100°C

For operation near to or just below ambient temperature, cooling coil BKM-270-502D should be fitted and connected to a cold water supply.

Temperature fluctuation	±0·05°C
Temperature variation	0·1°C
Power rating, maximum	500 W

	Length	Width	Depth
Working space	350	300	160 mm
Overall dimensions	500	400	220 mm

CONTROLS

Grouped in a compartment at one end of the bath, these comprise a mains switch, heater indicator lamp and COMPENSTAT solid state direct reading thermostat, scaled 20 to 100 x 5°C.

TEST TUBE RACKS

Will accommodate up to 5 racks BKA-360

WATER BATH, *GALLENKAMP,* 15 litres capacity, stainless steel interior, as specified. With direct reading COMPENSTAT solid state temperature controller, metal sheathed heater, mains switch, heater indicator lamp and instructions. For a.c. single phase supplies.

BKM-250-010P	Water bath, 220–240V	**£151·88**
BKM-250-030J	Water bath, 110–120V	**£151·88**

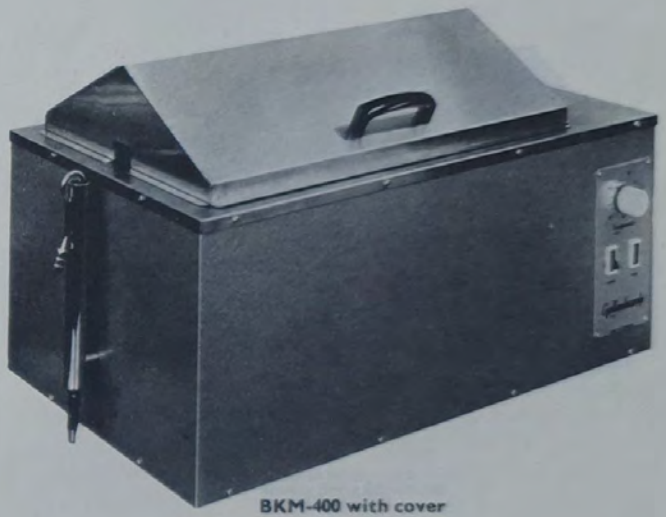
ACCESSORIES

	Cooling coil, for operation of bath near to or just below ambient temperature. Clips to side of bath. With nozzles for connection to cold water supply using 8mm bore flexible tubing.	
BKM-270-502D	Cooling coil	**£22·67**
	Cover, stainless steel, gabled to direct condensation to sides of bath. Must be used for operation of bath above 50°C.	
BKM-270-514T	Cover	**£24·19**
BKM-270-526M	Shelf, adjustable	**£16·09**
	Thermometer holder, stainless steel. Clips to side of bath.	
BKM-270-538F	Thermometer holder	**£2·48**
	Insulating spheres (2 packs required)	*See BKA-390-K*
	Test tube racks	*See BKA-360*
	Thermometer, 0 to 110°C	*See THE-490-030W*

Gallenkamp GENERAL PURPOSE WATER BATH

30 LITRES CAPACITY

- Stainless steel interior
- Stove enamelled outer case
- High efficiency glass fibre insulation
- Maximum temperature 100°C
- COMPENSTAT solid state temperature controller
- Fitted shelf adjustable for height
- Sheathed heater mounted below perforated shelf
- Accessories include test tube racks, gabled cover, cooling coil and constant level



BKM-400 with cover and constant level

Technical data

Temperature range	
Without cover	Ambient to 50°C
With cover	Ambient to 100°C

For operation near to or just below ambient temperature, cooling coil BKM-420-516L should be fitted and connected to a cold water supply.

Temperature fluctuation	±0·15°C
Temperature variation	0·1°C
Power rating, maximum	1·5kW

	Length	Width	Depth
Working space	430	300	200mm
Overall dimensions	640	410	270mm

CONTROLS

Grouped in a compartment at one end of the bath, the controls include a mains switch, heater indicator lamp and COMPENSTAT solid state direct reading thermostat, scaled 0 to 100 × 5°C.

TEST TUBE RACKS

Will accommodate up to 6 racks BKA-360.

WATER BATH, *GALLENKAMP*, 30 litres capacity, stainless steel interior, as specified. With direct reading COMPENSTAT solid state temperature controller, metal sheathed heater, adjustable perforated shelf, mains switch, heater indicator lamp and instructions. For a.c. single phase supplies.

BKM-400-010L	Water bath, 220–240V	**£205·88**
BKM-400-030F	Water bath, 110–120V	**£217·13**

ACCESSORIES

BKM-420-504S	Constant level device Cooling coil, for operation of bath near to or just below ambient temperature. Fixes to side of bath. With nozzles for connection to cold water supply using 8 to 9mm bore flexible tubing.	**£16·13**
BKM-420-516L	Cooling coil Cover, stainless steel, gabled to direct condensation to sides of bath. With handle and tubulure for thermometer.	**£18·68**
BKM-420-528E	Cover	**£26·10**
	Insulating spheres (3 packs required)	*See BKA-390-K*
	Test tube racks	*See BKA-360*
	Thermometer, 0 to 110°C	*See THL-490-030W*
	Thermometer holder	*See BKM-270-538F*

Gallenkamp GENERAL PURPOSE WATER BATH

70 LITRES CAPACITY

- Stainless steel interior
- Stove enamelled outer case
- High efficiency glass fibre insulation
- Maximum temperature 95°C
- Contact thermometer temperature control
- Fitted shelf adjustable for height
- Sheathed heater mounted below perforated shelf
- Accessories include test tube racks, gabled cover, cooling coil and constant level



BKM-450 with cover

Technical data

Temperature range	
Without cover	Ambient to 50°C
With cover	Ambient to 95°C

For operation near to or just below ambient temperature, cooling coil BKM-470-506C should be fitted and connected to a cold water supply.

Temperature fluctuation	±0·1°C
Temperature variation	0·1°C
Power rating, maximum	2kW

	Length	Width	Depth
Working space	600	460	280mm
Overall dimensions	840	560	330mm

CONTROLS

All controls are grouped at one end of the bath and comprise an adjustable contact thermometer, transistorised relay and three-heat switch. The three-heat switch has an OFF position and enables the power input to the bath to be set to 0·5, 1 or 2kW, to provide rapid heating and optimum control at the set temperature. A tubulure for an indicating thermometer, mains and heater indicator lamps are also fitted.

TEST TUBE RACKS

Will accommodate up to 12 racks BKA-360.

WATER BATH, *GALLENKAMP*, 70 litres capacity, stainless steel interior, as specified. With adjustable contact thermometer, transistorised relay, perforated stainless steel shelf, three-heat switch, mains and heater indicator lamps and instructions. For a.c. single phase supplies.

BKM-450-010W	Water bath, 220–240V	**£346·50**
BKM-450-030Q	Water bath, 110–120V	**£347·63**

SPARE PART

	Contact thermometer	See BJH-420-070R

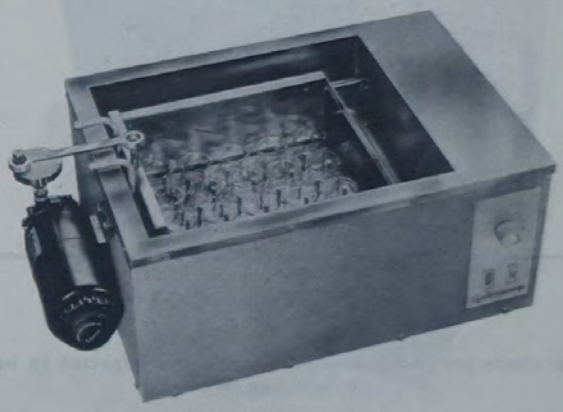
ACCESSORIES

	Cooling coil, for operation of bath near to or just below ambient temperature.	
BKM-470-506C	Cooling coil	**£30·60**
	Cover, stainless steel, gabled to direct condensation to sides of bath.	
BKM-470-518S	Cover	**£36·28**
	Constant level device	See BKM-420-504S
	Insulating spheres (5 packs required)	See BKA-390-K
	Test tube racks	See BKA-360
	Thermometer, 0 to 110°C	See THL-490-030W

Gallenkamp SHAKING WATER BATH INCUBATORS

15 LITRES CAPACITY

- **Direct reading COMPENSTAT solid state control to within 0·1°C**
- **Airtight covers for anaerobic working**
- **Variable shaking speeds and stroke lengths**
- **Stainless steel interior**



BKS-300 with rack and cooling coil

Technical data

Temperature range	
Without cover	Ambient to 50°C
With cover	Ambient to 80°C

For operation near to or just below ambient temperature, cooling coil BKM-270-502D should be fitted and connected to a cold water supply.

Temperature fluctuation	±0·1°C
Power rating, maximum	500 W
Stroke lengths	12·5, 25 or 38mm
Shaker speed	Continuously variable from 50/min to maximum speed as follows:

Stroke	Maximum speed
12·5mm	200/min
25mm	140/min
38mm	100/min

	Length		Width		Depth
Rack dimensions			280	×	230mm
Internal dimensions of bath	350	×	300	×	160mm
Overall dimensions	600	×	390	×	250mm

WATER BATH INCUBATOR, shaking, *GALLENKAMP*, 15 litres capacity, as specified, comprising stainless steel water bath with direct reading COMPENSTAT solid state thermostat, 500 W sheathed heater, rack carriage, drive motor with speed control having an OFF position, mains switch, heater indicator lamp and instructions. **Without** rack, cover and other accessories. For single phase supplies.

BKS-300-010F	Water bath incubator, 220–240 V 50 Hz	**£281·25**
BKS-300-030W	Water bath incubator, 110–120 V 60 Hz	**£292·50**

ACCESSORIES

Racks, stainless steel, for conical flasks.

BKS-320-502Q	Rack, 20 × 25 ml flasks	**£11·42**
BKS-320-506Y	Rack, 10 × 50 ml flasks	**£9·56**
BKS-320-512N	Rack, 8 × 100 ml flasks	**£15·53**
BKS-320-516F	Rack, 4 × 250 ml flasks	**£10·13**

Rack, stainless steel, for 16mm diameter test tubes.

BKS-320-522K	Rack, 48 × 16mm tubes	**£19·46**

Cover, stainless steel, gabled, covering half of rack. Two may be fitted to form an airtight water seal. With gas tubulure for anaerobic working.

BKS-320-540Y	Cover	**£15·53**

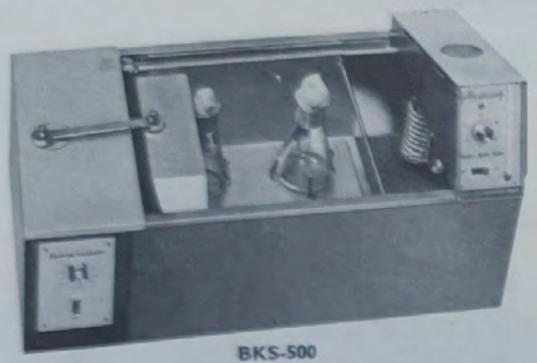
Cover, gabled, covering entire working space — *See BKM-270-514T*

Cooling coil	*See BKM-270-502D*
Thermometer, 10 to 60°C	*See THR-510-T*
Thermometer, 0 to 110°C	*See THL-490-030W*
Thermometer holder	*See BKM-270-538F*
Conical flasks	*See FHB-370*
Test tubes, 125 × 16mm	*See TES-630-110N*

Gallenkamp SHAKING MODULAR WATER BATH INCUBATORS

20 LITRES CAPACITY

- Stainless steel interior
- Solid state thermostat for highest precision, with additional safety thermal cutout
- Clear, hinged plastics cover protects temperature controls against accidental alteration
- Variable shaking speeds and stroke lengths
- Gabled cover available for anaerobic or controlled atmosphere working
- Fitted drain cock for easy emptying



BKS-500

ANNOUNCEMENT

These products are under development and are expected to become available late 1977

Technical data

Temperature range	
Without cover	Ambient to 50°C
With cover	Ambient to 80°C

For operation near to or just below ambient temperature, cooling coil BKA-340-518G should be fitted and connected to a cold water supply.

Temperature fluctuation	±0·1°C
Power rating, maximum	1600 W
Stroke lengths	6, 12, 19, 25, 31 or 38 mm
Shaker speed	Continuously variable from 30/min to maximum speed as follows:

Stroke	Maximum speed
12 mm	200/min
25 mm	140/min
38 mm	100/min

	Length	Width	Depth
Rack dimensions	220	305 mm	
Internal dimensions of bath	290	375	160 mm
Overall dimensions	320	610	350 mm

WATER BATH INCUBATOR, shaking, *GALLENKAMP*, 20 litres capacity, as specified, comprising stainless steel water bath, thermostatic control by solid state COMPENSTAT controller with motor driven stirrer, thermometer, safety thermal cutout, 1500 W heater, shaking mechanism driven by a motor with solid state speed control and platform for fitting flask racks. **Without** racks, covers and other accessories. For single phase supplies.

BKS-500-010M	Water bath incubator, 220–240 V 50 Hz	**£286·88**
BKS-500-030G	Water bath incubator, 110–120 V 60 Hz	**£298·13**

SPARE PART

	Thermometer	See BKA-340-010T

ACCESSORIES

	Racks, stainless steel, for conical flasks.	
BKS-520-506P	Rack, 36 x 25 ml flasks	£24·98
BKS-520-512U	Rack, 20 x 50 ml flasks	£17·04
BKS-520-518Y	Rack, 12 x 100 ml flasks	£13·50
BKS-520-524N	Rack, 8 x 250 ml flasks	£10·13
	Rack, stainless steel, for 16 mm diameter test tubes.	
BKS-520-530C	Rack, 72 x 16 mm tubes	£36·00
	Cover, stainless steel, gabled, covering half of rack. Two may be fitted. Forms an airtight water seal. With gas tubulure for controlled atmosphere working.	
BKS-520-554E	Cover	£16·88
	Cover, gabled, covering entire working space	See BKA-340-548U
	Cooling coil	See BKA-340-518G
	Constant level	See BKA-340-502Y

Gallenkamp SHAKING WATER BATH INCUBATOR

70 LITRES CAPACITY

- **Accurate solid state speed controller with direct reading scale. Tachogenerator ensures stability of shaking speed at all settings.**
- **Variable shaking speeds and stroke lengths**
- **Contact thermometer control to within 0·2°C**
- **Stainless steel construction**



BKS-800 with rack

Technical data

Temperature range	
Without cover	Ambient to 50°C
With cover	Ambient to 80°C

For operation near to or just below ambient temperature, cooling coil BKM-470-506C should be fitted and connected to a cold water supply.

Temperature fluctuation	±0·2°C
Power rating, maximum	2kW
Stroke lengths	6, 12, 19, 25, 31 or 38mm
Shaker speed	Continuously variable from 20 to 200/min Load diagram on control panel shows maximum speed for combinations of load and stroke length
Depth of water above rack	25mm (minimum) to 200mm (maximum)

	Length		Width		Depth
Rack dimensions	530	×	430mm		
Internal dimensions of bath	600	×	460	×	280mm
Overall dimensions	840	×	560	×	370mm

WATER BATH INCUBATOR, shaking, *GALLENKAMP*, 70 litres capacity, as specified, comprising stainless steel water bath with adjustable contact thermometer, three-heat power switch, two 1kW sheathed heaters, rack carriage, drive motor, solid state speed controller with direct reading scale having a zero speed position, mains switch, mains and heater indicator lamps and instructions. **Without** rack, cover and other accessories. For single phase supplies.

BKS-800-010L	Water bath incubator, 220–240V 50Hz	**£645·75**
BKS-800-030F	Water bath incubator, 110–120V 60Hz	**£658·13**

SPARE PART

	Contact thermometer	*See BJH-420-070R*

ACCESSORIES

	Racks, stainless steel, for conical flasks.	
BKS-820-502W	Rack, 65 × 50ml flasks	**£65·25**
BKS-820-506X	Rack, 45 × 100ml flasks	**£53·72**
BKS-820-512T	Rack, 25 × 250ml flasks	**£43·59**
BKS-820-518H	Rack, 20 × 500ml flasks	**£38·81**
	Cover, stainless steel, gabled, covering entire bath. Not airtight.	
BKS-820-530R	Cover	**£44·55**
	Cooling coil	*See BKM-470-506C*
	Thermometer, 10 to 60°C	*See THR-510-T*
	Thermometer, 0 to 110°C	*See THL-490-030W*
	Conical flasks	*See FHB-370*

Gallenkamp REFRIGERATED THERMOSTATIC BATHS

35 LITRES CAPACITY

- Temperature range −20 to 50°C
- Contact thermometer control
- Stainless steel interior
- Internal depth 230mm
- Fitted shelf adjustable for height
- Available with pump for circulating cooled liquid to external apparatus
- Suitable for maturing jelly samples at 10°C as specified in BS 647 and BS 757



BLC-240

Technical data

Temperature range (in ambient of 25°C)	−20 to 50°C				
Temperature fluctuation	±0·05°C				
Power rating, maximum	850 W				
	Length		Width		Depth
Working space	430	×	360	×	230mm
Overall dimensions	690	×	610	×	860mm

CONSTRUCTION

Comprises an upper section containing the bath and controls, supported on a plinth which houses the refrigerator. This outer case has a stove enamelled finish and is mounted on smoothly running castors. The interspace between the outer case and the bath is filled with rigid polyurethane foam insulation and is vapour sealed. Across one end of the bath is a bridge which houses the electrical controls and supports the heater, cooling coil, stirrer and contact thermometer. The bath is fitted with a hinged, easily raised lid and a perforated stainless steel shelf, the height of which can be adjusted to suit the load.

CONTROLS

Temperature is controlled by a contact thermometer which actuates a transistorised relay in the heater supply circuit. Below ambient temperature, the refrigerator is operated continuously. The bath liquid can be water, aqueous ethylene glycol or light oil depending on the operating temperature and is efficiently stirred by a propeller driven by a quiet induction motor.

COOLED THERMOSTATIC BATH, *GALLENKAMP*, 35 litres capacity, as specified, with refrigerator, contact thermometer, transistorised relay, stirrer, motor, adjustable shelf, hinged cover and instructions. For a.c. single phase supplies.

BLC-240-010T	Cooled bath, 220–240V 50Hz	**£652·50**
BLC-240-030N	Cooled bath, 110–120V 60Hz	**£671·63**

COOLED THERMOSTATIC BATH, *GALLENKAMP*, 35 litres, as BLC-240 but with built-in pump to circulate bath liquid to external apparatus at rates between 11·5 litres/min at zero head and 2 litres/min at 1·6m head. With instructions. For a.c. single phase supplies.

BLC-280-010X	Cooled bath, 220–240V 50Hz	**£795·38**
BLC-280-030Y	Cooled bath, 110–120V 60Hz	**£814·50**

SPARE PARTS

BLC-310-010J	Contact thermometer	**£25·09**

ACCESSORY

	Lubricant, for stirrer motor bearings	See *LUB-230-E*

Gallenkamp CALIBRATING OIL BATHS, 200°C

9 LITRES CAPACITY

For comparisons of thermometers, thermocouples and other similar applications

- **Manually controlled model for steadily changing temperature**
- **Thermostatically controlled model for constant or changing temperatures**
- **Temperature variation ±0·25°C**



BLC-550 with stirring accessories

Technical data

Temperature range	40 to 200°C
Temperature variation	±0·25°C
Capacity	9 litres
Internal dimensions of bath	200 mm diameter × 300 mm deep
External dimensions of case	280 × 280 × 350 mm high

CONSTRUCTION

A cylindrical, welded bath of cadmium plated steel with a removable top cover is fitted in an outer metal case with glass wool insulation and a heat break between. A 3-pin plug and socket is fitted together with a support rod at the back of the case for mounting a stirrer motor. The bath is heated by a double, tubular heater rated at 250 and 1250 W, of which the latter portion is used solely as a boost heater. Manually and thermostatically controlled versions are available.

Manually controlled model

The heating and cooling rates are:

Temperature of bath	50°C	200°C
Heating rate (250 W heater)	1°C/min	0·4°C/min
Cooling rate	0·05°C/min	0·5°C/min

Time to heat from 20 to 200°C (with boost heater) 40 min

When the bath is stirred, the temperature variation over 200 mm diameter and 230 mm depth is only ±0·25°C. If it is necessary to adjust the heating and cooling rates, a variable transformer EFT-700-050Q can be incorporated in the 250 W heater circuit.

Thermostatically controlled model

This version enables comparisons to be made at constant temperatures, in addition to the steadily rising or falling temperatures obtained with the manually controlled model. It is fitted with an adjustable 0 to 200°C contact thermometer, an electronic relay and a stirrer. The temperature fluctuation is within ±0·2°C.

OIL BATH, calibrating, *GALLENKAMP*, 9 litres capacity, manually controlled, as specified, with plain removable cover and instructions but **without** stirrer. For a.c. single phase supplies.

BLC-550-010L	Oil bath, 220–240 V	**£137·25**
BLC-550-030F	Oil bath, 110–120 V	**£141·75**

OIL BATH, calibrating, *GALLENKAMP*, as BLC-550 but thermostatically controlled. Fitted with 0 to 200°C contact thermometer, electronic relay and stirrer assembly. With instructions. For a.c. single phase supplies.

BLC-600-010P	Oil bath, 220–240 V 50 Hz	**£282·38**
BLC-600-030J	Oil bath, 110–120 V 60 Hz	**£318·38**

SPARE PARTS

BLC-620-070G	Contact thermometer, 0 to 200°C. (F)	**£25·09**
	Transformer	*See EFT-700-050Q*
	Oil, for filling bath	*See BLC-780-510A*

Gallenkamp THERMOSTATIC OIL BATHS, 200°C

27 AND 60 LITRES CAPACITIES

For a wide range of applications such as oxidation stability tests on oils and greases and as a heating source in extractions and distillations and any work requiring close temperature control

- **Temperature fluctuation within ±0·5°C**
- **Powerful motor driven stirrer**



BLC-750

Technical data

Temperature range	30 to 200°C									
Temperature fluctuation	±0·25°C									
Temperature variation	±0·5°C, throughout the working space									
Capacity	27 litres					60 litres				
Time to heat from 20 to 200°C	80 min					110 min				
Power rating, maximum	2 kW					3·5 kW				
	Length		Width		Depth	Length		Width		Depth
Working space	280	×	300	×	200 mm	430	×	380	×	280 mm
Internal dimensions of the bath	390	×	300	×	230 mm	550	×	380	×	300 mm
Overall dimensions, excluding the control box	500	×	420	×	290 mm	650	×	480	×	290 mm

CONSTRUCTION

Strongly constructed in steel throughout with a rectangular welded inner tank having a durable matt black finish and a large area floor, strong enough to support heavy objects.

CONTROLS

All controls are mounted in a control box which bridges one end of the bath, leaving a maximum of space free from obstruction. Heating is by two independently switched, tubular immersion heaters, one of which is used as a boost heater. The thermostat is mounted in the control box and operates in conjunction with a hotwire relay. A powerful shaded pole motor, also fitted in the control box, drives a stirring rotor attached to a flexible stainless steel shaft.

OIL BATHS, thermostatic, *GALLENKAMP*, maximum temperature 200°C, as specified, with instructions. For single phase supplies.

BLC-750-010S	Oil bath, 27 litres, 220–240 V 50 Hz	**£234·00**
BLC-750-030M	Oil bath, 27 litres, 110–120 V 60 Hz	**£239·63**
BLC-750-110X	Oil bath, 60 litres, 220–240 V 50 Hz	**£266·63**
BLC-750-130Y	Oil bath, 60 litres, 110–120 V 60 Hz	**£272·25**

ACCESSORIES for BLC-750

	Oil, opaque, with viscosity characteristics suitable for use in above baths between 50 and 200°C. Flash point 232°C. In 22·5 litres non-returnable drum.	
BLC-780-510A	Oil	**£11·80**
	Lubricant for motor bearings	*See LUB-230-E*

SAND BATHS

SAND BATH, shallow form, tinned iron, diameter 150mm.

BLD-230-T	Sand bath	Pack of 10 **£2·31**

SAND BATHS, deep form, tinned iron, with flat bottom and sloping sides. May also be used as oil baths. Dimensions given are diameter × depth.

BLD-270-030F	Sand baths, 150 × 38mm	Pack of 10 **£1·63**
BLD-270-050W	Sand baths, 200 × 48mm	Pack of 5 **£1·22**
BLD-270-070Q	Sand baths, 250 × 60mm	Pack of 5 **£2·12**



BLD-230



BLD-270

Gallenkamp ELECTRICALLY HEATED SAND BATH, 325°C

- **Working area 470 × 270mm**
- **Temperature controlled by energy regulator**
- **Efficient insulation to protect bench top**
- **Even heating without the presence of fluids**

An electrically heated sand bath for heating glassware containers and small objects where even heat is required but the use of a fluid bath containing water or oil is undesirable. The bath is of cast iron, hot process aluminium sprayed to resist corrosion. It is mounted on a robust steel base which is efficiently insulated to prevent overheating the bench top. Heating is by a sheathed 2kW element controlled by an energy regulator with an arbitrary scale of 100 divisions. Maximum effective sand temperature is about 325°C. Bath dimensions 470 × 270 × 25mm deep.



BLD-350

SAND BATH, *GALLENKAMP*, electrically heated, as specified, with energy regulator and heater indicator lamp. For 220–240V a.c. single phase supplies.

BLD-350-U	Sand bath	**£101·25**

SPARE PART

Heating element	*See HPL-610-010J*

OTHER GALLENKAMP BATHS

FLOATING OUT BATH

- **For preparation of microscope slides after wax embedding**
- **Maximum temperature 80°C**

See HJC-600

SOXHLET BATH

- **Electrically heated – six-place**
- **Accepts flasks up to 500ml**

See EXP-300 et seq.

VISCOMETER BATHS

- **Alternative models for 120 and 250°C**
- **Illuminated work space**

See VHC-220 et seq



Viscometer Bath

WAX EMBEDDING BATH

- **For routine histological specimen preparations**
- **Maximum temperature 100°C**

See HJC-200 et seq.

Gallenkamp

TUBE HEATING BLOCKS



BLD-700 with block and tubes

Applications in haematology, pathology, bacteriology, prothrombin testing, drying, melting and boiling point checks and other routine tests in which a liquid heating medium is undesirable.

These blocks comprise an outer case, with heater and thermostat, into which are fitted interchangeable aluminium blocks drilled to accept test tubes.

Temperature control is by means of a direct reading solid state thermostat designed for zero voltage switching to minimise radio interference.

The stove enamelled outer case is insulated and ventilated. Controls include mains and heater indicator lamps, mains switch and fuse. With BLD-760-E the controls are mounted in a separate control box connected by a lead to the heater unit.

Technical data

	BLD-700-A	BLD-730-C	BLD-760-E
Temperature range	30 to 100°C	30 to 100°C	90 to 180°C
Temperature control	±0·1°C	±0·1°C	±0·2°C
Time to heat to maximum temperature, min	12	18	30
Power rating, maximum, W	250	450	450
Dimensions, height × width × depth, mm	100 × 190 × 140	100 × 290 × 230	100 × 300 × 220 (case) 90 × 130 × 140 (control box)
Net mass, kg	1·25	2·75	3



BLD-760 with blocks and tubes

HEATER UNIT, *TECHNE*, as specified, for a single block. Temperature range 30 to 100°C. **Without** block. For 220–240V 50–60Hz single phase supplies.

BLD-700-A Heater unit **£73·70**

HEATER UNIT, *TECHNE*, as specified, for three blocks. Temperature range 30 to 100°C. **Without** blocks. For 220–240V 50–60Hz single phase supplies.

BLD-730-C Heater unit **£96·80**

HEATER UNIT, *TECHNE*, as specified, for three blocks. Temperature range 90 to 180°C. With controls mounted in a separate control box. **Without** blocks. For 220–240V 50–60Hz single phase supplies.

BLD-760-E Heater unit **£116·60**

ACCESSORIES

Blocks, aluminium, 95 × 70 × 50mm high, approximate mass 1kg.

BLD-810-506W	Block, 20 × 12mm dia. tubes	£10·86
BLD-810-512E	Block, 12 × 16mm dia. tubes	£10·86
BLD-810-518P	Block, 8 × 19mm dia. tubes	£10·86
BLD-810-524U	Block, 6 × 25mm dia. tubes	£10·86

TUBE HEATING BLOCKS

GAS HEATED

For coal gas — See *BYB-680-N*
For natural gas — See *BYC-680-D*

WARBURG BATHS

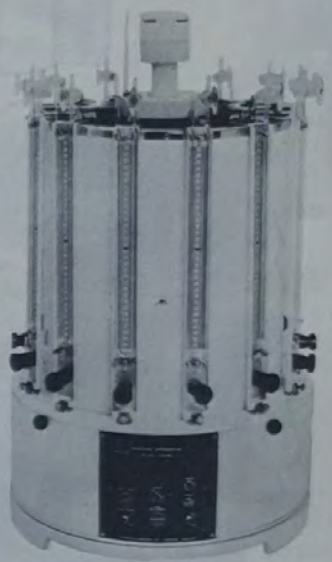
For the measurement of tissue respiration rates and enzyme activities

- **Rotating body accepts 13 manometers**
- **Adjustable speed and stroke of manometers**
- **Temperature controlled to within ±0·01°C**
- **Automatic boost heating**

Comprises a circular tank around the edge of which are mounted 13 manometers in stainless steel holders. The manometers are oscillated by means of a drive mechanism, the speed and stroke of which are adjustable. Any single manometer can be stopped for examination or adjustment, without affecting the others, merely by holding it. The main body of the apparatus rotates on ball bearings, power supplies being connected through slip rings to give completely unrestricted rotation.

The control and circulation system, together with the heaters, form a central lift-out unit, leaving the outside of the tank unobstructed.

Temperature sensing is by a thermistor bridge which provides minimum fluctuation, rapid heating without overshoot and rapid temperature recovery. The temperature is set by adjusting a knob on a direct reading scale, with final correction on a fine adjustment knob. Energy to the heaters is switched by a plug-in solid state device.



BLH-500

Photosynthesis model

For photochemical work, a photosynthesis model is available with a glass base fitted to the tank and underside lighting is provided by 13 tungsten filament lamps. A cooling coil is fitted to the tank for operation of bath at or near to ambient temperature.

Technical data

Maximum temperature	60°C
Temperature fluctuation	±0·01°C at 37°C
Tank capacity	14 litres
Speed control	0 to 130strokes/min
Stroke	13 to 51mm
Power rating, maximum	1·25kW
Dimensions of manometer holder	45 × 10 × 535mm high
Overall dimensions	560mm diameter × 915mm high
Net mass	41kg



BLH-560-502 with manometers

WARBURG BATH, *TOWNSON & MERCER,* as specified, with automatic boost heater, thermistor bridge control and 13 standard manometer holders but **without** glassware. For single phase supplies.

BLH-500-010T Warburg bath, 220–240V 50Hz **£1234·20**
BLH-500-030N Warburg bath, 110–120V 60Hz **£1234·20**

WARBURG BATH, *TOWNSON & MERCER,* **photosynthesis model,** similar to BLH-500 but with 13 tungsten filament lamps and cooling coil. **Without** glassware. For single phase supplies.

BLH-540-010X Warburg bath, 220–240V 50Hz **£1522·40**
BLH-540-030Y Warburg bath, 110–120V 60Hz **£1522·40**

ACCESSORIES

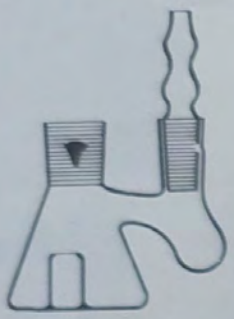
BLH-560-502C	Bench stand, for supporting seven standard manometers when removed from the bath. Bench stand	£19·25
BLH-560-512W	Cooling coil for BLH-500, with stand and mounting rod. Cooling coil	£32·89
	Flasks	See *BLH-690-U and BLH-7·0-W*
	Manometer	See *BLH-650-C*

Gallenkamp

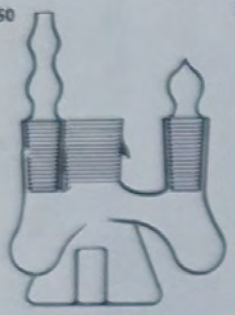
WARBURG GLASSWARE



BLH-650



BLH-690



BLH-710

- **Suitable for use with BLH-500 and BLH-540**
- **Borosilicate glass throughout**
- **Manometers and flasks fitted with hooks for joint retaining springs**

MANOMETER, Warburg, capillary bore, fitted with 3-way stopcock and 14/15 cone for connecting flask.

BLH-650-C Manometer **£10·04**

NOTE: The joint for the flask connection is fitted with hooks for spring connectors. One pair of spring connectors QJH-870-V 38mm is required for each manometer to support either of the flasks listed below.

FLASK, Warburg, with side bulb and gas tube. Main neck 14/15 socket.

BLH-690-U Flask **£6·14**

FLASK, Warburg, as BLH-690-U but with additional side bulb which is stoppered.

BLH-710-W Flask **£8·92**

ACCESSORIES

Pipettes, Warburg	*See PMP-910*
Spring connectors, 38mm	*See QJH-870-V*

BATTERIES

STANDARD CELL, miniature Weston, semi-micro version with limbs arranged coaxially to eliminate asymmetric temperature errors. In case 110 × 20 × 20mm fitted with a 4mm socket terminal at each end. Can be used in any position and is unaffected by shock and vibration.

Technical data

Emf at 20°C	1·01860V
Calibrated accuracy	±0·01%
Temperature coefficient over the range 15 to 25°C	−40μV/°C
Drift	0·01% per annum
Maximum current	10μA



BML-700

With certificate of test.

BML-700-B Standard cell **£6·60**

VOLTAGE REFERENCE BATTERY, MALLORY, emf 1·35V, single cell. A robust extremely stable d.c. voltage reference source which can provide a small current without damage. Emf remains within ±1% over the range −20 to +70°C. Dimensions 63 × 40 × 95mm, in carrying case.

BML-830-S Voltage reference battery **£13·17**

BATTERIES (ACCUMULATORS), *EXIDE*, storage, multiple type, 2V. In polystyrene container with screw terminals and charging instructions. Supplied uncharged **without** acid.

Capacity at 10h rate, Ah	20	40	60	80
Acid volume, ml	460	750	1930	1790

BMP-550-030C	Battery, 2V, 20Ah	£7·10
BMP-550-070N	Battery, 2V, 40Ah	£9·85
BMP-550-110E	Battery, 2V, 60Ah	£12·71
BMP-550-160M	Battery, 2V, 80Ah	£15·84



BMP-550

BATTERY (ACCUMULATOR), *EXIDE*, storage type, three cell, 6V, capacity 12Ah at 20h rate. In polystyrene container with screw terminals and charging instructions. Acid volume 355ml. Supplied uncharged **without** acid.

BMP-600-P	Battery, 6V, 12Ah	£9·79

DRY BATTERY, 4·5V, code H30, 99×33×91mm, with screw terminals.

BMT-240-C	Dry battery, 4·5V, code H30	£0·46

DRY BATTERIES, with brass cap and can base connections.

Voltage, V	1·5	3
Code	2LP	2T10
Dia. × height, mm	34×61	21×74

BMT-390-010C	Dry battery, 1·5V, code 2LP	£0·10
BMT-390-030T	Dry battery, 3V, code 2T10	£0·10

DRY BATTERIES, high power, with brass cap and can base connections.

Voltage, V	1·5	1·5	1·5
Code	HP2	HP7	HP11
Dia. × height, mm	34×61	14×50	26×50

BMT-460-030J	Dry battery, 1·5V, code HP2	£0·13
BMT-460-050D	Dry battery, 1·5V, code HP7	£0·08
BMT-460-070U	Dry battery, 1·5V, code HP11	£0·13



BMV-220

BATTERY CHARGERS

BATTERY CHARGER, output 1·5A maximum at 2, 6 or 12V. Fully tropicalised, in ventilated case 125×110×170mm high with ammeter and twin output leads fitted with crocodile clips. Consumption 30W, for 200–250V 50Hz supplies.

BMV-220-T	Battery charger	£15·13



BMV-260

BATTERY CHARGER, output 2A maximum at 2, 6 or 12V. In ventilated case 140×125×200mm high with ammeter, nine-position switch to enable charging rate to be maintained, output fuse, shrouded output terminals and mains cable. Consumption 48W, for 200–250V 50Hz supplies.

BMV-260-X	Battery charger	£18·84


BMV-330

BATTERY CHARGER, as BMV-260-X but fully tropicalised.

BMV-280-A	Battery charger	£22·22

BATTERY CHARGER, output 1 to 4A at 2, 6 or 12V. In ventilated case 280×190×152mm with mains switch, current and voltage controls, input and output fuses, and shrouded output terminals. Maximum consumption 85W, for 200–250V 50Hz supplies.

BMV-330-E	Battery charger	£34·88

RECTIFIER UNIT, output 5A at 6, 8, 10 or 12V d.c., 4A at 3·5V a.c. or 1A at 20V a.c. Fully tropicalised transformer and rectifier unit in ventilated case 305×216×190mm with ammeter 0 to 6×0·25A, overload cutout with reset button for d.c. circuit, d.c. voltage range control, mains switch, shrouded output terminals and mains cable. For 200–240V 50Hz supplies.

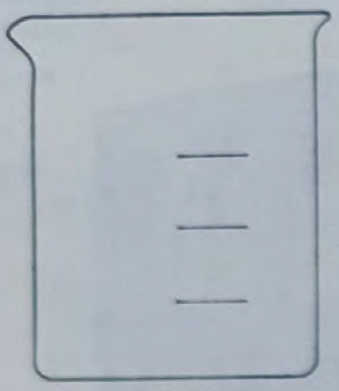
BMV-400-R	Rectifier unit	£84·94


BMV-400

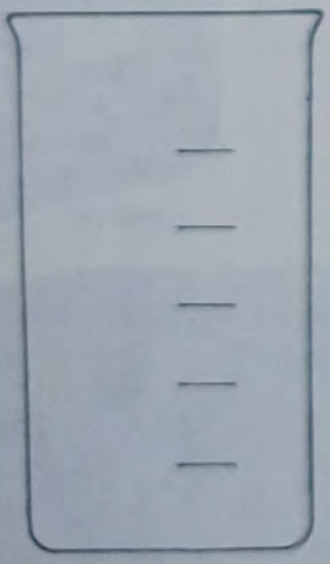
Gallenkamp

BEAKERS

All capacities and dimensions quoted are nominal



BNB-300



BNB-340

GLASS BEAKERS

BEAKERS, *PYREX* **glass,** squat form, with spout. Capacities above 25ml have two or more graduation marks showing approximate capacities.

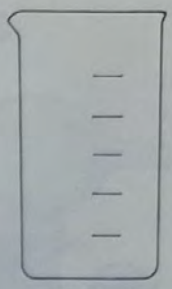
BNB-300-010E	Beaker, 5ml	£0·33
BNB-300-012A	Beakers, 5ml	Pack of 60 £15·93
BNB-300-030V	Beaker, 10ml	£0·33
BNB-300-032R	Beakers, 10ml	Pack of 60 £15·93
BNB-300-050P	Beaker, 25ml	£0·33
BNB-300-052L	Beakers, 25ml	Pack of 120 £31·68
BNB-300-070J	Beaker, 50ml	£0·36
BNB-300-073D	Beakers, 50ml	Pack of 12 £3·45
BNB-300-075W	Beakers, 50ml	Pack of 144 £37·72
BNB-300-090D	Beaker, 100ml	£0·39
BNB-300-093U	Beakers, 100ml	Pack of 12 £3·74
BNB-300-095Q	Beakers, 100ml	Pack of 120 £33·98
BNB-300-110A	Beaker, 150ml	£0·46
BNB-300-113R	Beakers, 150ml	Pack of 12 £4·37
BNB-300-115N	Beakers, 150ml	Pack of 96 £31·74
BNB-300-130R	Beaker, 250ml	£0·47
BNB-300-133L	Beakers, 250ml	Pack of 12 £4·57
BNB-300-135H	Beakers, 250ml	Pack of 96 £33·18
BNB-300-150L	Beaker, 400ml	£0·56
BNB-300-153F	Beakers, 400ml	Pack of 12 £5·42
BNB-300-155B	Beakers, 400ml	Pack of 60 £24·61
BNB-300-170F	Beaker, 500ml	£0·59
BNB-300-173W	Beakers, 500ml	Pack of 6 £2·84
BNB-300-175S	Beakers, 500ml	Pack of 60 £25·82
BNB-300-190W	Beaker, 600ml	£0·71
BNB-300-193Q	Beakers, 600ml	Pack of 6 £3·40
BNB-300-195M	Beakers, 600ml	Pack of 60 £30·99
BNB-300-210T	Beaker, 800ml	£0·85
BNB-300-212P	Beakers, 800ml	Pack of 48 £31·11
BNB-300-230N	Beaker, 1000ml	£1·01
BNB-300-233H	Beakers, 1000ml	Pack of 6 £5·28
BNB-300-235D	Beakers, 1000ml	Pack of 36 £28·81
BNB-300-250H	Beaker, 1500ml	£1·32
BNB-300-252D	Beakers, 1500ml	Pack of 24 £26·28
BNB-300-270B	Beaker, 2000ml	£1·83
BNB-300-272U	Beakers, 2000ml	Pack of 12 £18·17
BNB-300-290S	Beaker, 3000ml	£2·46
BNB-300-292X	Beakers, 3000ml	Pack of 12 £26·80
BNB-300-310P	Beaker, 5000ml	£3·68
BNB-300-312L	Beakers, 5000ml	Pack of 6 £20·07

BEAKERS, *PYREX* **glass,** tall form, without spout, with three or more graduation marks showing approximate capacities.

BNB-340-010W	Beaker, 50ml	£0·45
BNB-340-012S	Beakers, 50ml	Pack of 144 £47·15
BNB-340-030Q	Beaker, 100ml	£0·40
BNB-340-032M	Beakers, 100ml	Pack of 96 £28·41
BNB-340-050K	Beaker, 150ml	£0·44
BNB-340-052G	Beakers, 150ml	Pack of 96 £30·82
BNB-340-070E	Beaker, 250ml	£0·49
BNB-340-072A	Beakers, 250ml	Pack of 72 £26·11
BNB-340-090V	Beaker, 400ml	£0·59
BNB-340-092R	Beakers, 400ml	Pack of 72 £30·94
BNB-340-110S	Beaker, 600ml	£0·69
BNB-340-112K	Beakers, 600ml	Pack of 72 £36·28
BNB-340-130M	Beaker, 1000ml	£1·04
BNB-340-132Y	Beakers, 1000ml	Pack of 36 £29·30
BNB-340-150G	Beaker, 2000ml	£2·01
BNB-340-152C	Beakers, 2000ml	Pack of 12 £19·95

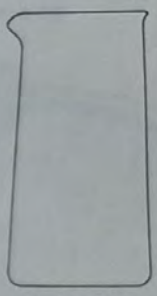
BEAKERS, *PYREX* **glass,** tall form, with spout, with three or more graduation marks showing approximate capacities.

BNB-380-010R	Beaker, 50ml	£0·45
BNB-380-012N	Beakers, 50ml	Pack of 144 £47·15
BNB-380-030L	Beaker, 100ml	£0·40
BNB-380-032H	Beakers, 100ml	Pack of 96 £28·41
BNB-380-050F	Beaker, 150ml	£0·44
BNB-380-052B	Beakers, 150ml	Pack of 96 £30·82
BNB-380-070W	Beaker, 250ml	£0·49
BNB-380-072S	Beakers, 250ml	Pack of 72 £26·11
BNB-380-090Q	Beaker, 400ml	£0·59
BNB-380-092M	Beakers, 400ml	Pack of 72 £30·94
BNB-380-110N	Beaker, 600ml	£0·69
BNB-380-112J	Beakers, 600ml	Pack of 72 £36·28
BNB-380-130H	Beaker, 1000ml	£1·04
BNB-380-132D	Beakers, 1000ml	Pack of 36 £29·38


BNB-380

BEAKERS, *PYREX* **glass,** conical form, wide mouth, with spout.

BNB-420-010F	Beaker, 125ml	£0·58
BNB-420-012B	Beakers, 125ml	Pack of 96 £44·62
BNB-420-030W	Beaker, 250ml	£0·61
BNB-420-032S	Beakers, 250ml	Pack of 72 £34·79
BNB-420-050Q	Beaker, 400ml	£0·62
BNB-420-052M	Beakers, 400ml	Pack of 72 £35·71
BNB-420-070K	Beaker, 500ml	£0·76
BNB-420-072G	Beakers, 500ml	Pack of 60 £38·18
BNB-420-090E	Beaker, 650ml	£0·89
BNB-420-092A	Beakers, 650ml	Pack of 48 £35·19
BNB-420-110B	Beaker, 1000ml	£1·28
BNB-420-112U	Beakers, 1000ml	Pack of 36 £41·80


BNB-420

METAL BEAKERS

BEAKERS, aluminium, squat form, with spout.

BNH-300-010N	Beaker, 100ml	£0·74
BNH-300-030H	Beaker, 250ml	£0·91
BNH-300-050B	Beaker, 500ml	£1·26
BNH-300-070S	Beaker, 1000ml	£1·46


BNH-300

BEAKERS, stainless steel, with spout.

BNH-360-010R	Beaker, 200ml	£4·50
BNH-360-030L	Beaker, 300ml	£4·73
BNH-360-050F	Beaker, 600ml	£6·53
BNH-360-070W	Beaker, 700ml	£7·13
BNH-360-090Q	Beaker, 1200ml	£9·57


BNH-360

PLASTICS BEAKERS

BEAKERS, polypropylene, squat form, with spout. Capacities up to 2000ml have four or more graduation marks showing approximate capacities.

BNH-700-010E	Beakers, 25ml	Pack of 10 £0·83
BNH-700-030V	Beakers, 50ml	Pack of 10 £0·94
BNH-700-050P	Beakers, 100ml	Pack of 10 £1·05
BNH-700-070J	Beakers, 250ml	Pack of 10 £1·87
BNH-700-090D	Beakers, 400ml	Pack of 10 £2·75
BNH-700-110A	Beakers, 600ml	Pack of 5 £1·60
BNH-700-130R	Beakers, 1000ml	Pack of 5 £2·15
BNH-700-150L	Beaker, 2000ml	Each £0·88
BNH-700-170F	Beaker, 5000ml	Each £4·51


BNH-700

Continued overleaf



BNH-740

BEAKERS, clear polystyrene, disposable, squat form, capacity 20ml. Intended for single use, and suitable for medical and radioisotope work.

BNH-740-C	Beakers	Pack of 100 **£1·47**



BNH-790

BEAKERS, PTFE, squat form, inert to most chemicals except molten alkali metals and fluorine. Replace platinum beaker for many purposes. Suitable for use up to 300°C. (F)

BNH-790-010K	Beaker, 50ml	**£3·54**
BNH-790-030E	Beaker, 100ml	**£3·97**
BNH-790-050V	Beaker, 150ml	**£4·74**
BNH-790-070P	Beaker, 250ml	**£6·36**
BNH-790-090J	Beaker, 500ml	**£12·62**
BNH-790-110G	Beaker, 1000ml	**£18·93**
	Beaker covers	*See WEF-500*

BELL JARS

Moulded glass with ground flange at base. All dimensions are approximate



BNX-300

BELL JARS, knob top. Dimensions given are height to shoulder × inside flange diameter.

BNX-300-010X	Bell jar, 200 × 150mm	**£6·99**
BNX-300-030Y	Bell jar, 250 × 175mm	**£7·65**
BNX-300-050C	Bell jar, 300 × 200mm	**£9·90**

BELL JARS, 29/32 socket top, without stopper or stopcock. Dimensions given are height to shoulder × inside flange diameter.

BNX-340-010J	Bell jar, 200 × 150mm	**£7·55**
BNX-340-030D	Bell jar, 250 × 175mm	**£8·16**
BNX-340-050U	Bell jar, 300 × 200mm	**£10·58**

BELL JAR, graduated, similar to BNX-340-010J but graduated 0 to 2000 × 50ml.

BNX-380-H	Bell jar, 2000ml	**£11·12**



BNX-340

ACCESSORIES

BNX-400-502Y	Stopcock, glass, 29/32 cone.	**£5·72**
	Bases, plate glass, frosted one side. Size 200 × 200mm is for jars 150 and 175mm diameter. Size 250 × 250mm is for jars 200mm diameter.	
BNX-400-510J	Base, 200 × 200mm	**£1·35**
BNX-400-512F	Base, 250 × 250mm	**£2·40**
	Stopper, glass, 29/32 cone	*See QTE-130-C*
	Stopper, polypropylene, 29/32 cone	*See SYH-310-190V*



BNX-340 with stopcock



BNX-340 with stopper

BELLOWS

BELLOWS, hand, with flexible plastics pumping bulb 53mm diameter having inlet and outlet valves, and short length of 5mm bore tubing connected to outlet.

BOR-300-U	Bellows	£0·92



BOR-300

BELLOWS, hand, with flexible plastics pumping bulb 53mm diameter having screwed inlet and outlet valves and riffled nozzles for flexible tubing connection.

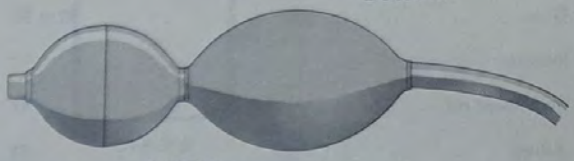
BOR-340-P	Bellows	£1·52



BOR-340

BELLOWS, hand, with flexible plastics pumping bulb and reservoir. With inlet and outlet valves and short length of 5mm bore tubing connected to outlet. Dimensions given are bulb diameter × reservoir diameter inflated.

BOR-380-010H	Bellows, 40 × 65mm	£1·74
BOR-380-030B	Bellows, 50 × 75mm	£1·91
BOR-380-050S	Bellows, 60 × 100mm	£2·14



BOR-380

BELLOWS, hand, suitable for blowing dust from delicate mechanisms, lenses, etc. Flexible plastics pumping bulb approximately 53mm diameter fitted with short, tapered outlet tube.

BOR-420-V	Bellows, 53mm	Pack of 5 £1·91



BOR-420

BELLOWS, foot, to deliver air at a steady pressure, suitable for glassblowing, etc. Overall dimensions including step and air pipe 300 × 180 × 380mm high.

BOR-600-T	Bellows, foot	£24·19



BOR-600

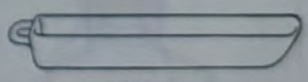
SPARE PARTS

BOR-620-010C	Rubber disc	£1·01
BOR-620-030T	String net	£0·59

BOATS

BOATS, combustion, porcelain, glazed, with handle. Dimensions given are length × width × height. (F)

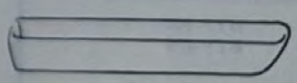
BSH-300-010E	Boats, 60 × 10 × 8mm	Pack of 10 £4·39
BSH-300-030V	Boats, 72 × 6 × 8mm	Pack of 10 £4·39
BSH-300-050P	Boats, 78 × 11 × 8mm	Pack of 10 £4·50
BSH-300-070J	Boats, 85 × 12 × 8mm	Pack of 10 £4·50
BSH-300-090D	Boats, 100 × 18 × 12mm	Pack of 10 £6·53



BSH-300

BOATS, combustion, silica, translucent, glazed, with handle. Dimensions given are length × width × height.

BSH-340-010W	Boat, 50 × 15 × 10mm	£1·74
BSH-340-030Q	Boat, 80 × 17 × 11mm	£2·25
BSH-340-050K	Boat, 100 × 20 × 12mm	£2·60



BSH-380

BOATS, combustion, highly refractory material, specially made for the analysis of carbon and sulphur in steel. Batch tested for carbon and sulphur blanks. Dimensions given are length × width × height.

BSH-380-010R	Boats, 73 × 15 × 13mm	Pack of 100 £5·54
BSH-380-050F	Boats, 98 × 17 × 12mm	Pack of 100 £5·54

BOTTLES

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Woulff	Gas washing

GENERAL PURPOSE GLASS BOTTLES

All capacities quoted are nominal

NARROW NECK



BTF-200
BTF-220



BTF-250
BTF-270
BTF-300

BOTTLES, plastics-stoppered reagent, clear white glass, narrow neck fitted with interchangeable octagonal head polypropylene stopper.

BTF-200-030P	Bottle, 30ml, 16/16 neck	£0·26
BTF-200-050J	Bottle, 60ml, 16/16 neck	£0·27
BTF-200-070D	Bottle, 125ml, 19/17 neck	£0·30
BTF-200-090U	Bottle, 250ml, 24/20 neck	£0·34
BTF-200-110R	Bottle, 500ml, 24/20 neck	£0·44
BTF-200-130L	Bottle, 1000ml, 29/32 neck	£0·63

BOTTLES, plastics-stoppered reagent, as BTF-200 but amber glass.

BTF-220-050S	Bottle, 60ml, 16/16 neck	£0·50
BTF-220-070M	Bottle, 125ml, 19/17 neck	£0·56
BTF-220-090G	Bottle, 250ml, 24/20 neck	£0·63
BTF-220-110D	Bottle, 500ml, 24/20 neck	£0·74
BTF-220-130U	Bottle, 1000ml, 29/32 neck	£1·10

Polypropylene stoppers *See SYH-310*

BOTTLES, glass-stoppered reagent, clear white glass, narrow neck with interchangeable ground glass stopper.

BTF-250-030D	Bottle, 30ml, 16/16 neck	£0·47
BTF-250-050U	Bottle, 60ml, 16/16 neck	£0·50
BTF-250-070X	Bottle, 125ml, 19/17 neck	£0·52
BTF-250-090Y	Bottle, 250ml, 24/20 neck	£0·64
BTF-250-110F	Bottle, 500ml, 24/20 neck	£0·74
BTF-250-130W	Bottle, 1000ml, 29/32 neck	£0·99

BOTTLES, glass-stoppered reagent, as BTF-250 but amber glass.

BTF-270-050G	Bottle, 60ml, 16/16 neck	£0·72
BTF-270-070A	Bottle, 125ml, 19/22 neck	£0·81
BTF-270-090R	Bottle, 250ml, 24/29 neck	£0·95
BTF-270-110X	Bottle, 500ml, 24/29 neck	£1·13
BTF-270-130Y	Bottle, 1000ml, 29/32 neck	£1·40

BOTTLES, glass-stoppered reagent, clear *PYREX* glass, narrow neck with interchangeable ground glass stopper.

BTF-300-050B	Bottle, 60ml, 19/17 neck	£1·39
BTF-300-070S	Bottle, 100ml, 19/17 neck	£1·44
BTF-300-090M	Bottle, 250ml, 24/29 neck	£1·75
BTF-300-110J	Bottle, 500ml, 24/29 neck	£2·13
BTF-300-130D	Bottle, 1000ml, 40/38 neck	£3·11
BTF-300-150U	Bottle, 2 litres, 40/38 neck	£3·63
BTF-300-170X	Bottle, 5 litres, 50/42 neck	£6·07
BTF-300-190Y	Bottle, 10 litres, 60/46 neck	£11·10
BTF-300-210F	Bottle, 20 litres, 60/46 neck	£18·00



BTF-350

BOTTLES, reagent, narrow screw neck, clear white glass, Winchester pattern, with polypropylene screw cap.

Capacity, ml	50	100	300	500	1,000	2,500
Thread	R3/24	R3/24	R3/28	R4/31	R4/31	R4/31

BTF-350-050M	Bottles, 50ml	Pack of 10 £0·97
BTF-350-052Y	Bottles, 50ml	Pack of 144 £10·82
BTF-350-070G	Bottles, 100ml	Pack of 10 £1·07
BTF-350-072C	Bottles, 100ml	Pack of 96 £8·03
BTF-350-090A	Bottles, 300ml	Pack of 10 £1·61
BTF-350-092T	Bottles, 300ml	Pack of 48 £6·06
BTF-350-112Q	Bottles, 500ml	Pack of 24 £4·12
BTF-350-132K	Bottles, 1000ml	Pack of 12 £3·20
BTF-350-152E	Bottles, 2000ml	Pack of 12 £4·92



BTF-420

BOTTLES, reagent, narrow screw neck, as BTF-350 but amber glass.

BTF-360-110N	Bottles, 500ml	Pack of 12 £2·08
BTF-360-130H	Bottles, 1000ml	Pack of 12 £3·21
BTF-360-150B	Bottle, 2000ml	Each £0·41

ACCESSORIES for BTF-350 and BTF-360

BTF-374-030D	Caps, polypropylene, R3/24	Pack of 25 £0·25
BTF-374-050U	Caps, polypropylene, R3/28	Pack of 25 £0·28
BTF-374-070X	Caps, polypropylene, R4/31	Pack of 25 £0·64
	Cap, spray, R3/24, polythene and stainless steel, press button action. With 110mm dip tube.	
BTF-379-170D	Cap, spray	£0·27

BOTTLES, screw neck, clear white glass, flat (medical pattern), with polypropylene screw sealing cap.

Capacity, ml	50	100	150	300	500
Thread, R3	22	24	24	28	28

BTF-420-050C	Bottles, 50ml	Pack of 10 £0·96
BTF-420-052V	Bottles, 50ml	Pack of 144 £11·48
BTF-420-070T	Bottles, 100ml	Pack of 10 £1·01
BTF-420-072P	Bottles, 100ml	Pack of 120 £10·69
BTF-420-090N	Bottles, 150ml	Pack of 10 £1·14
BTF-420-092J	Bottles, 150ml	Pack of 72 £7·13
BTF-420-110K	Bottles, 300ml	Pack of 10 £1·69
BTF-420-112G	Bottles, 300ml	Pack of 36 £5·57
BTF-420-130E	Bottles, 500ml	Pack of 10 £2·15
BTF-420-132A	Bottles, 500ml	Pack of 36 £7·03



BTF-450

BOTTLES, oil sample, clear white glass. Supplied corked.

BTF-450-030K	Bottles, 225ml	Pack of 10 £1·60
BTF-450-050E	Bottles, 450ml	Pack of 10 £2·53

Gallenkamp

GENERAL PURPOSE GLASS BOTTLES

All capacities quoted are nominal

WIDE NECK



BTF-550

BOTTLES, glass-stoppered reagent, clear white glass, wide neck with individually ground glass stoppers.

BTF-550-050T	Bottle, 60ml	**£0·65**
BTF-550-070N	Bottle, 125ml	**£0·70**
BTF-550-090H	Bottle, 250ml	**£0·90**
BTF-550-110E	Bottle, 500ml	**£1·04**
BTF-550-130V	Bottle, 1000ml	**£1·41**

BOTTLES, reagent, wide screw neck, clear white glass, with black plastics screw cap lined with waxed disc.

Capacity, ml	15	30	60	100	180
Thread R3/	28	33	38	38	48

Capacity, ml	300	500	1,000
Thread R3/	51	58	63

BTF-590-010D	Bottles, 15ml	Pack of 10 **£0·57**
BTF-590-012W	Bottles, 15ml	Pack of 144 **£6·56**
BTF-590-030U	Bottles, 30ml	Pack of 10 **£0·93**
BTF-590-032Q	Bottles, 30ml	Pack of 144 **£11·03**
BTF-590-050X	Bottles, 60ml	Pack of 10 **£0·99**
BTF-590-052K	Bottles, 60ml	Pack of 144 **£11·66**
BTF-590-070Y	Bottles, 100ml	Pack of 10 **£1·02**
BTF-590-072E	Bottles, 100ml	Pack of 108 **£9·63**
BTF-590-090C	Bottles, 180ml	Pack of 10 **£1·52**
BTF-590-092V	Bottles, 180ml	Pack of 72 **£8·06**
BTF-590-110W	Bottles, 300ml	Pack of 10 **£1·52**
BTF-590-112S	Bottles, 300ml	Pack of 24 **£3·26**
BTF-590-130Q	Bottles, 500ml	Pack of 10 **£2·03**
BTF-590-132M	Bottles, 500ml	Pack of 24 **£4·40**
BTF-590-150K	Bottles, 1000ml	Pack of 10 **£2·75**
BTF-590-152G	Bottles, 1000ml	Pack of 24 **£5·95**



BTF-590

BOTTLES, extra wide screw neck, clear white glass, with black plastics screw cap lined with waxed disc.

Capacity, ml	15	30	60	120	250
Thread R3/	38	38	51	58	83

BTF-620-010V	Bottles, 15ml	Pack of 10 **£0·90**
BTF-620-012R	Bottles, 15ml	Pack of 144 **£10·86**
BTF-620-030P	Bottles, 30ml	Pack of 10 **£0·93**
BTF-620-032L	Bottles, 30ml	Pack of 144 **£11·23**
BTF-620-050J	Bottles, 60ml	Pack of 10 **£1·08**
BTF-620-052F	Bottles, 60ml	Pack of 72 **£6·75**
BTF-620-070D	Bottles, 120ml	Pack of 10 **£1·25**
BTF-620-072W	Bottles, 120ml	Pack of 72 **£8·22**
BTF-620-090U	Bottles, 250ml	Pack of 10 **£2·21**
BTF-620-092Q	Bottles, 250ml	Pack of 48 **£9·61**



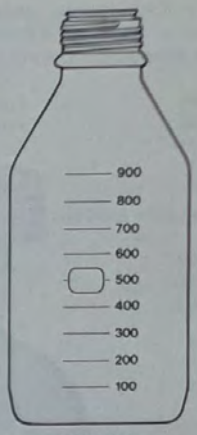
BTF-620

ACCESSORIES for BTF-590 and BTF-620

BTF-640-030B	Caps, polypropylene, R3/33	Pack of 25 **£0·88**
BTF-640-050S	Caps, polypropylene, R3/38	Pack of 25 **£0·92**
BTF-640-070M	Caps, polypropylene, R3/48	Pack of 25 **£0·92**
BTF-640-090G	Caps, polypropylene, R3/51	Pack of 25 **£0·97**
BTF-640-110D	Caps, polypropylene, R3/58	Pack of 25 **£0·97**
BTF-640-130U	Caps, polypropylene, R3/63	Pack of 25 **£0·97**
BTF-640-150X	Caps, polypropylene, R3/83	Pack of 25 **£0·97**
	Caps, polypropylene, R3/28	See *BTF-374-050U*

BOTTLES, screw neck, borosilicate glass, with sloping shoulders to assist pouring. With graduations showing approximate capacities. Can be autoclaved. Screw threads are to ISO R/1115 size GL 45. Internal neck diameter 30mm. **Without** caps. (F)

BTF-680-090B	Bottle, 250ml	**£0·67**
BTF-680-110V	Bottle, 500ml	**£0·87**
BTF-680-130P	Bottle, 1000ml	**£1·09**



BTF-680


BTF-720

ACCESSORIES

Screw caps, polypropylene, interchangeable. Supplied with polypropylene pouring rings for insertion into bottle necks. Caps and rings can be autoclaved at 132°C. In pack containing 10 caps and 10 pouring rings. (F)

BTF-690-502U	Caps	Pack **£1·80**

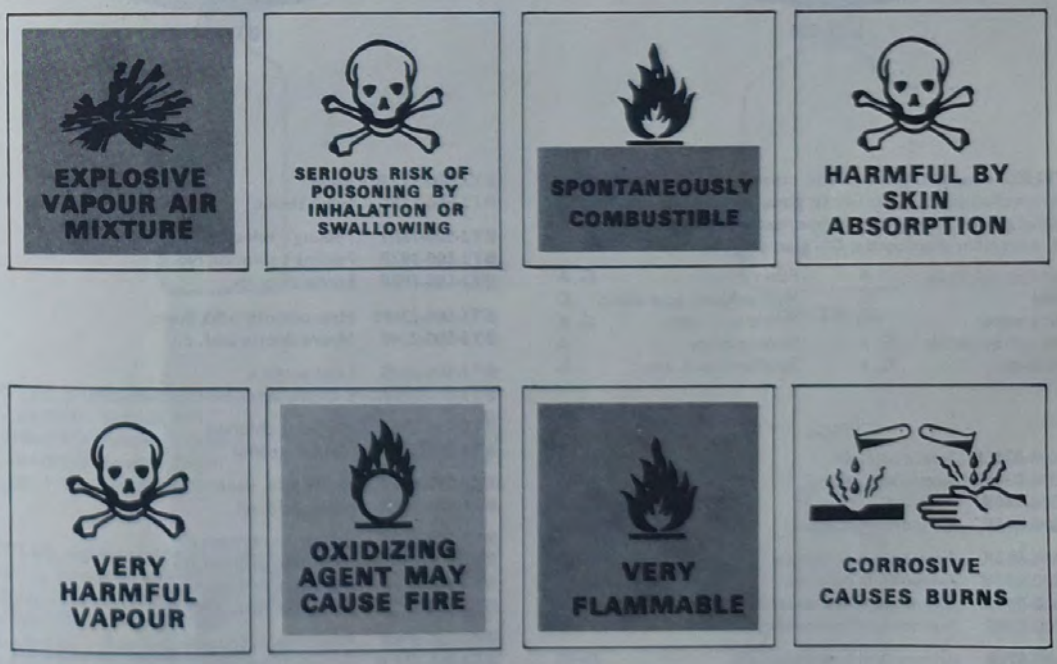
BOTTLES, Kilner, wide neck with screw sealing ring and expendable coated metal cap.

BTF-720-010N	Bottles, 350ml	Pack of 12 **£4·35**
BTF-720-030H	Bottles, 700ml	Pack of 12 **£4·88**
BTF-720-050B	Bottles, 1500ml	Pack of 6 **£3·50**

SPARE PARTS

BTF-724-010M	Caps	Pack of 25 **£1·60**

HAZARD LABELS



For use with your own reagent bottles
See LAB-610-W

LABELLED REAGENT BOTTLES



BTJ-500



BTJ-630

BOTTLES, reagent, glass, 250ml capacity, narrow 24/29 neck, with enamelled label. Clear white glass with an interchangeable hexagonal grip polypropylene stopper except the following titles as coded. A – amber glass bottle; G – glass stopper.

Ammonium sulphide	A	Ether	G, A
Benzene	G	Hydrochloric acid, conc.	G
Bromine water	G	Nitric acid, conc.	G, A
Carbon tetrachloride	G, A	Silver nitrate	A
Chloroform	G, A	Sulphuric acid, conc.	G

	Title	
BTJ-500-030U	Acetic acid, dil.	£0·85
BTJ-500-034M	Acetic acid, glacial	£0·85
BTJ-500-040R	Acetone	£0·85
BTJ-500-046F	Ammonium acetate	£0·85
BTJ-500-052K	Ammonium carbonate	£0·85
BTJ-500-058V	Ammonium chloride	£0·85
BTJ-500-064D	Ammonium hydroxide 0·880	£0·85
BTJ-500-068S	Ammonium hydroxide, conc.	£0·85
BTJ-500-072E	Ammonium hydroxide, dil.	£0·85
BTJ-500-078P	Ammonium molybdate	£0·85
BTJ-500-084U	Ammonium oxalate	£0·85
BTJ-500-090C	Ammonium sulphide	£1·15
BTJ-500-100C	Barium chloride	£0·85
BTJ-500-106N	Benzene	£1·15
BTJ-500-112S	Bromine water	£1·15
BTJ-500-122P	Calcium chloride	£0·85
BTJ-500-128D	Carbon tetrachloride	£1·46
BTJ-500-134Y	Chloroform	£1·46
BTJ-500-140N	Copper sulphate	£0·85
BTJ-500-172A	Ether	£1·46
BTJ-500-178L	Ethyl alcohol	£0·85
BTJ-500-188Y	Fehling's solution No. 1	£0·85
BTJ-500-192R	Fehling's solution No. 2	£0·85
BTJ-500-198F	Ferric chloride	£0·85
BTJ-500-230M	Hydrochloric acid, conc.	£1·15
BTJ-500-234E	Hydrochloric acid, dil.	£0·85
BTJ-500-264S	Lead acetate	£0·85
BTJ-500-270A	Lime water	£0·85
BTJ-500-280U	Mercuric chloride	£0·85
BTJ-500-286Y	Methyl alcohol	£0·85
BTJ-500-296F	Nitric acid, conc.	£1·46
BTJ-500-300R	Nitric acid, dil.	£0·85
BTJ-500-330Y	Potassium chromate	£0·85
BTJ-500-336T	Potassium dichromate	£0·85
BTJ-500-342B	Potassium ferricyanide	£0·85
BTJ-500-348M	Potassium ferrocyanide	£0·85
BTJ-500-354R	Potassium hydroxide	£0·85
BTJ-500-360W	Potassium iodide	£0·85
BTJ-500-366K	Potassium permanganate	£0·85
BTJ-500-372P	Potassium thiocyanate	£0·85
BTJ-500-412G	Silver nitrate	£1·15
BTJ-500-418R	Sodium carbonate	£0·85
BTJ-500-424W	Sodium hydroxide	£0·85
BTJ-500-428X	Sodium hydroxide, dil.	£0·85
BTJ-500-434T	Sodium phosphate	£0·85
BTJ-500-440B	Stannous chloride	£0·85
BTJ-500-446M	Sulphuric acid, conc.	£1·15
BTJ-500-450V	Sulphuric acid, dil.	£0·85

BOTTLES, reagent, glass, as BTJ-500 but 500ml capacity. A – amber glass bottle; G – glass stopper.

Hydrochloric acid, conc.	G	Silver nitrate	A
Nitric acid, conc.	G, A	Sulphuric acid, conc.	G

	Title	
BTJ-590-030D	Acetic acid, dil.	£1·08
BTJ-590-034S	Acetic acid, glacial	£1·08
BTJ-590-068B	Ammonium hydroxide, conc.	£1·08
BTJ-590-072K	Ammonium hydroxide, dil.	£1·08
BTJ-590-100Y	Barium chloride	£1·08
BTJ-590-230S	Hydrochloric acid, conc.	£1·47
BTJ-590-234K	Hydrochloric acid, dil.	£1·08
BTJ-590-296L	Nitric acid, conc.	£1·78
BTJ-590-300A	Nitric acid, dil.	£1·08
BTJ-590-412M	Silver nitrate	£1·39
BTJ-590-424F	Sodium hydroxide	£1·08
BTJ-590-446S	Sulphuric acid, conc.	£1·47
BTJ-590-450E	Sulphuric acid, dil.	£1·08

BOTTLES, reagent, clear white glass, narrow neck with polypropylene stopper, as BTJ-590 but with blank enamelled label and border for user inscription by means of a wax pencil, paint, felt tip marker, etc.

BTJ-610-070Q	Bottle, 125ml, 19/22 neck	£0·85
BTJ-610-090K	Bottle, 250ml, 24/29 neck	£0·85
BTJ-610-110H	Bottle, 500ml, 24/29 neck	£1·08

BOTTLES, reagent, clear white glass, as BTJ-610 but wide neck and with ground glass stopper.

BTJ-630-070C	Bottle, 125ml	£0·90
BTJ-630-090T	Bottle, 250ml	£0·93
BTJ-630-110Q	Bottle, 500ml	£1·22

GENERAL PURPOSE PLASTICS BOTTLES

All capacities quoted are nominal

NARROW NECK



BTK-200



BTK-230-150

BOTTLES, polythene, narrow neck, with polythene screw cap.

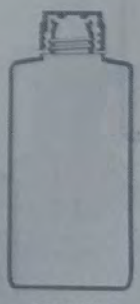
BTK-200-050F	Bottles, 60ml	Pack of 10 £1·04
BTK-200-070W	Bottles, 125ml	Pack of 10 £1·20
BTK-200-090Q	Bottles, 250ml	Pack of 10 £1·42
BTK-200-110N	Bottles, 500ml	Pack of 10 £1·82

BOTTLES, rigid polythene, narrow neck, with polythene screw cap having integrally formed plug. 2500 and 5000ml sizes have a polythene-covered swivel-type handle. (F)

BTK-230-110P	Bottles, 500ml	Pack of 5 £1·91
BTK-230-130J	Bottles, 1000ml	Pack of 5 £2·43
BTK-230-150D	Bottle, 2500ml	Each £2·43
BTK-230-170U	Bottle, 5000ml	Each £2·75

BOTTLES, polypropylene, narrow neck with polypropylene screw cap.

BTK-270-030Y	Bottles, 30ml	Pack of 10 £1·10
BTK-270-050C	Bottles, 60ml	Pack of 10 £1·21
BTK-270-070T	Bottles, 125ml	Pack of 10 £1·65
BTK-270-090N	Bottles, 250ml	Pack of 10 £2·20
BTK-270-110K	Bottles, 500ml	Pack of 10 £2·86
BTK-270-130E	Bottles, 1000ml	Pack of 10 £6·62



BTK-270

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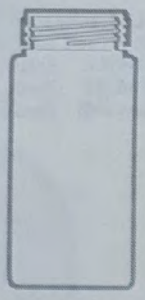
GENERAL PURPOSE PLASTICS BOTTLES

All capacities quoted are nominal

WIDE NECK



BTK-390

BOTTLES, polystyrene, wide neck with plastics cap.

BTK-350-050Y	Bottles, 60ml	Pack of 20 **£1·42**
BTK-350-070C	Bottles, 125ml	Pack of 20 **£1·96**
BTK-350-090T	Bottles, 250ml	Pack of 10 **£1·58**
BTK-350-110Q	Bottles, 350ml	Pack of 10 **£2·06**

BOTTLES, polypropylene, wide neck, with polypropylene screw cap. Can be sterilised in an autoclave at 121°C.

BTK-390-050D	Bottles, 60ml	Pack of 10 **£1·54**
BTK-390-070U	Bottles, 125ml	Pack of 10 **£2·09**
BTK-390-090X	Bottles, 250ml	Pack of 10 **£2·97**
BTK-390-110L	Bottles, 500ml	Pack of 10 **£3·30**
BTK-390-130F	Bottle, 1000ml	Each **£0·76**



BTK-420

BOTTLES, polythene, extra wide neck, with black plastics screw cap with liner.

BTK-420-070P	Bottles, 125ml	Pack of 10 **£1·52**
BTK-420-090J	Bottles, 250ml	Pack of 10 **£2·14**
BTK-420-110G	Bottles, 500ml	Pack of 5 **£2·19**
BTK-420-130A	Bottles, 1000ml	Pack of 5 **£2·59**

BOTTLES, rigid polythene, extra wide neck, square section, fitted with rigid polythene screw cap.

BTK-460-110B	Bottle, 500ml	**£0·80**
BTK-460-130S	Bottle, 1000ml	**£0·84**
BTK-460-150M	Bottle, 2000ml	**£1·04**

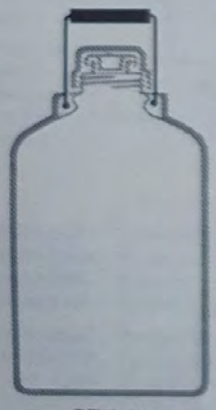


BTK-460

BOTTLES, semi-rigid, polythene, with moulded graduations, polythene screw cap and polythene covered swivel type handle. (F)

Capacity, litres	6	11
Max. graduation, litres	5	10
Subdivision, litres	1	2

BTK-490-050S	Bottle, 6 litres	**£1·13**
BTK-490-090G	Bottle, 11 litres	**£1·80**



BTK-490

BOTTLE, polythene, heavy-duty, rectangular shape, with integrally moulded handle and screw cap. Capacity 23 litres.

BTK-530-V	Bottle, 23 litres	**£5·29**

BOTTLE, thick polythene, with screw cap and lifting handles. Capacity 50 litres, diameter 380mm.

BTK-560-A	Bottle, 50 litres	**£19·63**



BTK-530



BTK-560

DROPPING AND DISPENSING BOTTLES

All capacities quoted are nominal

GLASS


BTR-500


BTR-520


BTR-540

BOTTLES, dropping, clear glass, with 16/16 interchangeable plastics stopper, vinyl teat and glass pipette.

BTR-500-030J	Bottle, 30ml	£0·39
BTR-500-050D	Bottle, 60ml	£0·40
BTR-500-070U	Bottle, 125ml	£0·47

BOTTLES, dispensing, clear glass with 24/20 interchangeable plastics stopper, vinyl bulb and graduated glass pipette.

Capacity, ml		250	500	
Pipette graduated at, ml		5	5 and 10	
BTR-520-090A	Bottle, 250ml			£1·17
BTR-520-110U	Bottle, 500ml			£1·24

BOTTLES, dropping, clear glass, with ground-in pipette stopper and rubber teat.

BTR-540-030E	Bottle, 30ml	£0·78
BTR-540-050V	Bottle, 60ml	£0·84
BTR-540-070P	Bottle, 125ml	£1·18

BOTTLES, dropping, TK pattern, clear glass with ground-in slotted stopper. (F)

BTR-580-030W	Bottle, 30ml	£0·54
BTR-580-050Q	Bottle, 50ml	£0·56
BTR-580-070K	Bottle, 100ml	£0·61


BTR-580


BTR-620


BTR-650

BOTTLE, dropping, TK pattern, 50ml capacity, as BTR-580-050Q but amber glass. (F)

BTR-590-B	Bottle, 50ml	£0·54

BOTTLE, dropping, canada balsam, clear glass, 30ml capacity with loose fitting glass cap and glass rod dropper.

BTR-620-T	Bottle, 30ml	£0·92

BOTTLE, dropping, cedar wood oil, clear glass, 60ml capacity, with 16/16 polythene stopper and glass rod dropper.

BTR-650-V	Bottle, 60ml	£1·17

LABELLED

BOTTLES, dropping, clear white glass, 60ml capacity, narrow 16/16 neck, with enamelled label. With polythene stopper having integral teat dropper.

Title	*pH range*
Litmus	5 to 8
Methyl orange	2·9 to 4·6
Methyl orange, screened	2·9 to 4·6
Phenolphthalein	8·3 to 10
Universal indicator	3 to 11
Starch indicator	—

	Title	
BTR-750-030E	Litmus	£0·90
BTR-750-070P	Methyl orange	£0·90
BTR-750-090J	Methyl orange, screened	£0·90
BTR-750-130A	Phenolphthalein	£0·90
BTR-750-170L	Universal indicator	£0·90
BTR-750-210C	Starch indicator	£0·90



BTR-750

BOTTLE, dropping, clear white glass, 60ml capacity, as BTR-750 but with blank enamelled label and border for user inscription by means of a wax pencil, paint, felt tip marker, etc.

BTR-770-W	Bottle, 60ml	£0·90

PLASTICS



BTR-830



BTR-860

BOTTLES, dropping, polythene with screw cap, vinyl teat and polythene pipette.

BTR-830-050E	Bottle, 60ml	**£0·33**
BTR-830-070V	Bottle, 125ml	**£0·44**

BOTTLES, dropping, polythene, pliable with screw cap having hinged jet tube which is open when raised, allowing either single drops or a continuous stream to be expelled by suitable hand pressure on the bottle. When the jet tube is lowered flat, the bottle is sealed.

BTR-860-030M	Bottles, 25ml	Pack of 10 **£1·04**
BTR-860-050G	Bottles, 50ml	Pack of 10 **£1·18**
BTR-860-070A	Bottles, 100ml	Pack of 10 **£1·29**

CULTURE BOTTLES

All capacities quoted are nominal



BTS-300

BOTTLES, McCartney, glass, narrow neck with aluminium screw cap with rubber liner. Can be autoclaved.

Capacity, ml	7	14	28
Thread R3/	20	20	22

BTS-300-010V	Bottles, 7ml	Pack of 24 **£2·30**
BTS-300-012R	Bottles, 7ml	Pack of 288 **£25·09**
BTS-300-030P	Bottles, 14ml	Pack of 24 **£2·41**
BTS-300-032L	Bottles, 14ml	Pack of 288 **£26·21**
BTS-300-050J	Bottles, 28ml	Pack of 12 **£1·32**
BTS-300-052F	Bottles, 28ml	Pack of 144 **£14·34**

SPARE PARTS

BTS-320-030B	Caps, aluminium, R3/20	Pack of 100 **£3·03**
BTS-320-050S	Caps, aluminium, R3/22	Pack of 100 **£3·07**



BTS-400

BOTTLES, McCartney, glass, 28ml capacity as BTS-300 but with 4mm hole in centre of cap to permit withdrawal of contents by using a hypodermic needle to puncture the rubber liner.

BTS-350-050U	Bottles, 28ml	Pack of 12 **£1·46**
BTS-350-052Q	Bottles, 28ml	Pack of 144 **£15·90**

SPARE PARTS

BTS-370-010S	Caps with central hole and rubber liner.	Pack of 25 **£1·13**



BTS-430

BOTTLES, universal container, glass, 28ml capacity, wide neck with aluminium screw cap, thread R3/28, with rubber liner. Can be autoclaved.

BTS-400-050B	Bottles, 28ml	Pack of 12 **£1·41**
BTS-400-052U	Bottles, 28ml	Pack of 144 **£15·36**

BOTTLES, universal container, clear polystyrene, expendable, 25ml capacity, wide neck with polypropylene screw cap which seals without the use of a separate insert.

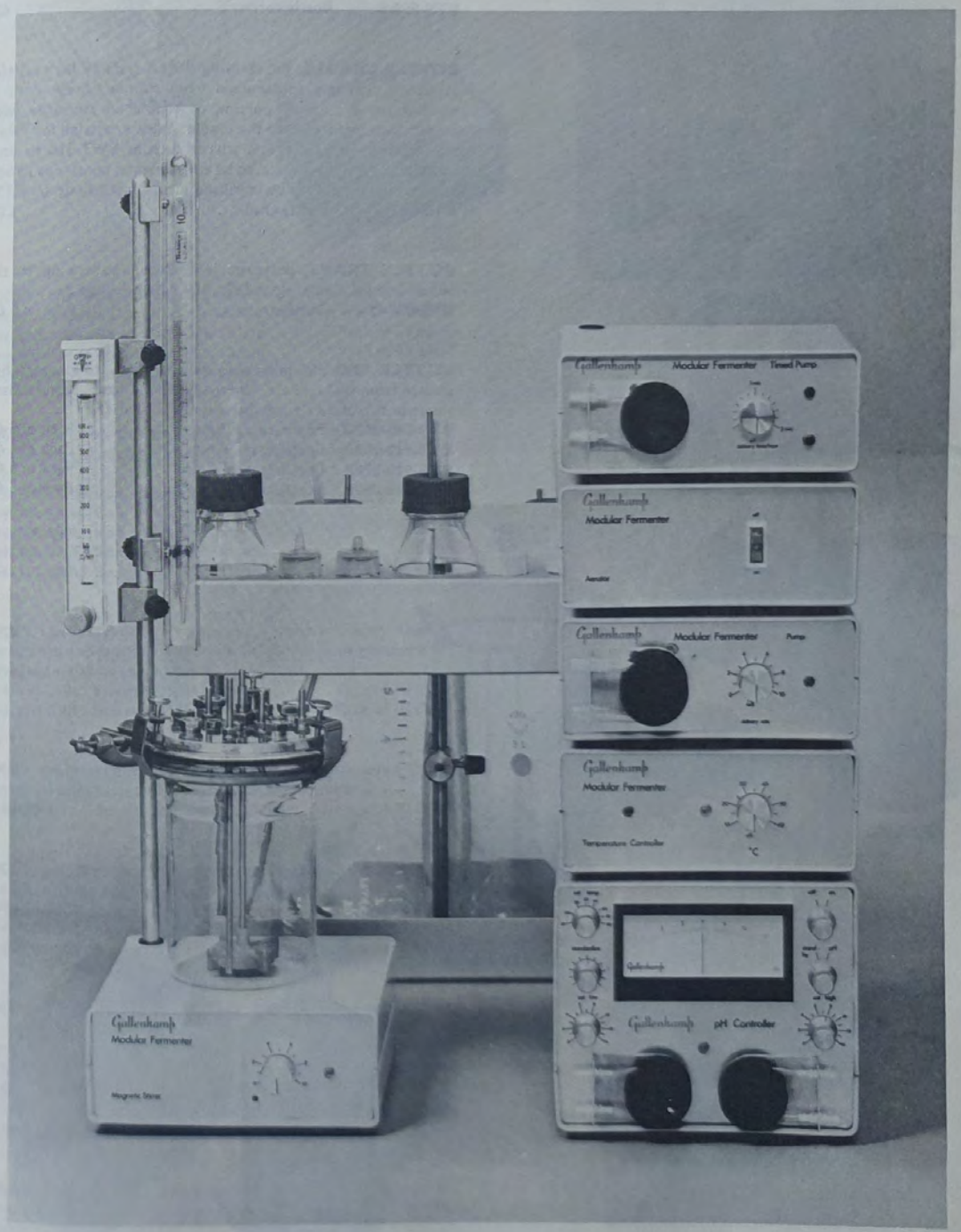
BTS-430-S	Bottles, 25ml	Pack of 10 **£0·56**

Gallenkamp MODULAR FERMENTER

For the growth and study of micro organisms under batch or continuous culture conditions.

The system is presented as a series of modules each of which can be added to the basic fermenter vessel module independently of all others. Most of the modules can also be used as components of other fermentation systems either proprietary or custom built.

For full details see FBL-200-W et seq.



Gallenkamp

BOTTLE CARRIERS AND DRIP TRAYS



BTS-820

BOTTLE CARRIER, polythene coated strong wire cage able to accommodate two 2·5 litre Winchester shape bottles. With carrying handle and rubber feet. Overall dimensions 330 x 190 x 430mm high.

BTS-820-Q Bottle carrier **£3·08**

BOTTLE CARRIER, polythene, to accommodate a 2·5 litre Winchester shape bottle. Liquid tight, with carrying handle pivoted for easy pouring.

BTS-850-S Bottle carrier **£5·06**

BOTTLE CRADLE, for carrying *PYREX* glass 20 litre bottle or aspirator. Strongly constructed from stainless steel with two handles and a cutaway portion to enable an aspirator with a stopcock to be fitted into the cradle. With provision for locating the cradle over a magnetic stirrer such as SWT-310 to enable microbiological media, etc. to be stirred while contained in bottle within the cradle. May be sterilised in an autoclave up to 121°C.

BTS-870-E Bottle cradle **£38·42**

BOTTLE TRAYS, polypropylene, accommodate up to three 500ml bottles. Dimensions 260 x 100 x 20mm deep.

BTS-880-U Bottle trays Pack of 5 **£1·22**

BOTTLE TRAYS, polypropylene, circular, to protect bench surface from spillage, etc. Internally ribbed base accommodates a single bottle of maximum diameter as shown. (F)

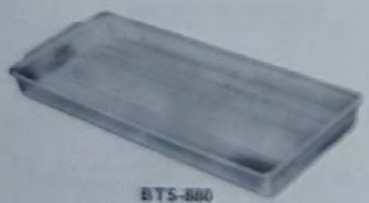
BTS-910-030G	Bottle tray, 70mm	Pack of 5 **£0·99**
BTS-910-050A	Bottle tray, 95mm	Pack of 5 **£1·54**
BTS-910-070R	Bottle tray, 130mm	Pack of 5 **£2·53**
BTS-910-090L	Bottle tray, 150mm	Pack of 5 **£3·25**



BTS-850



BTS-870 with bottle and stirrer



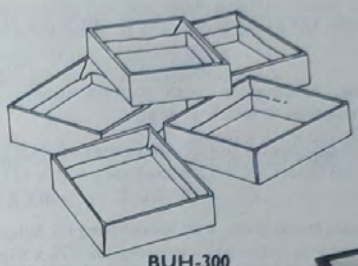
BTS-880



BTS-910

BOXES

All dimensions quoted are nominal internal



BUH-300



BUH-340

BOXES, cardboard, open, rectangular, with easily cleaned white glossy finish. Dimensions given are length × width × depth.

BUH-300-010F	Boxes, 50 × 50 × 13 mm	Pack of 25 **£6·02**
BUH-300-030W	Boxes, 75 × 50 × 13 mm	Pack of 25 **£6·13**
BUH-300-050Q	Boxes, 100 × 75 × 13 mm	Pack of 25 **£7·03**

BOXES, cardboard, rectangular, with white lined interior and with lid having glass top. Dimensions given are length × width × depth.

BUH-340-010A	Box, 66 × 40 × 19 mm	**£1·13**
BUH-340-030R	Box, 84 × 52 × 25 mm	**£1·13**
BUH-340-050L	Box, 102 × 64 × 32 mm	**£1·13**
BUH-340-070F	Box, 128 × 84 × 40 mm	**£1·19**
BUH-340-090W	Box, 152 × 102 × 51 mm	**£1·38**

BOXES, polystyrene, transparent, circular, with slightly tapered sides and snap-on polythene lid. Dimensions given are the internal diameter at top × depth.

BUH-390-010L	Boxes, 40 × 34 mm	Pack of 10 **£1·31**
BUH-390-030F	Boxes, 60 × 74 mm	Pack of 10 **£2·10**

BOXES, polystyrene, transparent, circular, with loose fitting lid. Internal dimensions 50 mm diameter × 25 mm deep.

BUH-420-J	Boxes, 50 × 25 mm	Pack of 10 **£0·56**

BOXES, polystyrene, transparent, rectangular, with sliding lid. Dimensions given are length × width × depth.

BUH-450-010Y	Boxes, 43 × 30 × 10 mm	Pack of 10 **£0·60**
BUH-450-030C	Boxes, 57 × 37 × 13 mm	Pack of 10 **£1·04**
BUH-450-050T	Boxes, 72 × 41 × 20 mm	Pack of 10 **£1·46**

BOXES, polystyrene, transparent, rectangular, with lid. Size Nos. -010D and -030U have straight sides, size No. -070Y has tapered sides. Dimensions given are length × width at top × depth.

BUH-490-010D	Boxes, 120 × 77 × 18 mm	Pack of 10 **£1·70**
BUH-490-030U	Boxes, 170 × 112 × 50 mm	Pack of 10 **£5·63**
BUH-490-070Y	Boxes, 273 × 154 × 88 mm	Pack of 5 **£6·05**

BOXES, polystyrene, transparent, rectangular, with slightly tapered sides and lid. Dimensions given are length × width at top × depth.

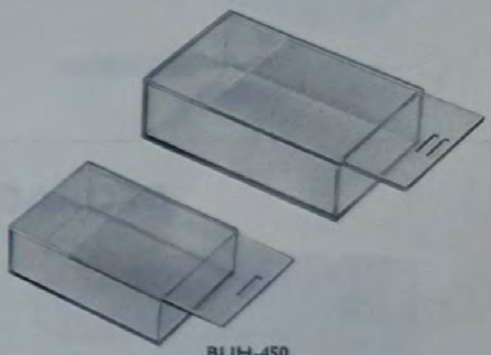
BUH-530-010X	Boxes, 105 × 105 × 82 mm	Pack of 10 **£6·30**
BUH-530-030Y	Boxes, 229 × 120 × 89 mm	Pack of 10 **£8·30**



BUH-390



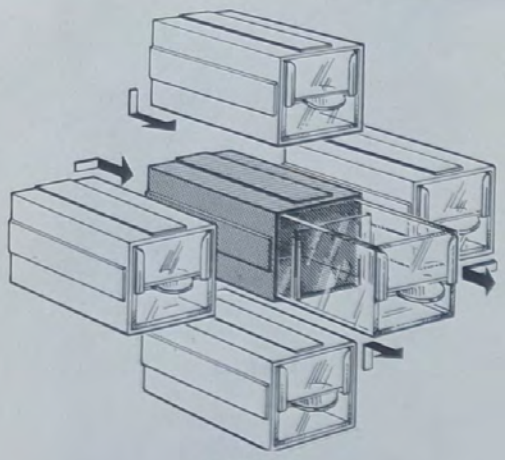
BUH-420



BUH-450



BUH-490
BUH-530 are similar



BUH-560

BOXES, polystyrene, stackable, rectangular, suitable for storage of small components or mounted 35mm transparencies. Transparent drawer, internally 114mm long × 50mm wide × 50mm deep with removable partition, slides in outer case having dovetails on all four sides so that units can be connected rigidly together to make an assembly of the required size. With pocket for label on front of drawer and keyhole in rear of outer case for wall mounting.

BUH-560-T Boxes, 114 × 50 × 50mm Pack of 6 **£1·86**

BOXES, polythene, rectangular, with snap-on sealing lid. Dimensions given are length × width × depth.

BUH-700-010T Box, 170 × 110 × 70mm **£0·51**

BUH-700-030N Box, 230 × 120 × 80mm **£0·65**

BOX, polypropylene, rectangular, with loose fitting lid. Suitable for use as an instrument tray. Internal dimensions 200 × 70 × 50mm deep.

BUH-740-R Box, 200 × 70 × 50mm **£0·78**

BOX, polypropylene, open, rectangular, with slightly tapered sides, rim and moulded handles. Internal dimensions at top 323 × 178 × 98mm deep.

BUH-770-T Box, 323 × 178 × 98mm **£1·61**



BUH-700
BUH-740



BUH-770

STORAGE CABINETS



- Enamelled steel case
- Transparent plastics drawers for visible storage
- Drawers have label holders and safety stop
- Alternative sizes with 8, 16, 30 and 48 drawers
- Overall dimensions 150 × 310 × 560mm high

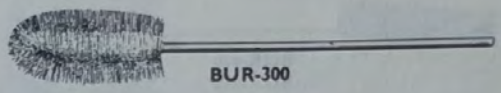
See TOL-470 et seq

BRUSHES

All dimensions quoted are nominal

BRUSHES, beaker, with bristles 15mm long, forming a head 70mm diameter at the widest part × 150mm long, on hardwood handle. Overall length 400mm

BUR-300-A	Brushes, 70mm dia.	Pack of 6 **£1·24**

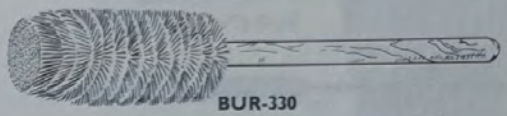

BUR-300

BRUSH, beaker, hair, 70mm diameter × 150mm long, with fan shaped end, on hardwood handle. Overall length 400mm.

BUR-330-C	Brush, 70mm dia.	**£2·25**

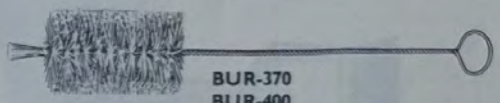
BRUSHES, bottle, white fibre on galvanised wire handle.

Dia. of head, mm		40	50	70
Head length × overall length, mm		50 × 250	75 × 350	150 × 450
BUR-370-010R	Brushes, 40mm dia.			Pack of 10 **£1·26**
BUR-370-030L	Brushes, 50mm dia.			Pack of 10 **£1·70**
BUR-370-050F	Brushes, 70mm dia.			Pack of 10 **£2·18**


BUR-330

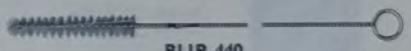
BRUSHES, bottle, white nylon on galvanised wire handle.

Dia. of head, mm		40	50	70
Head length × overall length, mm		50 × 250	75 × 350	150 × 450
BUR-400-010M	Brushes, 40mm dia.			Pack of 10 **£1·52**
BUR-400-030G	Brushes, 50mm dia.			Pack of 10 **£1·86**
BUR-400-050A	Brushes, 70mm dia.			Pack of 10 **£2·64**


BUR-370
BUR-400

BRUSHES, burette, stiff white bristle on galvanised wire handle.

Dia. of head, mm		13	16	19	25
Overall length, mm		500	600	750	900
For burette capacity, ml		10	25	50	100
BUR-440-010H	Brushes, 13mm dia.				Pack of 10 **£0.92**
BUR-440-030B	Brushes, 16mm dia.				Pack of 10 **£1·04**
BUR-440-050S	Brushes, 19mm dia.				Pack of 10 **£1·16**
BUR-440-070M	Brushes, 25mm dia.				Pack of 10 **£1·31**


BUR-440

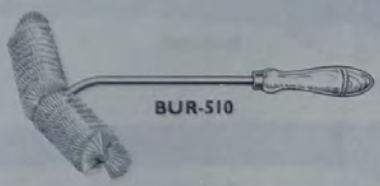
BRUSHES, cylinder, stiff white nylon with fan shaped end, on strong galvanised wire handle.

Dia. of head, mm		60	70
Head length × overall length, mm		120 × 650	140 × 650
BUR-480-010C	Brushes, 60mm dia.		Pack of 10 **£3·41**
BUR-480-030T	Brushes, 70mm dia.		Pack of 10 **£3·83**


BUR-480

BRUSHES, flask, bristle on curved galvanised wire. Curved head 100mm long × 50mm diameter with hinged joint and rubber covered stem on hardwood handle.

BUR-510-A	Brushes, 50mm dia.	Pack of 5 **£2·93**


BUR-510

BRUSHES, test tube, white bristle with fan shaped end, on galvanised wire handle.

Dia. of head, mm		15	30
For tubes dia., mm		10 to 12	16 to 25
BUR-550-010P	Brushes, 15mm		Pack of 10 **£0·53**
BUR-550-030J	Brushes, 30mm		Pack of 10 **£0·70**

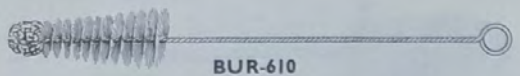
BRUSHES, test tube, white nylon with fan shaped end, on galvanised wire handle.

Dia. of head, mm		10	30
For tubes dia., mm		10 to 12	16 to 25
BUR-580-010R	Brushes, 10mm		Pack of 10 **£0·59**
BUR-580-030L	Brushes, 30mm		Pack of 10 **£0·77**

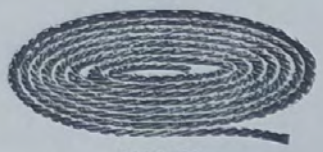

BUR-550
BUR-580

BRUSHES, test tube, white bristle with cotton yarn tip, on galvanised wire handle.

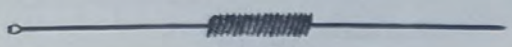
Dia. of head, mm	15	25	
For tubes dia., mm	10 to 12	16 to 25	
BUR-610-010M	Brushes, 15mm		Pack of 10 **£0·62**
BUR-610-030G	Brushes, 25mm		Pack of 10 **£0·78**



BUR-610
BUR-640



BUR-670



BUR-700



BUR-750



BUR-770



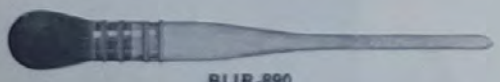
BUR-800



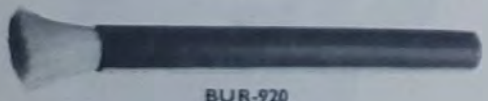
BUR-830



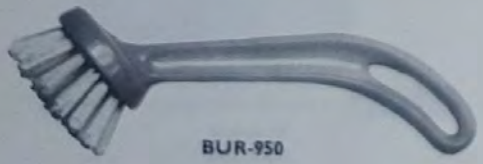
BUR-860



BUR-890



BUR-920



BUR-950

BRUSHES, test tube, white nylon with cotton yarn tip, on galvanised wire handle.

Dia. of head, mm	15	25	
For tubes dia., mm	12 to 16	19 to 25	
BUR-640-010X	Brushes, 15mm		Pack of 10 **£0·70**
BUR-640-030Y	Brushes, 25mm		Pack of 10 **£0·80**

BRUSH, tube (pipe cleaner), white yarn approximately 3mm diameter for cleaning small bore tubes, stopcocks, pipettes, etc.

BUR-670-T Brush, 3mm dia. Pack of 15 metres **£0·53**

BRUSHES, tube, white nylon set in centre of galvanised wire for cleaning tubes open at both ends.

Dia. of head, mm	3	6	12	
Overall length, mm	400	400	600	
BUR-700-010L	Brushes, 3mm dia.			Pack of 10 **£1·13**
BUR-700-030F	Brushes, 6mm dia.			Pack of 10 **£1·13**
BUR-700-050W	Brushes, 12mm dia.			Pack of 10 **£1·22**

BRUSH, flat form, bristle, 12mm wide, in metal mount on wood handle.

BUR-750-C Brush, 12mm wide **£0·51**

BRUSH, flat form, hair, 25mm wide in metal mount on wood handle.

BUR-770-L Brush, 25mm wide **£1·00**

BRUSH, flat form, dusting, 110mm wide in wood handle.

BUR-800-G Brush, 110mm wide **£1·28**

BRUSHES, round form, soft hair in quill mount.

Dia. of head, mm	4	6	8	
Overall length, mm	60	70	80	
BUR-830-010F	Brushes, 4mm dia.			Pack of 10 **£0·68**
BUR-830-030W	Brushes, 6mm dia.			Pack of 10 **£1·06**
BUR-830-050Q	Brushes, 8mm dia.			Pack of 10 **£1·13**

BRUSHES, round form (pencil), hair, head approximately 18mm long in metal mount on wood handle.

BUR-860-K Brushes, 18mm long Pack of 10 **£3·34**

BRUSHES, round form, mop or dabber. Soft hair in metal mount on wood handle.

Dia. of head, mm	9	11	14	
Length of head, mm	30	34	38	
BUR-890-010J	Brush, 9mm dia.			**£0·64**
BUR-890-030D	Brush, 11mm dia.			**£0·82**
BUR-890-050U	Brush, 14mm dia.			**£1·28**

BRUSHES, cleaning, comprising a bundle of polypropylene filaments in a polythene handle which is heat sealed at the top. Designed so that contaminated filaments can be cut off and the handle trimmed to expose clean filaments. Overall length 200mm.

BUR-920-010E	Brushes, 7mm dia.	Pack of 10 **£1·80**
BUR-920-030V	Brushes, 11mm dia.	Pack of 10 **£3·04**
BUR-920-050P	Brushes, 17mm dia.	Pack of 10 **£5·91**

BRUSHES, cleaning, nylon set in polystyrene handle. Overall length 170mm.

BUR-950-J Brushes, 170mm long Pack of 3 **£0·56**



BUX-300



BUX-340



BUX-380

BUCKETS

BUCKET, polypropylene, with lid and rigid handle, without spout. Capacity 9 litres internally graduated in litres.
BUX-300-J Bucket, 9 litres **£1·10**

BUCKET, polypropylene, with pouring spout and rigid handle. Capacity 12 litres internally graduated in litres.
BUX-340-E Bucket, 12 litres **£1·33**

BUCKET, polythene, with pouring spout and strong wire handle with hand grip. Capacity 14 litres.
BUX-380-W Bucket, 14 litres **£1·91**

BUCKET, stainless steel, seamless, with easy-pour rim and handle. Capacity 12 litres. (F)
BUX-450-M Bucket, 12 litres **£11·98**



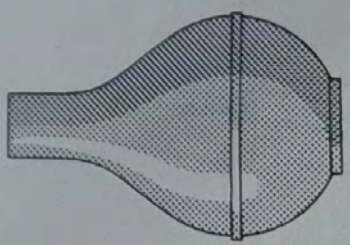
BUX-450

BULBS

BULBS, PVC, pear shape, for use with pipettes, etc. Neck bore 4mm.

Diameter, mm	32	36	40	48
For pipettes, ml	10	15	25	40

BVJ-300-010U	Bulbs, 32mm	Pack of 5 **£1·18**
BVJ-300-030X	Bulbs, 36mm	Pack of 5 **£1·24**
BVJ-300-050Y	Bulbs, 40mm	Pack of 5 **£1·26**
BVJ-300-070C	Bulbs, 48mm	Pack of 5 **£1·31**



BVJ-300

BULBS (TEATS), PVC, for dropper pipettes, etc.

Nominal capacity, ml	1·4	2·7	4
Neck bore, mm	3	4	5

BVJ-340-010P	Bulbs, 1·4ml	Pack of 25 **£1·26**
BVJ-340-030J	Bulbs, 2·7ml	Pack of 25 **£1·26**
BVJ-340-050D	Bulbs, 4ml	Pack of 25 **£1·41**

BULBS (TEATS), PVC, in pack containing 10 each of nominal capacities 1·4, 2·7 and 4ml BVJ-340.
BVJ-380-N Bulbs Pack **£1·69**



BVJ-340

BURETTES

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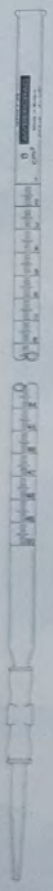
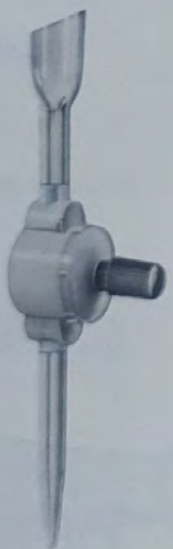
Conway	... 112	Schellbach	... 108



BWF-300



BWF-330



Stopcock of BWF-400

Technico BURETTES TO BS 846 WITH DETACHABLE STOPCOCKS

BURETTE, *TECHNICO,* BS 846 **Class B,** with rubber pinchvalve and glass jet. Capacity 50 × 0·1 ml. Permanent amber stain graduations.

BWF-300-G Burette, 50 × 0·1 ml **£2·23**

BURETTE PINCHVALVES, *GRIFFIN,* as fitted to BWF-300-G. More accurate and convenient than a pinchclip and particularly suitable for controlling the flow from a burette. Consists of a rubber moulding with bore tapering from 7 to 4mm at each end and a valve chest at the centre containing a glass sphere. When the finger grips are pressed, the valve opens.

BWF-330-Y Burette pinchvalves Pack of 5 **£2·27**

BURETTE JETS, glass, for attachment to a burette by means of rubber tubing or *GRIFFIN* pinchvalve BWF-330-Y.

BWF-350-R Burette jets Pack of 5 **£1·61**

BURETTE, *TECHNICO,* BS 846 **Class B,** with plastics diaphragm stopcock. Capacity 50 × 0·1 ml. The stopcock is polythene with a neoprene diaphragm and can be dismantled for cleaning. Suitable for use with reagents which tend to seize glass stopcocks or dissolve stopcock lubricants. Permanent amber stain graduations.

BWF-400-V Burette, 50 × 0·1 ml **£4·06**

SPARE PARTS

BWF-420-010E	Burette with ground taper	**£2·19**
BWF-420-030V	Burette jet with ground taper	**£0·41**
BWF-420-050P	Burette stopcock, polythene, with two spare diaphragms	**£1·43**

Burette brushes	*See BUR-440*
Burette holders	*See STE-690 et seq.*
Burette readers	*See THM-920*
Burette stands	*See STA-200 et seq.*

Technico BURETTES TO BS 846 WITH STRAIGHT BORE STOPCOCKS

BURETTES, *TECHNICO,* BS 846 **Class B,** with straight bore PTFE stopcock. Permanent amber stain graduations.

BWF-450-050R	Burette, 5 × 0·05 ml	**£4·43**
BWF-450-090F	Burette, 10 × 0·02 ml	**£4·81**
BWF-450-110C	Burette, 25 × 0·1 ml	**£5·06**
BWF-450-150N	Burette, 50 × 0·1 ml	**£6·12**
BWF-450-152J	Burettes, 50 × 0·1 ml	Pack of 10 **£50·60**

BURETTES, *TECHNICO,* BS 846 **Class B,** with straight bore glass stopcock. Permanent amber stain graduations. Capacities 1, 2, 5 and 10 × 0·02 ml have an enlarged top for easy filling.

BWF-490-010B	Burette, 1 × 0·01 ml	**£2·47**
BWF-490-030S	Burette, 2 × 0·02 ml	**£2·76**
BWF-490-050M	Burette, 5 × 0·05 ml	**£2·88**
BWF-490-070G	Burette, 10 × 0·1 ml	**£1·96**
BWF-490-090A	Burette, 10 × 0·02 ml	**£3·45**
BWF-490-110U	Burette, 25 × 0·1 ml	**£2·51**
BWF-490-112Q	Burettes, 25 × 0·1 ml	Pack of 10 **£20·70**
BWF-490-130X	Burette, 25 × 0·05 ml	**£2·82**
BWF-490-150Y	Burette, 50 × 0·1 ml	**£2·65**
BWF-490-152E	Burettes, 50 × 0·1 ml	Pack of 10 **£21·85**
BWF-490-170C	Burette, 100 × 0·2 ml	**£2·99**



BWF-450

BURETTES, *TECHNICO,* BS 846 **Class B,** with straight bore interchangeable glass stopcock. Permanent amber stain graduations. Capacities 5 and 10 ml have an enlarged top for easy filling.

BWF-520-050H	Burette, 5 × 0·05 ml	**£3·80**
BWF-520-090S	Burette, 10 × 0·02 ml	**£4·14**
BWF-520-110P	Burette, 25 × 0·1 ml	**£3·57**
BWF-520-150D	Burette, 50 × 0·1 ml	**£4·03**
BWF-520-152W	Burettes, 50 × 0·1 ml	Pack of 10 **£33·35**

BURETTES, *TECHNICO,* BS 846 **Class A,** with straight bore interchangeable glass stopcock. Permanent amber stain graduations. Capacities 1, 2, 5 and 10 ml have an enlarged top for easy filling.

BWF-550-010V	Burette, 1 × 0·01 ml	**£6·44**
BWF-550-030P	Burette, 2 × 0·02 ml	**£7·36**
BWF-550-050J	Burette, 5 × 0·05 ml	**£7·13**
BWF-550-090U	Burette, 10 × 0·02 ml	**£8·05**
BWF-550-110R	Burette, 25 × 0·1 ml	**£6·44**
BWF-550-130L	Burette, 25 × 0·05 ml	**£6·90**
BWF-550-150F	Burette, 50 × 0·1 ml	**£6·67**
BWF-550-170W	Burette, 100 × 0·2 ml	**£7·36**

BURETTES, *TECHNICO,* as BWF-550 but with works' certificate of examination stating volume delivered between zero and each of five points on the burette scale, and the full scale delivery time for water.

BWF-570-010H	Burette, 1 × 0·01 ml	**£11·27**
BWF-570-030B	Burette, 2 × 0·02 ml	**£12·31**
BWF-570-050S	Burette, 5 × 0·05 ml	**£12·02**
BWF-570-090G	Burette, 10 × 0·02 ml	**£14·95**
BWF-570-110D	Burette, 25 × 0·1 ml	**£13·11**
BWF-570-130U	Burette, 25 × 0·05 ml	**£13·69**
BWF-570-150X	Burette, 50 × 0·1 ml	**£13·46**
BWF-570-170Y	Burette, 100 × 0·2 ml	**£14·15**



BWF-490
BWF-520

Gallenkamp

Technico BURETTES TO BS 846 WITH DOUBLE OBLIQUE BORE STOPCOCKS

BURETTES, *TECHNICO*, BS 846 **Class B,** with double oblique bore glass stopcock. Permanent amber stain graduations. Capacities 1, 2, 5 and 10 × 0·02 ml have an enlarged top.

BWF-620-010L	Burette, 1 × 0·01 ml	**£3·80**
BWF-620-030F	Burette, 2 × 0·02 ml	**£4·03**
BWF-620-050W	Burette, 5 × 0·05 ml	**£3·80**
BWF-620-070Q	Burette, 10 × 0·1 ml	**£3·22**
BWF-620-090K	Burette, 10 × 0·02 ml	**£4·49**
BWF-620-110H	Burette, 25 × 0·1 ml	**£3·57**
BWF-620-130B	Burette, 25 × 0·05 ml	**£4·14**
BWF-620-150S	Burette, 50 × 0·1 ml	**£3·80**
BWF-620-170M	Burette, 100 × 0·2 ml	**£4·26**



BWF-620

BURETTES, *TECHNICO*, BS 846 **Class A,** with double oblique bore glass stopcock. Permanent amber stain graduations. Capacities 1, 2, 5 and 10 ml have an enlarged top.

BWF-650-010N	Burette, 1 × 0·01 ml	**£7·59**
BWF-650-030H	Burette, 2 × 0·02 ml	**£8·51**
BWF-650-050B	Burette, 5 × 0·05 ml	**£9·43**
BWF-650-090M	Burette, 10 × 0·02 ml	**£9·20**
BWF-650-110J	Burette, 25 × 0·1 ml	**£8·05**
BWF-650-130D	Burette, 25 × 0·05 ml	**£9·43**
BWF-650-150U	Burette, 50 × 0·1 ml	**£8·51**
BWF-650-170X	Burette, 100 × 0·2 ml	**£8·74**



BWF-650
BWF-670

BURETTES, *TECHNICO*, as BWF-650 but with works' certificate of examination stating volume delivered between zero and each of five points on the burette scale, and the full scale delivery time for water.

BWF-670-010W	Burette, 1 × 0·01 ml	**£13·00**
BWF-670-030Q	Burette, 2 × 0·02 ml	**£13·80**
BWF-670-050K	Burette, 5 × 0·05 ml	**£14·84**
BWF-670-090V	Burette, 10 × 0·02 ml	**£16·33**
BWF-670-110S	Burette, 25 × 0·1 ml	**£15·07**
BWF-670-130M	Burette, 25 × 0·05 ml	**£16·56**
BWF-670-150G	Burette, 50 × 0·1 ml	**£14·32**
BWF-670-170A	Burette, 100 × 0·2 ml	**£15·81**

SPARE PART for BWF-490 to BWF-670

BWF-700-010R	Stopcock springs	Pack of 10 **£0·63**

Technico BURETTES TO BS 846 MANUFACTURED FROM SPECIAL PURPOSE GLASSES

BURETTES, *TECHNICO*, BS 846 **Class B,** low actinic amber glass with straight bore stopcock. White graduations.

BWH-300-090F	Burette, 10 × 0·02 ml	**£4·37**
BWH-300-130T	Burette, 25 × 0·05 ml	**£4·37**
BWH-300-150N	Burette, 50 × 0·1 ml	**£4·14**

BURETTES, *TECHNICO*, BS 846 **Class B,** Schellbach glass with blue line on white enamel background, with straight bore stopcock. Permanent amber stain graduations.

BWH-350-110N	Burette, 25 × 0·1 ml	**£3·68**
BWH-350-150B	Burette, 50 × 0·1 ml	**£4·37**

BURETTES, *TECHNICO*, as BWH-350 but with double oblique bore stopcock.

BWH-370-110W	Burette, 25 × 0·1 ml	**£5·41**
BWH-370-150K	Burette, 50 × 0·1 ml	**£5·52**



BWH-370

Schellbach glass burette with double oblique bore stopcock and automatic zero See BWJ-330-X

PYREX BURETTES WITH STRAIGHT BORE STOPCOCKS

BURETTES, *PYREX*, BS 846 **Class B,** borosilicate glass, with straight bore stopcock and amber stain graduations.

BWH-500-050B	Burettes, 5 × 0·02 ml	Pack of 2 **£8·17**
BWH-500-070S	Burettes, 10 × 0·1 ml	Pack of 2 **£8·17**
BWH-500-090M	Burettes, 10 × 0·02 ml	Pack of 2 **£7·07**
BWH-500-130D	Burettes, 25 × 0·05 ml	Pack of 2 **£9·03**
BWH-500-150U	Burettes, 50 × 0·1 ml	Pack of 2 **£7·88**

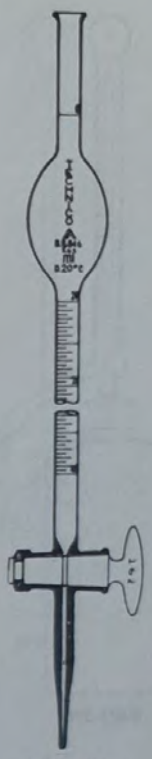
BURETTES, *PYREX*, BS 846 **Class A,** borosilicate glass, with straight bore stopcock and amber stain graduations. With works' certificate giving volume delivered at one point.

BWH-520-090V	Burettes, 10 × 0·02 ml	Pack of 2 **£15·87**
BWH-520-150G	Burettes, 50 × 0·1 ml	Pack of 2 **£18·17**

Technico BULB BURETTES TO BS 846

BURETTES, bulb, *TECHNICO*, BS 846 **Class A,** borosilicate glass with straight bore interchangeable glass stopcock and white graduations. All capacities have a scale range of 25 ml and subdivisions of 0·05 ml.

BWH-600-010F	Burette, 45 ml	**£10·12**
BWH-600-030W	Burette, 65 ml	**£10·12**
BWH-600-050Q	Burette, 85 ml	**£10·12**
BWH-600-070K	Burette, 105 ml	**£10·12**



BWH-600



BWH-650

Technico DISPENSING BURETTES

BURETTES, dispensing, *TECHNICO*, **Class B,** borosilicate glass with straight bore stopcock and white graduations.

BWH-650-010Q	Burette, 250 × 1 ml	**£5·29**
BWH-650-030K	Burette, 500 × 5 ml	**£5·98**
BWH-650-050E	Burette, 1000 × 10 ml	**£10·88**

Gallenkamp TITRATION STAND ASSEMBLIES

For electrometric titrations at ambient or elevated temperatures

- **Efficient variable magnetic stirring**
- **Convenient and quick to use**
- **Accept standard electrodes, burettes and thermometers**
- **Quick release bosshead enables electrodes to be lifted clear of titration vessel**



See TLB-300 et seq.

For METTLER Titration System Modules *See TLD-200-Y et seq.*

Gallenkamp

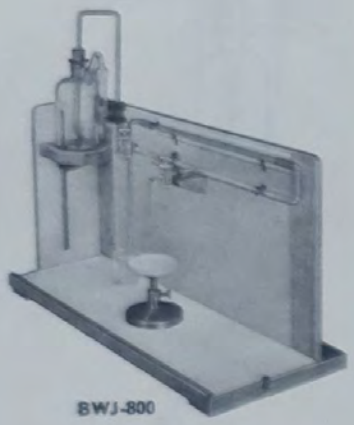
Technico MICRO BURETTES



BWJ-610

BURETTES, micro, *TECHNICO*, **Class B,** borosilicate glass with white graduations and interchangeable stopcock. Mounted on tripod base with offset so that the burette tube is free for cleaning. Burette tube and cup top fitted with glass caps.

BWJ-610-010B	Burette, 2 × 0·01 ml	**£15·99**
BWJ-610-030S	Burette, 5 × 0·02 ml	**£15·99**



BWJ-800

BURETTE, micro, Conway, *TECHNICO*, **Class A,** to deliver 0·25 ml, subdivisions 0·001 ml, and capable of being read to 0·00025 ml, the graduated tube being a length of precision bore tubing. The graduated burette tube is connected by plastics tubing to the remaining glass parts which are of borosilicate glass. The liquid which is delivered from the jet is in contact only with borosilicate glass. The reservoir bottle is fitted with a guard tube. A ball and socket ground joint is fitted between the reservoir delivery tube and the burette stopcock tube to simplify cleaning, and minimise breakage. The burette is mounted on a wood stand with white glazed base and a white background to the burette tube. The stand has an adjustable support for the reservoir bottle and an adjustable table under the delivery jet to take a micro-diffusion dish or a micro beaker. With instructions. (Microdiffusion Analysis and Volumetric Error, Edward J. Conway, F.R.S., M.B., D.Sc.)

BWJ-800-S	Burette, Conway	**£75·94**

SPARE PARTS

BWJ-820-502D	Burette tube, graduated	**£4·33**
BWJ-820-504W	Main connecting tube, with two stopcocks and ball and socket joint	**£8·57**
BWJ-820-506S	Reservoir delivery tube, with ball joint	**£3·26**
BWJ-820-508X	Pressure balancing tube, with stopcock, borosilicate glass	**£3·84**
BWJ-820-510E	Reservoir bottle, with two necks	**£3·07**
BWJ-820-512A	Moisture guard tube	**£1·74**
	Microdiffusion dishes for use with BWJ-800-S	*See CMV-450-Q*

OTHER BURETTES

Haldane	*See GAS-750-010L*	Nalfloc	*See WHX-820-030V*
Hempel	*See GAV-920-M*	Orsat	*See GAS-350-010U and GAS-350-502W*
Lloyd	*See GAS-610-030S*		
Martin	*See GAV-790-C*	Tutweiler	*See GAV-950-X*

BURNERS

Burners are listed under the following sub-headings:

	page		page
Multi gas	113	LPG (bottled)	117
Coal gas	113	Liquid fuel	118
Natural (methane) gas	115	Blowpipes	118

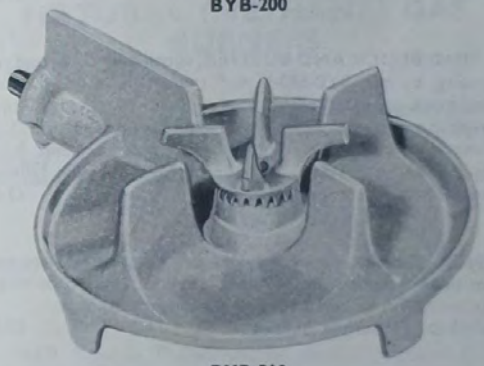
BURNERS



BYB-200



BYB-250



BYB-310

MULTI-GAS BURNERS

BURNER, Bunsen, for coal gas, methane, butane, propane or mixtures of these gases. With 13mm o.d. burner tube, adjustable jet, screwed air regulator, gas control needle valve, adjustable baffle and gas inlet tube 9mm o.d. Overall height 160mm.

BYB-200-J Burner, Bunsen **£3·49**

RADIANT HEATER, semi-micro, *GRIFFIN*, for coal or natural (methane) gas to give fine control of heat and unaffected by draughts. Employs a concept combining radiant and convection heating. Gas controlled by a needle valve is burned at a small jet surrounded by a metal wire helix which becomes the source of radiant heat. Objects to be heated such as crucibles, flasks, micro slides, etc. can be supported on the draught shield and the castellated top is particularly suitable for holding horizontal tubes securely. Overall height 70mm. With instructions.

BYB-250-U Radiant heater **£7·65**

SPARE PARTS

BYB-260-030E Helices Pack of 12 **£1·95**

BURNER, ring, for coal or natural (methane) gas. Fitted with injector for methane and supplied with alternative injector for coal gas. Mounted on vitreous enamelled, heat deflecting base, with air and gas regulators. Overall dimensions 300 × 210 × 80mm high.

BYB-310-R Burner, ring **£10·55**



BYB-400



BYB-420-504



BYB-420-514

COAL GAS BURNERS

BURNERS, Bunsen, for coal gas, with air regulator and riffled gas inlet tube 9mm o.d. Overall height 120mm. Dimension given is o.d. of burner tube.

BYB-400-030H Burners, Bunsen, 11mm Pack of 6 **£5·87**
BYB-400-050B Burners, Bunsen, 13mm Pack of 6 **£6·82**

ACCESSORIES

Ribbon burner heads, 125mm long with cradle support at each end for tubes up to 25mm diameter. Flame length 100mm.

BYB-420-504U Ribbon burner head, 11mm **£1·63**
BYB-420-508M Ribbon burner head, 13mm **£1·63**

Flat flame burner heads, flame width 50mm.

BYB-420-514R Flat flame burner heads, 11mm Pack of 3 **£2·88**
BYB-420-518J Flat flame burner heads, 13mm Pack of 3 **£3·06**



BYB-450



BYB-500

BURNER, Bunsen, for coal gas, as BYB-400-050B but with gas control stopcock and pilot flame for ignition. Overall height 160mm.

BYB-450-E Burner, Bunsen **£4·84**

BURNER, Bunsen, *FLAMEFAST*, for coal gas, without air regulator, giving non-luminous flame. With riffled gas inlet tube 9mm o.d. Overall height 120mm.

BYB-500-Y Burner, Bunsen **£1·35**

BURNER, Teclu, for coal gas, with 13mm o.d. burner tube, conical mixing section, screwed air regulator, gas control needle valve and riffled gas inlet tube 9mm o.d. Overall height 143mm.

BYB-560-M Burner, Teclu **£3·15**

BURNER, flat flame (batswing, fishtail benchlight), for coal gas, suitable for working small diameter soda-lime glass tubing. With ceramic head and riffled gas inlet tube 9mm o.d. Overall height 185mm.

BYB-600-A Burner, flat flame **£1·22**

BURNER, semi-micro, for coal gas, with 4·5mm o.d. burner tube, air regulator and riffled gas inlet tube 9mm o.d. Overall height 95mm.

BYB-650-L Burner, semi-micro **£1·81**

HEATING BLOCK AND BURNER, semi-micro, for coal gas, comprising burner BYB-650-L and removable heating block. Heating block is an aluminium cylinder 60mm diameter × 38mm high with three recesses in top 12·5, 14 and 22mm diameter, 28, 21 and 9mm deep respectively with asbestos pad at bottom. Block mounted on three legs on base of burner. Overall height 170mm.

BYB-680-N Heating block and burner **£5·06**

BURNER, Bunsen, pipeline, for coal gas, with 11mm o.d. burner tube, threaded $\frac{1}{8}$in. BSP at one end for connection to gas supply line. With air regulator and gas control stopcock.

BYB-750-D Burner, Bunsen **£3·15**

BURNER, Meker pattern, *AMAL* **Graduate,** for coal gas, with perforated burner head 25mm diameter, jet No. 230, air regulator and riffled gas inlet tube 9mm o.d. Overall height 143mm.

BYB-800-H Burner, Meker pattern **£2·84**

BURNER, Meker pattern, *AMAL* **Major,** for coal gas, with perforated burner head 43mm diameter, gas control needle valve and riffled gas inlet tube 9mm o.d. Overall height 180mm.

BYB-840-C Burner, Meker pattern **£6·62**



BYB-560



BYB-600



BYB-650



BYB-680



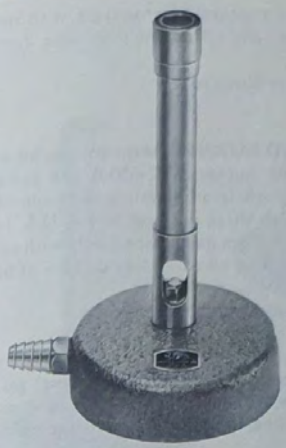
BYB-750

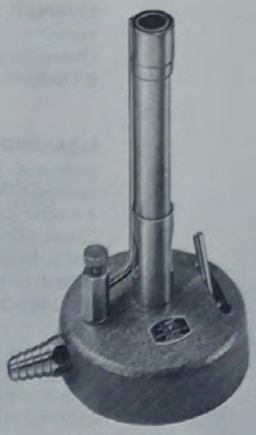


BYB-800



BYB-840


BYC-400


BYC-455


BYC-505

NATURAL (METHANE) GAS BURNERS

BURNER, Bunsen, *FLAMEFAST*, for natural (methane) gas with 13mm o.d. burner tube, air regulator and riffled gas inlet tube 9mm o.d. Overall height 125mm.

BYC-400-G Burner, Bunsen **£1·49**

ACCESSORY

Flat flame burner heads, flame width 50mm

BYC-420-540G Flat flame burner heads Pack of 3 **£2·41**


BYC-525

BURNER, Bunsen, *FLAMEFAST*, for natural (methane) gas, as BYC-400-G but with gas control stopcock and pilot flame for ignition. Overall height 130mm.

BYC-455-K Burner, Bunsen **£5·29**

BURNER, Bunsen, *FLAMEFAST*, for natural (methane) gas, without air regulator, giving non-luminous flame. With riffled gas inlet tube 9mm o.d. Overall height 120mm.

BYC-505-X Burner, Bunsen **£1·58**

BURNER, semi-micro, *FLAMEFAST*, for natural (methane) gas, with 5·5mm i.d. burner tube, air regulator and riffled gas inlet tube 9mm o.d. Overall height 88mm.

BYC-525-A Burner, semi-micro **£1·55**

BURNER, Teclu, *FLAMEFAST*, for natural (methane) gas, with 13mm o.d. burner tube, conical mixing section, screwed air regulator, gas control needle valve and riffled gas inlet tube 9mm o.d. Overall height 125mm.

BYC-565-S Burner, Teclu **£4·39**


BYC-605

BURNER, flat flame (batswing, fishtail benchlight), for natural (methane) gas, suitable for working small diameter soda-lime glass tubing. With ceramic head and riffled gas inlet tube 9mm o.d. Overall height 214mm.

BYC-605-G Burner, flat flame **£1·91**

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BYC-650

BURNER, semi-micro, for natural (methane) gas, with 5mm i.d. burner tube, air regulator and riffled gas inlet tube 9mm o.d. Overall height 95mm.

BYC-650-B Burner, semi-micro **£2·34**

HEATING BLOCK AND BURNER, semi-micro, for natural (methane) gas, comprising burner BYC-650-B and removable heating block. Heating block is an aluminium cylinder 60mm diameter × 38mm high with three recesses in top 12·5, 14, and 22mm diameter, 28, 21 and 9mm deep respectively with asbestos pad at bottom. Block mounted on three legs on base of burner. Overall height 170mm.

BYC-680-D Heating block and burner **£5·84**



BYC-680

BURNER, Bunsen, pipeline, for natural (methane) gas, with 13mm o.d. burner tube, threaded ⅛in. BSP at one end for connection to gas supply line. With air regulator and gas control stopcock.

BYC-750-Q Burner, Bunsen **£3·38**

BURNER, Meker pattern, *AMAL* **Graduate,** for natural (methane) gas, with perforated burner head 25mm diameter, jet No. 55, air regulator and riffled gas inlet tube 9mm o.d. Overall height 143mm.

BYC-800-U Burner, Meker pattern **£2·84**

BURNER, Meker pattern, *AMAL* **Major,** for natural (methane) gas, with perforated burner head 43mm diameter, jet No. 160 fitted and one each jet Nos. 150, 170 and 180, gas control needle valve and riffled gas inlet tube 9mm o.d. Overall height 180mm.

BYC-840-P Burner, Meker pattern **£6·62**



BYC-750



BYC-800



BYC-840

Gallenkamp

KJELDAHL HEATER UNITS

GAS HEATED

- Alternative coal or natural gas models
- Individual control of gas jets

Macro models *See NKH-400 et seq.*

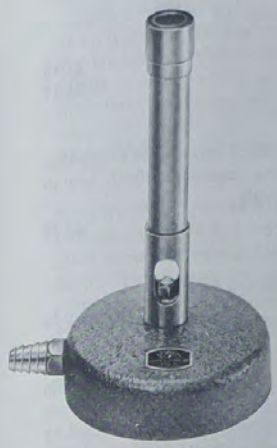
Micro models *See NKT-270 et seq.*



Micro model with flasks and exhaust tube



BYD-530



BYD-404



BYD-655



BYD-805

LIQUID PETROLEUM (BOTTLED) GAS BURNERS

BURNER, Bunsen, *FLAMEFAST*, for butane/propane gas, with 13mm o.d. burner tube, air regulator and riffled gas inlet tube 9mm o.d. Overall height 125mm.

BYD-404-S Burner, Bunsen **£1·49**

BURNER, Bunsen, *FLAMEFAST*, for butane/propane gas, as BYD-404-S but with gas control stopcock and pilot flame for ignition.

BYD-454-G Burner, Bunsen **£5·29**

BURNER, micro, for butane gas at 280mm w.g. and propane gas at 330mm w.g. With 8mm o.d. burner tube, gas control needle valve, air regulator and riffled gas inlet tube 9mm o.d. Overall height 100mm.

BYD-530-N Burner, micro **£2·53**

BURNER, semi-micro, *FLAMEFAST*, for butane/propane gas, with 5·5mm i.d. burner tube, air regulator and riffled gas inlet tube 9mm o.d. Overall height 88mm.

BYD-655-H Burner, semi-micro **£1·92**

BURNER, Meker pattern, *AMAL* **Graduate,** for butane/propane gas at approximately 280mm w.g. With perforated burner head 25mm diameter, jet No. 30, air regulator and riffled gas inlet tube 9mm o.d. Overall height 143mm.

BYD-805-D Burner, Meker pattern **£2·84**

BURNER, Meker pattern, *AMAL* **Major,** for butane/propane gas at approximately 280mm w.g. With perforated burner head 43mm diameter, jet No. 40 fitted and one each jet Nos. 30, 50 and 60, gas control needle valve and riffled gas inlet tube 9mm o.d. Overall height 180mm.

BYD-845-V Burner, Meker pattern **£6·62**

BURNER, Meker pattern, *AMAL* **Maximus,** for butane/propane gas at approximately 280mm w.g. Designed to give the equivalent amount of heat as the AMAL MAJOR BYB-840-C burning coal gas. With perforated burner head 60mm diameter, three fixed jets No. 50, gas control needle valve and riffled gas inlet tube 9mm o.d. Overall height 185mm.

BYD-890-Q Burner, Meker pattern **£15·62**



BYD-845



BYD-890



BYD-940 with cartridge

BURNER, Meker pattern, *LABOGAS*, for use with expendable butane cartridge. Provides flame temperature up to 1100°C and consumes approximately 60g/hour at full flame. Overall height 190mm, flame diameter 20mm. With air and flame adjustment valves and clip to hold cartridge but supplied **without** cartridge. (F)

BYD-940-U Burner, Meker pattern **£7·88**

ACCESSORY

Cartridges, 90mm diameter × 100mm high containing 200g of butane. (F)

BYD-950-504Y Cartridges Pack of 3 **£1·63**

Available for export by deck cargo Sea Freight only.

Gallenkamp

LIQUID FUEL BURNERS



BYF-300

BURNERS, for methylated spirit. Glass, with wick, metal wick holder and ground glass cap to reduce evaporation when not in use.

Nominal capacity, ml	60	125
Height, mm	85	90

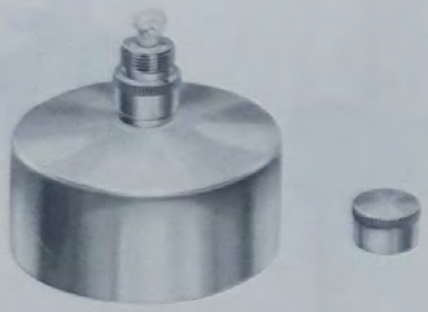
BYF-300-030V Burner, 60ml **£1·15**
BYF-300-050P Burner, 125ml **£1·17**

BURNER, for methylated spirit. Polished metal with screw cap, wick and metal wick holder. Nominal capacity 120ml, overall dimensions 78mm diameter x 62mm high.

BYF-330-J Burner **£3·38**

SPARE PART for BYF-300 and BYF-330

BYF-340-010W Wick Pack of 10 metres **£0·93**



BYF-330

BURNER, Bunsen, Barthel type, for methylated spirit. Suitable for the Naked Flame Test described in BS 738 and the Spirit Burner Test in BS 3289, 3497 and 3503. Comprises burner connected by flexible tubing to fuel reservoir 1 litre capacity, tripod stand with removable centre piece, one each fine and coarse gauzes, pricker and instructions.

BYF-500-X Burner, Bunsen **£35·66**

SPARE PART

BYF-510-010E Burner only **£23·85**



BYF-500

BLOWPIPES

BLOWPIPE, bench, for coal gas, with taps for gas and air control and adjustable sleeve for flame control. Elevation adjustment is by swivel joint and a height adjustment of 25mm is given by pillar sliding in sleeve with locking screw. Mounted on heavy tripod base. Overall height 190mm.

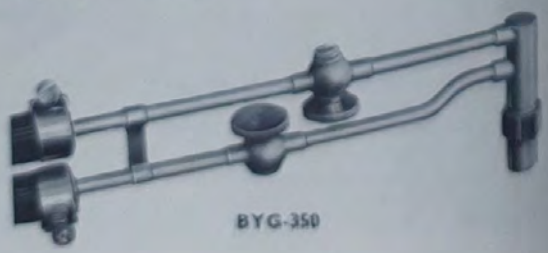
BYG-300-U Blowpipe **£14·34**

BLOWPIPE, hand, Bornkessel, for coal gas or natural gas and air. Not suitable for use with oxygen. With independent gas and air supply tubes, each fitted with a regulating tap giving fine control of flame.

BYG-350-Y Blowpipe **£11·09**



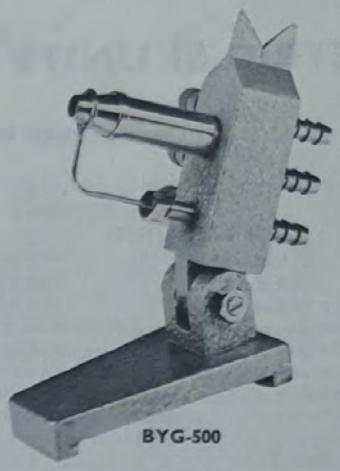
BYG-300



BYG-350

BLOWPIPE, *GALLENKAMP*, for either coal, natural (methane) or butane-propane mixtures with compressed air or oxygen-air mixtures. A supply of oxygen is essential to produce fully stable flame conditions. Capable of giving a range of flames for working soda-lime and borosilicate glasses. Separate taps for gas, air and oxygen are fitted and an oxygen bleed, controlled by a needle valve, is used to stabilise the flame. Inlet nozzles accept 10mm bore flexible tubing. With integral V-notch for cutting and shaping glass tubing, joint for vertical adjustment of burner tube, stable base and three interchangeable jets, two of which can be located in the base when not in use.

BYG-500-E Blowpipe **£28·13**



BYG-500

BLOWPIPE, *FLAMEMASTER*, hand torch, for either coal, natural (methane), butane or propane gas with air or air-oxygen mixtures using accessory mixer. Gives from small needle to large brush flame. With sprung operating grip which reduces air and gas to pilot flame when released. With Miniflame unit, fine control needle valves, nozzles suitable for 6 to 8mm bore tubing and cap for burner head.

BYG-570-B Blowpipe **£15·95**

ACCESSORIES

Oxygen-air mixer, to enable Miniflame or Maxiflame units to be used for working borosilicate glass. With non-return valve.

BYG-590-506B Oxygen-air mixer **£6·60**

Maxiflame unit, to enable either coal, natural (methane), butane or propane gas to be used with compressed air. Fits in place of Miniflame unit and comprises jet and nozzle assembly, capable of producing a flame suitable for brazing.

BYG-590-518R Maxiflame unit **£2·75**

Oxyflame units, to enable either coal, natural (methane), butane or propane to be used with oxygen only. Fits in place of Miniflame unit. Set of three capable of giving different sizes of hot flame for brazing and light welding. Complete with nozzle cap.

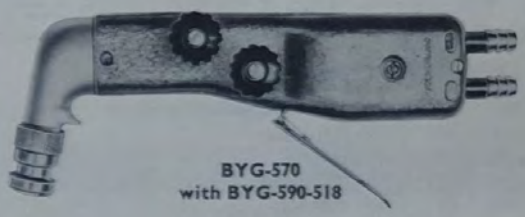
BYG-590-530E Oxyflame units Set **£4·46**

Soldering attachment to convert blowpipe into a soldering iron with adjustable heat control for light soldering.

BYG-590-544Q Soldering attachment **£3·74**

Bench clamp, to convert to a bench blowpipe.

BYG-590-558F Bench clamp **£3·30**



BYG-570
with BYG-590-518

BLOWPIPE for butane gas. Hand held or free standing, capable of giving from a fine needle to a large brush flame using a gas control needle valve. With butane cylinder and instructions.

BYG-700-L Blowpipe **£4·84**

Available for export by deck cargo Sea Freight only.

SPARE PART

BYG-710-010B Butane cylinders Pack of 6 **£3·63**

Available for export by deck cargo Sea Freight only.



BYG-700

GLASSBLOWING TOOLS

A range of tools including:

Cutting knives

Cones

Diamonds

Shapers

Tapers

are listed under page heading *Glassblowing*

METRIC SI UNITS AND BRITISH EQUIVALENTS

Selected from BS 3763 : 1970 and other sources.

SI BASE UNITS

metre	(m)	– unit of length.
kilogram	(kg)	– unit of mass.
second	(s)	– unit of time.
ampere	(A)	– unit of electric current.
kelvin	(K)	– unit of thermodynamic temperature.
candela	(cd)	– unit of luminous intensity.
mole	(mol)	– unit of amount of substance.

SI SUPPLEMENTARY UNITS

radian	(rad)	– unit of plane angle.
steradian	(sr)	– unit of solid angle.

SI DERIVED UNITS
having special names and symbols

hertz	(Hz)	– unit of frequency.
newton	(N)	– unit of force.
pascal	(Pa)	– unit of pressure.
joule	(J)	– unit of energy.
watt	(W)	– unit of power.
coulomb	(C)	– unit of quantity of electricity.
volt	(V)	– unit of electric potential.
farad	(F)	– unit of electric capacitance.
henry	(H)	– unit of electric inductance.
ohm	(Ω)	– unit of electric resistance.
siemens	(S)	– unit of electric conductance.
weber	(Wb)	– unit of magnetic flux.
tesla	(T)	– unit of flux density.
lumen	(lm)	– unit of luminous flux.
lux	(lx)	– unit of illuminance.

NAMES AND SYMBOLS FOR SI PREFIXES

Factor	Prefix	Symbol
10^{12}	tera	T
10^{9}	giga	G
10^{6}	mega	M
10^{3}	kilo	k
10^{2}	hecto	h
10^{1}	deca	da
10^{-1}	deci	d
10^{-2}	centi	c
10^{-3}	milli	m
10^{-6}	micro	μ
10^{-9}	nano	n
10^{-12}	pico	p
10^{-15}	femto	f
10^{-18}	atto	a

UNITS RECOGNISED BY CIPM
(Comité International des Poids et Mesures)

minute	(min)	= 60s.
hour	(h)	= 3600s.
degree	(°)	= π/180rad.
litre	(l)	= 1dm³.
degree Celsius	(°C)	
ångström	(Å)	= 0·1nm.
standard atmosphere	(atm)	= 101 325Pa.
bar	(bar)	= 100kPa.

BRITISH MEASURES AND EQUIVALENTS (approx.)

1 inch	(in)	= 2·5400cm.
1 square inch	(in²)	= 6·4516cm².
1 cubic inch	(in³)	= 16·387cm³.
1 cubic foot	(ft³)	= 28·317dm³.
1 pint	(pt)	= 568·262cm³.
1 U.K. gallon	(gal)	= 4·546dm³.
1 fluid ounce	(fl oz)	= 28·413cm³.
1 ounce	(oz)*	= 28·350g.
1 pound	(lb)*	= 0·4536kg.

(* avoirdupois).

METRIC MEASURES AND EQUIVALENTS (approx.)

1 centimetre	(cm)	= 0·3937in.
1 square centimetre	(cm²)	= 0·1550in².
1 cubic centimetre	(cm³)	= 0·0610 in³.
		= 0·0352fl oz.
1 cubic decimetre	(dm³)	= 0·0353ft³.
1 gram		= 0·0353oz*.
1 kilogramme		= 2·2046lb*.

(*avoirdupois).

UNITS OF PRESSURE

1 atm	= 760mm Hg	= 29·9213in Hg.
	= 101 325N/m²	= 101 325Pa.
	= 1·0332kgf/cm²	= 14·696lbf/in².
1 bar	= 750·062mm Hg	= 29·53in Hg.
	= 1×10^5N/m²	= 1×10^5Pa.
	= 1·0197kgf/cm²	= 14·504lbf/in².
1 lbf/in²	= 6894·76N/m²	= 6894·76Pa.
	= $6{\cdot}89476 \times 10^{-2}$bar.	
	= $7{\cdot}0307 \times 10^{-2}$kgf/cm².	
1 torr	= 1/760atm	= 1mm Hg.
	= 1·3332mbar	

DERIVED UNITS IN TERMS OF BASE UNITS (examples)

speed, velocity	m/s; ms^{-1}.
acceleration	m/s^2; ms^{-2}.
density	kg/m^3; $kg\ m^{-3}$.
concentration	mol/m^3; $mol\ m^{-3}$.
dynamic viscosity	kg/(ms); (Pa s).
surface tension	kg/s^2; (Nm^{-1}).

CALCULATORS

SLIDE RULES

The following abbreviations are used to simplify specifications of slide rules:

A	– scale of squares on stock	– x_D^2	LL_{01}	– log-log scale	– $e^{-0.01x}$
B	– scale of squares on slide	– x_C^2	LL_{02}	– log-log scale	– $e^{-0.1x}$
C	– basic scale on slide (x_C)	– x	LL_{03}	– log-log scale	– e^{-x}
D	– basic scale on stock (x_D)	– x	Ps	– vector analysis scale	– $\sqrt{(1-s^2)}$
CI	– reciprocal of C scale	– $1/x_C$	Pt	– vector analysis scale	– $\sqrt{(1+t^2)}$
DI	– reciprocal of D scale	– $1/x_D$	S	– sine scale (5° 42′ to 90°)	– $\sin^{-1}x_D$
CF	– π displaced C scale	– πx_C	Sd	– sine differential scale	– $\propto/\sin\propto$
DF	– π displaced D scale	– πx_D	ISd	– inverse sine differential scale	– $x/\sin^{-1}x$
K	– cube of C scale	– x_C^3	ST	– small angle sin tan scale (0° to 5° 42′)	– $\begin{cases}\sin^{-1}x_D\\ \tan^{-1}x_D\end{cases}$
L	– log to base 10 of C scale	– $\log_{10}x_C$	T	– tangent scale (5° 42′ to 90°)	– $\tan^{-1}x_D$
LL_1	– log-log scale	– $e^{0.01x}$	Td	– tangent differential scale	– $\propto/\tan\propto$
LL_2	– log-log scale	– $e^{0.1x}$	ITd	– inverse tangent differential scale	– $x/\tan^{-1}x$
LL_3	– log-log scale	– e^{x}			

SLIDE RULE, length 250mm, with A, B, C, D, LL_2, LL_3, S and T scales. With instructions and case.

CAH-300-J Slide rule, 250mm **£2-48**

SLIDE RULE, length 250mm, with A, B, C, CI, D, K, L, S and T scales. With instructions and case.

CAH-340-E Slide rule, 250mm **£2-09**

SLIDE RULE, length 250mm, double sided, for advanced use. With scales A, B, C, CI, CF, D, DI, DF, K, L, LL_1, LL_2, LL_3, LL_{01}, LL_{02}, LL_{03}, Ps, Pt, S, Sd, ISd, ST, T, Td and ITd. With instructions and case.

CAH-380-W Slide rule, 250mm **£8-67**

SLIDE RULE, circular, plastics, approximately 128mm diameter. With scales A, B, C, D, K, S, T and a spiral log-log scale from 1·010 to 10^4. The stock and slide scales are printed in contrasting colours and the slide and cursor rotate about a central spindle. The basic C and D scales are equivalent in length to a 330mm linear scale. With instructions and case.

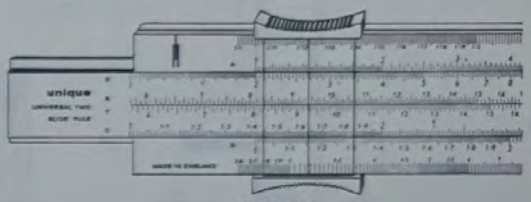
CAH-500-Q Slide rule, 128mm **£2-42**

SLIDE RULE/UNITS CONVERTER, circular, comprising slide rule CAH-500-Q with international units converter on the reverse side. Converter has six concentric 9-decade logarithmic scales superimposed with a clear interchangeable disc engraved with Imperial, metric, US and SI units of length, area, volume, mass, force and velocity. A second disc has units of energy or work, density, pressure, power, volume flow and heat flow. The decimal point is automatically positioned. With instructions and case.

CAH-540-L Slide rule/converter **£4-18**

SLIDE RULE/METRIC UNITS CONVERTER, circular, 140mm diameter, similar to CAH-540-L. With two single decade logarithmic scales which may be used as a simple slide rule and are equivalent in length to a 250mm linear scale. The disc has printed factors for conversion from Imperial to metric or SI units and a Fahrenheit/Centigrade temperature conversion scale is also incorporated. Conversion accuracy is usually to at least three figures but decimal point adjustment may be required. With instructions and case.

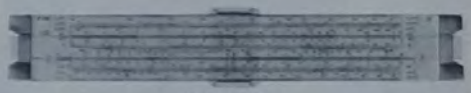
CAH-580-G Slide rule/converter **£3-08**



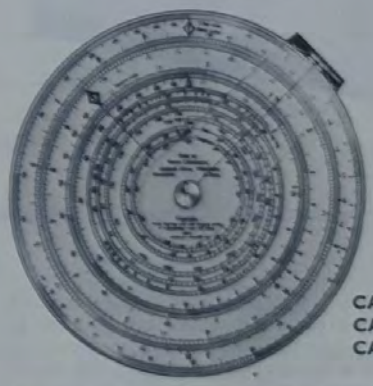
CAH-300



CAH-340



CAH-380



CAH-500
CAH-540 and
CAH-580 are similar



CAH-690

CALCULATOR, OTIS KING Model K, equivalent in length to a 1·68m linear slide rule and comprising two cylinders, one rotating and sliding within the other, with helical scales on both and a cursor tube with an engraved arrow at each end. Maximum diameter 33mm, closed length 150mm, open length 255mm. With instructions and case.

CAH-690-X Calculator, 255mm **£5-89**

Gallenkamp

Gallenkamp AUTOBOMB

An Automatic Adiabatic Bomb Calorimeter
For the rapid and accurate determination of calorific values of coal, coke, petroleum products and biological materials



CBA-300

Suitable for determinations specified in BS 1016, BS 3804, IP 12, ASTM D240, DIN 51708, DIN 51785.

- **Automatic adiabatic system ensures negligible heat loss from calorimeter during test period – eliminates cooling correction calculations**
- **Top cover assembly on telescopic lift – no dismantling between tests**
- **No handling of calorimeter thermometer – risk of breakage negligible**
- **Instantaneous heating for accurate response**
- **High speed water circulation through jacket and cover for temperature uniformity**
- **Only two thermometer readings necessary for each test**
- **Console encloses calorimeter and all control circuits, cables and water connections**
- **Firing wire continuity tester circuits give visual indication of successful firing**
- **Swing down control panel for immediate access for servicing**
- **Printed circuit for reliability**
- **Includes exclusive illuminated reader/vibrator for thermometer**

INTRODUCTION

The automatic adiabatic system employed in the Autobomb prevents exchange of heat between the calorimeter and jacket by ensuring that at every instant throughout the test, the jacket is at the same temperature as the calorimeter vessel which it wholly encloses. Thus, the system eliminates both the tedium of a large number of thermometer readings and the calculation of a cooling correction.

The circuit of the control system is basically simple and therefore reliable.

The overall design reduces manipulation and the possibility of unsuccessful attempts at firing. Both the determination of the effective heat capacity (J/°C) of the calorimeter system and the determination of the calorific values (J/g) of samples are rapid and accurate.

OPERATION

Having been filled and prepared, the bomb is placed in the calorimeter vessel which has previously been filled with water and the jacket lid is lowered to locate **in one single movement** the calorimeter cover, calorimeter stirrer, thermometers, thermistor assemblies and bomb firing connector. When the connector is pressed home the 'READY TO FIRE' lamp lights.

When the apparatus has stabilised, the firing switch is depressed and after a suitable period the final equilibrium temperature is noted and checked. Preparation for the next test involves merely switching off the heater, raising the jacket lid with its mounted components, swinging it to the rear and removing the bomb.

Calorimeter thermometer. This is an expensive item so that its mounting on the jacket lid, without the need for removal between tests is particularly important in reducing breakage risks.

The illuminated reader/vibrator, which facilitates the taking of accurate thermometer readings, is controlled by a pushbutton on the front panel.

Gallenkamp AUTOBOMB

CONSTRUCTION

Bomb. The capacity is approximately 300 ml. The body and cap are forged stainless steel bar to BS 1506-845 Grade B which is a stabilised austenitic steel having high corrosion resistance and is not subject to intercrystalline corrosion. The cap is secured by a locking ring machined from rolled aluminium bronze bar. The joint between the body and cap is made by a toroidal sealing ring which enables a gas-tight seal to be effected by hand tightening only. The oxygen filling point is fitted with a Schrader valve and the union between the bomb and filling tube, sealed by a toroidal sealing ring, is also designed for tightening by hand. Avoidance of the use of tools results in less wear to parts of the bomb. Two stainless steel electrodes are fitted to the cap; one has a ring-shaped support for flanged crucibles and is electrically connected to the cap and the other is insulated by means of a laminated plastics bush.

Each bomb is subjected to a hydraulic pressure test at 300 bars maintained for 10 minutes, and a certificate of test is issued. The certificate gives full details of the mechanical properties and chemical composition of the materials used in the construction of the bomb. Meets requirements of BS 4791.

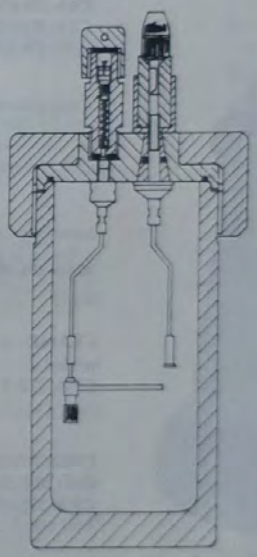
Bomb firing circuit. This is fed from an earthed winding on the mains transformer. It includes a fuse, a test circuit and a lamp which shows when the firing wire has fused. A remote firing switch accessory is available and is easily connected.

Calorimeter vessel. This is of stainless steel, polished outside, and 2 litres of water just cover the bomb. Three metal pegs are fixed inside to support the bomb a sufficient distance from the bottom to allow free circulation of water round the bomb, and a wire lifting handle facilitates assembly into the water jacket.

Console and water jacket. All control circuits are mounted on the swing-down front panel for ease of inspecting and servicing. They comprise an a.c. bridge, printed circuit amplifier, heater relay circuit, bomb 'test', 'ready for firing' and 'fire' systems and all associated switches, fuses, indicator lamps and meter.

The jacket and lid are of stainless steel, polished inside.

The calorimeter vessel is located inside the water jacket by a spacer which has the dual purpose of minimising thermal contact between the two and at the same time provides an adequate return path for the bomb firing circuit. The calorimeter is stirred by an independent motor mounted on the water jacket cover. A heat break in the stirrer shaft prevents conduction of heat to or from the calorimeter.



CBA-350

AUTOMATIC ADIABATIC BOMB CALORIMETER, *GALLENKAMP* **AUTOBOMB,** outfit comprising one each of the following:

CBA-320	Console (includes thermometer reader/vibrator and instructions manual)	**CBA-380-M**	Tube assembly
		CBA-390-F	Tube assembly
		CBA-394-502D	Two spanners
CBA-350-K	Bomb	**CBA-400-X**	Needle Valve
CBA-370-T	Bomb stand	**CBA-590-M**	Pad of report sheets
CBA-375-M	Pressure guage on stand	**GGM-250-C**	Tool set

For single phase supplies. The 200–250 V 50 Hz model must be used on a line to earthed neutral supply.

CBA-300-010T	Calorimeter, 200–250 V 50 Hz	**£985·50**
CBA-300-030N	Calorimeter, 110–130 V 60 Hz	**£994·50**

NOTE: When 220 V mains electricity supplies are phase-to-phase (110–0–110 V) it is necessary to isolate the apparatus using a 1:1 transformer which has an earthed secondary and a 10 A rating.

Thermometers, crucibles and firing wire are not included in the above outfit because several alternatives are available. A working outfit guide is given on page 125.

Gallenkamp AUTOBOMB COMPONENTS

CONSOLE, *GALLENKAMP*, comprising calorimeter vessel with stirrer, adiabatic water jacket with heater, circulating pump control circuits, as specified, in outer case, together with a thermometer reader/vibrator. Overall dimensions with cover raised 515 × 400 × 1090mm high. With instructions manual but without bomb, thermometers, accessories and spare parts. For single phase supplies. The 200–250V 50Hz model must be used on a line to earthed neutral supply.

CBA-320-010F	Console, 200–250V 50Hz	£735·75
CBA-320-030W	Console, 110–130V 60Hz	£744·75



CBA-350



CBA-370



CBA-375

SPARE PARTS

Stand-by spares kit, for CBA-320, comprising one matched pair of thermistor elements CBA-340-090N, one each amplifier and thyratron valves, two indicator lamps 14V, two illuminator lamps 6·3V, two gaskets for water pump and cartridge fuses.

CBA-340-010X	Spares kit, 220–250V	£19·35
CBA-340-030Y	Spares kit, 110–130V	£19·35
CBA-340-070T	Thermistor assemblies, matched pair	Pair £29·25
CBA-340-090N	Thermistor elements, matched pair	Pair £8·66

BOMB, *GALLENKAMP*, as specified, with works' certificate of test and instructions.

CBA-350-K	Bomb	£183·38

SPARE PARTS

Stand-by spares kit, for CBA-350-K, comprising two packs of high pressure Schrader valve cores; one valve housing, one pair of electrodes with ring support for crucibles of up to 25mm diameter, sealing ring and set of insulators; toroidal sealing rings for bomb and tube assembly; one pack of end ferrules and 6m of nylon tubing for tube assemblies.

CBA-356-010R	Spares kit	£33·08
CBA-356-030L	Toroidal sealing rings	Pack of 10 £0·68
CBA-356-050F	Valve cores, Schrader high pressure	Pack of 5 £1·58
CBA-356-070W	Valve housing	£5·57
	Electrodes, with ring support for crucibles of up to 25mm diameter, sealing ring and set of insulators.	
CBA-356-090Q	Electrodes set	Set £16·71

ACCESSORY

Pressure release valve, with side arm for connecting to absorption apparatus. For use when determining nitrogen and sulphur corrections. Pressure in bomb may be released immediately after test thereby saving the usual waiting period for the acid mist to settle.

CBA-356-502T	Release valve	£9·00

STAND, for supporting bomb cap when fitting crucible and firing wire.

CBA-370-T	Stand	£6·30

PRESSURE GAUGE, calibrated 0 to 50 bar with transparent front and blow-out plate in the rear.

CBA-375-M	Pressure gauge	£27·34

TUBE ASSEMBLY, nylon, 900mm long, for connecting bomb to pressure gauge.

CBA-380-M	Tube assembly	£5·29

SPARE PARTS

CBA-384-010Y	Toroidal sealing rings	Pack of 10 £1·69

TUBE ASSEMBLY, nylon, 900mm long, for connecting pressure gauge CBA-375-M to needle valve CBA-400-X.

CBA-390-F	Tube assembly	£3·15

SPARE PARTS

CBA-394-010B	End ferrules, for nylon tubing	Pack of 10 £0·39
CBA-394-030S	Nylon tubing	Per metre £0·23

ACCESSORY

CBA-394-502D	Spanner, 3/16 BSW for CBA-380-M, CBA-390-F and union nuts	£1·28

NEEDLE VALVE, for oxygen cylinder, with 37·5 bars blow-off valve, bull nosed inlet to BS 341 and fitting to accept CBA-390-F.

CBA-400-X	Needle valve	£21·12

Gallenkamp AUTOBOMB ACCESSORIES

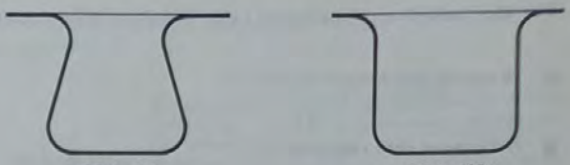
CRUCIBLES

CRUCIBLE, nickel chromium, general purpose for testing coal to BS 1016 Part 5, 25mm diameter × 18mm deep, with flange.
CBA-450-C Crucible, nickel **£1·19**

CRUCIBLE, as CBA-450-C but silica.
CBA-455-S Crucible, silica **£2·64**

CRUCIBLE, Inconel, type 1 to IP12 for testing fuels with flash points below 38°C. Base 19mm diameter, top 12·7mm diameter × 19mm deep, with flange.
CBA-460-S Crucible, type 1 **£5·18**

CRUCIBLE, Inconel, type 2 to IP12 for testing fuels with flash points above 38°C. 19mm diameter × 19mm deep, with flange.
CBA-465-L Crucible, type 2 **£1·97**



CBA-460 CBA-465



CBA-580

FIRING ACCESSORIES

FIRING WIRE, platinum, 44 swg (approx. 0·08mm diameter).
CBA-500-G Firing wire Reel of approx. 4·5 metres **£12·83**

FIRING WIRE, nickel chromium, 36 swg (approx. 0·19mm diameter).
CBA-505-W Firing wire Reel of approx. 23 metres **£0·92**

REMOTE FIRING SWITCH ASSEMBLY, comprising a biased-off switch mounted in a control box suitable for fixing to bench or wall and fitted with 9m of twin core cable.
CBA-510-W Firing switch **£14·63**

CAPSULES, gelatine, of stated approx. gross calorific value, for burning highly volatile liquids.
CBA-520-P Capsules, gelatine Pack of 10 **£0·23**

BENZOIC ACID, thermochemical standard. In sealed tube containing 100g.
CBA-530-Y Benzoic acid Tube **£5·43**

FIRING COTTON, in balls of about 110g.
CBA-535-B Firing cotton Ball **£1·05**

MISCELLANEOUS ACCESSORIES

BRIQUETTE PRESS, for solid fuels, with hardened steel punch and die 12·5mm diameter. The press has a screw action and is intended to be bolted to a bench top.
CBA-580-T Briquette press **£42·19**

REPORT SHEETS, for recording observations during calorific value determinations with adiabatic calorimeter. In pad of 100 sheets.
CBA-590-M Report sheets Pad **£1·35**

INSTRUCTIONS MANUAL, for Autobomb, extra copy.
CBA-595-F Instructions manual **£0·77**

WORKING OUTFIT

1. The following list is a guide to the items required for an initial working outfit:

1 Autobomb outfit	**CBA-300**
10 crucibles (depending on samples and test specifications)	**CBA-450-C to CBA-465-L as selected**
2 calorimeter thermometers (depending on initial temperatures)	**THP-520-030A to THP-520-150N as selected**
5 reels firing wire	**CBA-500-G or CBA-505-W**
1 ball firing cotton	**CBA-535-B**
1 tube benzoic acid	**CBA-530-Y**
1 briquette press	**CBA-580-T**
2 water jacket thermometers	**THL-630-070N**
1 each spares kits (recommended)	**CBA-340 and CBA-356**

2. In addition the following are required:
   3 lengths of flexible tubing N6·5 for water connections. Lengths as necessary to reach nearest tap and sink.
   An analytical balance to weigh the sample.
   A heavy duty balance capacity about 3kg to at least 1g to weigh the calorimeter vessel plus water.
3. For determining the CV of liquid fuels, order also:
   1 remote firing switch assembly **CBA-510-W**

THERMOMETERS

FOR CALORIMETER, to BS 791.

List No.	List No. with NPL Certificate	BS 791 Schedule mark	Scale span °C
THP-500-030X	THP-520-030A	Cal. 15 to 21 C	15 to 21
THP-500-050Y	THP-520-050R	Cal. 18 to 24 C	18 to 24
THP-500-070C	THP-520-070L	Cal. 21 to 27 C	21 to 27
THP-500-090T	THP-520-090F	Cal. 24 to 30 C	24 to 30
THP-500-110Q	THP-520-110C	Cal. 27 to 33 C	27 to 33
THP-500-130K	THP-520-130T	Cal. 30 to 36 C	30 to 36
THP-500-150E	THP-520-150N	Cal. 33 to 39 C	33 to 39

FOR WATER JACKET
Thermometer, range −5 to +50°C. *See THL-630-070N*

Gallenkamp

Gallenkamp BALLISTIC BOMB CALORIMETER

For the rapid determination of calorific values of food, animal feeds and faeces in dietetic research and other applications

- 10 results per hour
- Repeatability about 1%
- No special skill required
- Hand sealing bomb, no tools for assembly



CBA-330

INTRODUCTION

In ascertaining the calorific value of foodstuffs and other non-homogeneous materials, it is frequently difficult to obtain a truly representative single sample. In such cases the average of a number of approximate results can be superior to a single, accurate result from one sample.

The object of the Ballistic Bomb Calorimeter is to enable this to be done with speed. The heat of combustion causes a rapid rise in temperature of the bomb, shown as a 'throw' on the galvanometer spot. It is assumed, as in other ballistic instruments, that the peak galvanometer reading occurs before there is any significant heat loss from the bomb and its contents.

OPERATION

Having established the 'constant correction' (see Bomb firing system) for the heat dissipated by the firing wire and cotton, the operator has merely to place the sample in the crucible, tamp down with the tool provided, attach the cotton wicking, screw on the bomb body, fill the bomb with oxygen, press the timed firing button and read the maximum galvanometer deflection. The whole operation takes only a few minutes and calculation of calorific value to about 1% is by simple proportion comparison with a benzoic acid standard.

DESIGN

Bomb

The body and base are machined from forged stainless steel bar to BS 1506–845 Grade B, which is a stabilised austenitic steel generally recognised as being the most satisfactory for calorimeter bombs. The body is secured to the base by an aluminium bronze locking ring and the joint is sealed by a toroidal ring which provides a gas-tight seal by hand tightening only. In the base are an oxygen filling point, a gas pressure release needle valve, two sockets for the connection of the electric firing circuit, a pillar to carry the crucible and an insulated electrode. The firing wire is connected between the pillar and the electrode.

Oxygen filling system

Comprises a needle valve and a pressure gauge which has a glass front and a blowout back. Union fittings are provided for a nylon oxygen supply tube and a nylon bomb filling tube. A hand tightening union nut with a toroidal ring is used to seal the filling tube to the bomb.

Bomb firing system

Comprises a press button operated electric timing switch and a step down transformer. This system applies 2V to the firing wire for sufficient time to raise it to red heat and ignite the sample. The wire is unaffected by the firing and can be used repeatedly. The timing switch is self resetting so that the same amount of heat is introduced each time the bomb is fired. This results in a constant correction which simplifies the test procedure and the calculation of results.

Temperature measuring system

The temperature reached by the bomb body above the crucible is indicated by a light spot galvanometer connected to a thermocouple which plugs into a shallow hole in the top of the bomb body.

Developed in collaboration with D. S. Miller and P. R. Payne at the Human Nutrition Research Unit of the M.R.C.

REFERENCES

(1) Laboratory Practice, 8, 119 (1959).
(2) *News and Review* No. 2, December 1960.
(3) Fox, Miller and Payne, Proc. Nutr. Soc. 18 ix (1959).
(4) Miller and Payne, Brit. J. Nutr, 12, 501 (1959).

Gallenkamp BALLISTIC BOMB CALORIMETER

BOMB CALORIMETER, BALLISTIC, *GALLENKAMP*. Outfit comprising base control box with one each of the following items and full operating instructions:

CBA-394-502D	2 Spanners	**CBB-400-E**	Bomb filling tube
CBA-450-C	10 Crucibles	**CBB-410-U**	Battery
CBA-530-Y	1 Tube benzoic acid	**CBB-430-G**	Reducing valve
CBA-535-B	Firing cotton	**CBB-440-W**	Tube assembly
CBB-380-C	Ballistic bomb	**CBB-450-P**	Thermocouple
CBB-384-502A	Firing wire	**CBB-460**	Galvanometer

For single phase supplies.

CBB-330-010L	Calorimeter, 200–250V 50Hz	**£568·13**
CBB-330-030F	Calorimeter, 110–120V 50–60Hz	**£572·63**

ACCESSORIES

Stand-by spares kit for CBB-330, comprising 10 toroidal sealing rings, 10 end ferrules, 2m of nylon tubing, and 1 galvanometer lamp.

CBB-350-502W	Spares kit	**£5·18**
	Benzoic acid	*See CBA-530-Y*
	Firing cotton	*See CBA-535-B*

COMPONENTS

BALLISTIC BOMB, *GALLENKAMP*, as specified, with works' certificate of test. Without firing wire.

CBB-380-C	Ballistic bomb	**£219·38**

SPARE PARTS and ACCESSORIES

CBB-384-502A	Firing wire, platinum alloy	**£16·59**
	Toroidal sealing ring	*See CBA-356-030L*
	Crucible	*See CBA-450-C*

BOMB FILLING TUBE, high pressure nylon, 280mm long, for connecting bomb to outlet on base control box.

CBB-400-E	Filling tube	**£3·94**

SPARE PARTS

Toroidal sealing ring	*See CBA-384-010Y*
End Ferrules	*See CBA-394-010B*
Nylon tubing	*See CBA-394-030S*
Spanner	*See CBA-394-502D*

BATTERY, 1·5V, *EVER READY* AD 35.

CBB-410-U	Battery, 1·5V	**£0·64**

REDUCING VALVE, with bullnosed inlet to BS 341, for connecting to oxygen cylinders to give an output pressure adjustable over the range 20 to 30 bar. The valve is fitted with a blow-off on the outlet side set to operate at 32·5 bar and a union to accept tube assembly CBB-440-W.

CBB-430-G	Reducing valve	**£38·70**

TUBE ASSEMBLY, 900mm long, high pressure nylon, for connecting reducing valve CBB-430-G to base control box.

CBB-440-W	Tube assembly	**£2·08**

SPARE PARTS

End Ferrules	*See CBA-394-010B*
Nylon tubing	*See CBA-394-030S*

THERMOCOUPLE, with plug and terminations.

CBB-450-P	Thermocouple	**£8·44**

GALVANOMETER, with light spot indication, nominal resistance 38ohms. For single phase supplies.

CBB-460-010F	Galvanometer, 200–240V 50Hz	**£90·19**
CBB-460-030W	Galvanometer, 110–120V 50–60Hz	**£90·19**

METTLER ANALYTICAL BALANCES

Suitable for weighing calorimetry samples

- **Weighing range 160g**
- **Readability 0·1mg**
- **Digital readout**
- **Some models with automatic release**



See BFB-260-P et seq.

Gallenkamp

BOYS' GAS CALORIMETER

For use in ambient temperatures up to 30°C



CBB-800

GAS CALORIMETER, Boys', non-recording, for the determination in SI units of calorific values of coal gases from about 15 to 22·5MJ/m³. Comprises Boys' calorimeter vessel, Hyde pattern gas meter with fittings and case, all necessary thermometers, glass measures and tubing, gas pressure regulator, manometers, gauges and automatic cut-off device.

CBB-800-S Gas calorimeter **£886·05**

GAS CALORIMETER, Boys', as CBB-800-S but for measurements in Btu/ft³ from about 400 to 600 Btu/ft³.

CBB-804-R Gas calorimeter **£985·05**

GAS CALORIMETER, Boys', non-recording, as CBB-800-S but for the determination in SI units of calorific values of natural (methane) gases at about 38MJ/m³.

CBB-808-Q Gas calorimeter **£886·05**

GAS CALORIMETER, Boys', as CBB-808-Q but for measurements in Btu/ft³ at about 1000 Btu/ft³.

CBB-812-W Gas calorimeter **£985·05**

CARBOY ACCESSORIES



CDC-300



CDC-340

CARBOY POURER, PVC, for 45 litre carboys made to BS 678 and similar, with neck not exceeding 84mm o.d.

CDC-300-D Carboy pourer **£6·64**

CARBOY PUMP, polythene except operating bulb which is of rubber and does not come into contact with the liquid. With sliding tapered stopper for containers with neck 48 to 67mm i.d. and also suitable for use in open vessels. Maximum depth of vessel 580mm. Pumping rate approximately 5 litres/min.

CDC-340-V Carboy pump **£8·97**

CARBOY SIPHON, polythene, self-priming, comprising a flexible bulb and suction tube 360mm long × 9mm i.d. and an outlet tube 450mm long × 9mm i.d. Flow rate approximately 4 litres/min. (F)

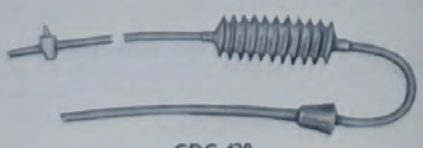
CDC-380-Q Carboy siphon **£1·09**



CDC-380

CARBOY SIPHON, polythene, self-priming, comprising a flexible bellows, suction tube 700mm long × 10mm i.d. and an outlet tube 950mm long × 10mm i.d. fitted with a stopcock. A sliding tapered stopper on the suction tube fits containers with neck diameters 35 to 64mm. Flow rate approximately 7 litres/min. (F)

CDC-420-E Carboy siphon **£4·84**



CDC-420

CATHETOMETERS



CDK-350

CATHETOMETER, with vertical scale 0 to 500 × 0·05 mm having vernier reading to 0·01 mm. Telescope mounted on carriage which slides vertically on graduated square-section metal bar supported on a heavy tripod base. Carriage can be clamped at any position on the bar. Telescope has × 10 Ramsden eyepiece with crosswire and auxiliary lens, 25 mm objective and rack and pinion focusing from 400 mm to infinity. Overall dimensions 590 × 590 × 950 mm high, mass 20 kg.

CDK-350-D Cathetometer **£128·43**

Griffin VERNIER MICROSCOPES

- **For linear measurements to 0·1 or 0·01 mm**
- **Engine divided, plated, rule steel scales**
- **Focusing × 10 Ramsden-type eyepiece**
- **Achromatic × 3 objective**
- **Lens to object distance 50 mm**



CDK-400

VERNIER MICROSCOPE, *GRIFFIN* **STUDENT,** with 150 mm scale reading to 0·1 mm. For horizontal or vertical measurements and particularly suitable for school use. Diecast body 295 × 96 × 111 mm high, has three feet for horizontal mounting and additional feet to enable it to stand vertically or lie on its back, so that horizontal readings may be taken perpendicular to the base feet.

Kinematically mounted carriage with locking screw and fine adjustment control covering 14 mm movement. Easily read scale 0 to 150 × 1 mm has double length vernier which can be read to 0·1 mm. The microscope body with crosswires and engraved datum lines at 0° and 90°, may be rotated through a full 360° about a spigot and locked in any position. With plastics cover.

CDK-400-H Vernier microscope **£91·04**



CDK-430

VERNIER MICROSCOPE, *GRIFFIN* **LINEAR,** with 170 mm scale reading to 0·01 mm. Cast body has three feet for horizontal mounting and additional feet to enable it to stand vertically or lie on its back, so that horizontal readings may be taken perpendicular to the base feet. A glass plate forms a flat working surface and is removable to allow objects to be viewed through an aperture in the base.

Kinematically mounted carriage with locking screw, has coarse adjustment control which requires only six turns to cover the full graduated length and a fine control which covers 12 mm movement. Easily read scale 0 to 170 × 0·5 mm has double length vernier which can be read to 0·01 mm with a focusing magnifier in a sliding mount. The microscope body with crosswires and engraved datum lines at 0° and 90°, may be rotated through a full 180° about a spigot and locked in any position. The drawtube can extend through 52 mm to enable a telescope objective accessory to be used and the crosswires are removable to enable a graticule to be fitted. Overall dimensions 290 × 190 × 170 mm high, mass 6 kg. With plastics cover.

CDK-430-J Vernier microscope **£182·36**

Continued overleaf



CDK-450

VERNIER MICROSCOPE, *GRIFFIN* **CO-ORDINATE,** with 170mm horizontal scale and 100mm vertical scale, each reading to 0·01 mm. Cast base is fitted with levelling feet and has a glass plate which forms a flat working surface and is removable to allow objects to be viewed through an aperture in the base.

The carriage and vertical column are kinematically mounted and each is fitted with a locking screw. The column has a coarse adjustment screw which requires only eight turns to cover the full graduated length and a fine control covering 10mm movement. The carriage is similarly adjusted using coarse and fine controls. Easily read 0 to 170 × 0·5mm horizontal and 0 to 100 × 0·5mm vertical scales can each be read to 0·01 mm by a double length vernier. The microscope body with crosswires and engraved datum lines at 0° and 90°, may be rotated through a full 180° about a spigot and locked in any position. The drawtube can extend through 52mm to enable a telescope objective accessory to be used and the crosswires are removable to enable a graticule to be fitted. Overall dimensions 295 × 185 × 300mm high, mass 8kg. In wood case.

CDK-450-S Vernier microscope **£299·45**

ACCESSORY for CDK-430-J and CDK-450-S

Telescope objective, focusing from 650mm to infinity.

CDK-470-502D Telescope objective **£13·95**

Griffin CENTRIFUGE

Maximum capacity four tubes, 100 × 16mm

Suitable for use by students or other individual workers performing small scale chemical analyses

- **Meets Nuffield syllabus requirements**
- **Operates only when lid is closed**
- **Biased switch for additional safety**
- **Minimum vibration**
- **Self-balancing action**
- **Four-place swing-out head**



CFB-500

With swing-out head which accommodates either two or four test tubes 100 × 16mm. Four adapters are provided for 75 × 10mm tubes.

Only visual balancing of the tubes and contents is required. The single speed motor is operated by a biased OFF switch. The lid is fitted with a catch and switch which prevents power being applied to the motor while the lid is open. Centrifuge bowl, outer steel case and lid are finished in acid-resisting paint. Mains cable and a mains indicator lamp are fitted.

Technical data

Capacity	4 test tubes, 100 × 16mm
Speed, maximum	2800rev/min
RCF, maximum	1200g
Power rating	100 W
Overall dimensions	390 × 310 × 240mm high (lid closed)
Net mass	6kg

CENTRIFUGE, *GRIFFIN,* **Nuffield,** as specified, with four-place swing-out head for 100 × 16mm test tubes and plastics adapters for 75 × 10mm test tubes, biased OFF switch and lid operated switch. For 220–240V 50Hz single phase supplies.

CFB-500-V Centrifuge **£60·84**

SPARE PARTS

CFB-520-030V Adapters, 75 × 10mm Pack of 4 **£0·35**

ACCESSORIES

Test tubes *See TES-600-030J and TES-600-070J*

Gallenkamp ANGLE CENTRIFUGE

Maximum capacity 120ml

Suitable for use in school, medical and small industrial laboratories

Accepts tubes up to 15ml capacity



CFB-700

ANNOUNCEMENT

These products are under development and are expected to become available late 1977

- **Maximum speed 5000rev/min**
- **Operates only when lid is closed**
- **Self-balancing action**
- **Head and motor completely enclosed**
- **Adjustable speed control**

With eight-place angle head having plastics buckets which accept 15ml glass or plastics centrifuge tubes. Adapters are available to allow smaller capacity tubes to be used. The self-balancing resilient mounting of the motor makes critical balancing of the tube contents unnecessary.

A solid state power controller gives adjustable control of motor speed between 1000 and 5000rev/min. The scale of the control is calibrated to show approximate speed attained for each setting. A hole is provided in the lid for insertion of the accessory tachometer CFC-530-N.

The head and motor are completely enclosed and mounted in a steel case. A switch operated by the lid prevents power being applied to the motor while the lid is open. Mains cable and a mains indicator lamp are fitted.

Technical data

Capacity	8 × 15ml
Speed, maximum	5000rev/min
RCF, maximum	2500g
Power rating	250W
Overall dimensions	300 × 250 × 220mm high (lid closed)
Net mass	6kg

CENTRIFUGE, *GALLENKAMP*, as specified, with angle head, speed controller, enclosed drive, mains cable and indicator lamp, and lid operated switch. For a.c. single phase supplies.

CFB-700-010C	Centrifuge, 220–240V	**£114·75**
CFB-700-030T	Centrifuge, 110–120V	**£118·13**

SPARE PARTS

CFB-730-030V	Brushes for motor	Pair **£1·69**
CFB-730-070J	Buckets	Pack of 8 **£0·50**
	Cushions	*See CFW-200-T*

ACCESSORIES

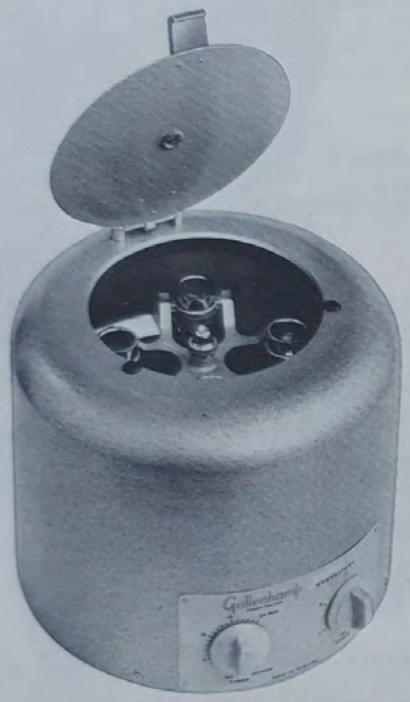
CFB-730-510H	Adapters for 75 × 10mm tubes	Pack of 8 **£3·07**
	Tachometer	*See CFC-530-N*

Gallenkamp LABORATORY CENTRIFUGE

Maximum capacity 200 ml

Suitable for use in school, medical and small industrial laboratories

Accepts tubes of up to 50 ml capacity



CFC-300 with accessories

- **Maximum speed 5000 rev/min**
- **Choice of angle and swing-out heads**
- **Self-balancing action**
- **Repeatable five-step speed control**
- **Built-in timer**

The centrifuge has a robust guard bowl and cover which completely enclose the head. In operation a continuous stream of air is drawn through the bowl and all parts remain cool, even after long periods of use. The motor and controls are housed below the bowl and, although totally enclosed for safety, they are readily accessible for the routine servicing. The interior of the bowl and all external surfaces are finished with a smooth easily cleaned stoved enamel which is resistant to abrasion and corrosion.

The motor is supported on flexible rubber mountings which make critical balancing of the tubes unnecessary. Fitted with television interference suppressor.

The speed control switch, which has an OFF and five speed positions, allows accurate repetition of operating speed. The speeds are chosen so that the change in centrifugal force is approximately the same from one step to the next.

The timer can be set to give automatic control of running time up to 20 minutes; it can also be set for continuous running. Tachometer CFC-530-N can be inserted through the aperture in the cover.

A choice of swing-out and angle heads is available. They are located on the tapered motor shaft and are held in place by a milled nut. All the heads are accurately balanced and designed for smooth running at maximum speed. The versatility of the heads is increased by the two-place trunnion and by adapters which can be used in the buckets to accommodate tubes for micro work, Wintrobe tests, etc.

Technical data

Capacity Speed, maximum RCF, maximum	*See table*
Timer	0 to 20 min and continuous
Power rating	500 W
Overall dimensions	350 mm diameter × 300 mm high
Net mass	10 kg

CENTRIFUGE, *GALLENKAMP*, as specified, maximum speed 5000 rev/min. With enclosed self-balancing drive, five-step speed control, automatic timer with continuous run position and instructions. **Without** head or accessories. For single phase supplies.

CFC-300-010B	Centrifuge, 220–240V	**£122·63**
CFC-300-030S	Centrifuge, 110–120V	**£123·75**

SPARE PARTS

CFC-330-030U	Carbon brushes, for motor	Pair **£0·90**

HEAD SPEEDS AND RCF VALUES

List No.	Type	Load, No. × ml	Max. speed, rev/min	Max. RCF
CFC-360-Y	Swing-out	6 × 15	3000	1500g
CFC-410-M	Swing-out	4 × 50 8 × 15	3000	1500g
CFC-490-C	Angle	6 × 15	5000	2750g

SWING-OUT HEAD, *GALLENKAMP*, six-place, for 15ml buckets. With trunnions but **without** buckets, cushions or tubes.

CFC-360-Y	Swing-out head	**£27·56**

ACCESSORIES

	Bucket, 15ml, stainless steel. Requires cushion CFW-200-T.	
CFC-370-504T	Bucket, 15ml	**£1·80**
	Cushion	*See CFW-200-T*

SWING-OUT HEAD, *GALLENKAMP*, four-place, for 8 × 15ml or 4 × 50ml buckets. Mixed loads of 15 and 50ml sizes may be centrifuged provided that opposing assemblies are the same. **Without** trunnions, buckets, cushions or tubes.

CFC-410-M	Swing-out head	**£23·91**

ACCESSORIES

	Trunnions, two-place, 15ml, supplied as balanced pair.	
CFC-420-504A	Trunnions, 2 × 15ml	Pair **£6·02**
	Trunnions, one-place, 50ml, supplied as balanced pair.	
CFC-420-514U	Trunnions, 1 × 50ml	Pair **£3·54**
	Bucket, 50ml, stainless steel. Requires cushion CFW-230-V or CFW-250-H.	
CFC-420-524R	Bucket, 50ml	**£2·48**
	Bucket, 15ml	*See CFC-370-504T*
	Cushion, 15ml	*See CFW-200-T*
	Cushions, 50ml	*See CFW-230-V to CFW-250-H*

ANGLE HEAD, *GALLENKAMP*, six-place for 15ml buckets. **Without** buckets, cushions or tubes.

CFC-490-C	Angle head	**£12·38**

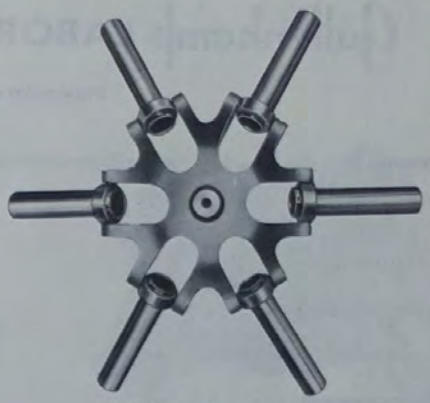
ACCESSORIES

Bucket, 15ml	*See CFC-370-504T*
Cushion, 15ml	*See CFW-200-T*

TACHOMETER, hand type, 130mm long scale calibrated 0 to 5000rev/min in white on a black dial. Complete with spindle, clockwise rotation.

CFC-530-N	Tachometer	**£30·42**

Fitting chart for tubes and buckets — See page 139
Adapters — See page 139



CFC-360 with accessories



CFC-410 with accessories



CFC-490 with accessories



CFC-530

Gallenkamp

Gallenkamp LABORATORY CENTRIFUGE

Maximum capacity 1000 ml

A general purpose laboratory centrifuge suitable for a wide range of routine and research applications

SAFETY FEATURES include:

- **No start until lid closed**
- **Automatic lid lock when head is spinning**
- **Head imbalance cutout**
- **Extra strong guard ring and case**
- **Controlled speed build-up**
- **Tachometer generator controlled speed up to 5000 rev/min**
- **Integral speed indicator**
- **Efficient brake**
- **Adjustable time switch with untimed run position**
- **Robust heavy-duty motor – efficient air cooling**
- **Solid state circuitry – television interference suppressor fitted**
- **Swing-out and angle heads**



CFD-400 with accessories

A robust, powerful motor is supported on flexible mountings in a heavy-gauge steel case. The head rotates inside an easily cleaned spun bowl. The bowl is surrounded by a steel cylinder and is covered by a heavy-gauge double skinned lid. The flexible mounting of the motor makes accurate balancing of the load unnecessary; only visual balancing of opposing loads is normally required.

All controls are mounted on a panel conveniently placed at the front of the outer case.

The motor cannot be started until the lid has been correctly closed and, no matter what the setting of the speed controller, the initial acceleration is controlled to provide a gentle build-up of the speed of the head.

The motor speed is controlled by a tachometer generator feed back, solid state, true speed controller and is indicated on a direct reading tachometer. A feature of the design is that repetitive tests at the same speed can be made without having to alter the setting of the speed control knob even if the load from one test to the next varies.

In the event of the head being excessively unbalanced during sample loading, a vibration sensing cutout switches off the motor and applies the brake very soon after starting.

The running time may be controlled automatically by the built-in 0 to 60 minute time switch, or controlled manually by using the untimed run position of the switch.

At the end of the run, the head may be allowed to come to rest naturally as the result of friction or it may be stopped more quickly by the application, during all or part of the period, of an electric brake which remains effective to standstill. With either method, an electric lock prevents the lid from being opened until the head has come to rest.

Fitted with television interference suppressor.

Technical data

Capacity, Speed, maximum, RCF, maximum	*See table*
Timer	0 to 60 min and continuous
Power rating	750 W
Overall dimensions	550 × 460 × 500 mm high
Net mass	60 kg

CENTRIFUGE, *GALLENKAMP*, as specified, maximum speed 5000 rev/min. With enclosed drive, tachometer generator speed controller, speed indicator, brake, timer with untimed run position, automatic lid lock, head imbalance cutout and instructions. **Without** head or accessories. For single phase supplies.

CFD-400-010G Centrifuge, 220–240 V 50 Hz **£585·00**
CFD-400-030A Centrifuge, 110–120 V 60 Hz **£591·75**

SPARE PARTS

CFD-420-030J Carbon brushes, for motor — Pair **£1·91**

HEAD SPEEDS AND RCF VALUES

List No.	Type	Load, No. × ml	Max. speed, rev/min	Max. RCF
CFD-500-B	Swing-out	16 × 15, 4 × 50, 8 × 50	4000	2850g
		4 × 100		3350g
CFD-600-Q	Swing-out	4 × 250	3000	1600g
CFD-650-E	Angle	16 × 15	5000	3400g
CFD-700-Y	Angle	8 × 50	5000	3400g

MULTILOAD SWING-OUT HEAD

SWING-OUT HEAD, *GALLENKAMP* **MULTILOAD,** four-place, for 15, 50 and 100ml buckets. Accepts trunnions CFD-520-506B to CFD-520-536P. Mixed loads may be centrifuged provided that the trunnions, buckets and contents in opposing positions are paired and reasonably balanced. **Without** trunnions, buckets, cushions or tubes.

CFD-500-B Swing-out head **£70·88**



CFD-500 with 15ml trunnions and buckets

ACCESSORY TRUNNIONS

Supplied as balanced pairs.

Trunnions, four-place, 15ml, require eight buckets CFC-370-504T.

CFD-520-506B Trunnions, 4 × 15ml Pair **£18·45**

Trunnions, one-place, 50ml, require two buckets CFC-420-524R.

CFD-520-516V Trunnions, 1 × 50ml Pair **£10·35**

Trunnions, two-place, 50ml, require four buckets CFC-420-524R.

CFD-520-526S Trunnions, 2 × 50ml Pair **£14·51**

Trunnions, one-place, 100ml, require two buckets CFD-530-536Y.

CFD-520-536P Trunnions, 1 × 100ml Pair **£13·16**

ACCESSORY BUCKETS

Bucket, 100ml, stainless steel. Requires cushion CFW-320-U.

CFD-530-536Y Bucket, 100ml **£2·70**

Bucket, 15ml, stainless steel *See CFC-370-504T*

Bucket, 50ml, stainless steel *See CFC-420-524R*

ACCESSORY CUSHIONS

Cushions *See CFW-200-T to CFW-320-U*



CFD-500 with 100ml trunnions and buckets

250ml SWING-OUT HEAD

SWING-OUT HEAD, *GALLENKAMP*, four-place with 250ml buckets. Supplied with four steel buckets CFD-610-010G for use with bottles CFT-890-H. No cushions required. **Without** bottles.

CFD-600-Q Swing-out head **£158·63**

SPARE PARTS

Buckets, 250ml, steel, for use with bottles CFT-890-H. No cushions required. Supplied as balanced pair.

CFD-610-010G Buckets, 250ml Pair **£28·13**

ACCESSORY

Centrifuge bottle, polypropylene, 250ml with screw cap *See CFT-890-H*

ANGLE HEADS

ANGLE HEAD, *GALLENKAMP*, sixteen-place, for 15ml buckets. **Without** buckets, cushions or tubes.

CFD-650-E Angle head **£109·13**

ACCESSORIES

Bucket, 15ml *See CFC-370-504T*

Cushions, 15ml *See CFW-200-T*



CFD-700 with buckets

ANGLE HEAD, *GALLENKAMP*, eight-place, for 50ml buckets. **Without** buckets, cushions or tubes.

CFD-700-Y Angle head **£102·94**

ACCESSORIES

Bucket, 50ml *See CFC-420-524R*

Cushions, 50ml *See CFW-250-H*

Tubes, cushions, adapters and fitting chart *See pages 137 to 139*

Floor stands *See OVH-700-Q*

Gallenkamp

MICRO-HAEMATOCRIT CENTRIFUGE



CFM-300

For the determination of red blood cell volume by the micro capillary method using a speed up to 11000rev/min, equivalent to 12000g which reduces centrifuging time to a maximum of 5 minutes.

With robust cast bowl and cover, and fitted with a quiet running universal motor which has permanently lubricated bearings.

A built-in automatic timer starts the centrifuge when set to the required period which may be between 1 and 14 minutes. Operating speed is reached within a few seconds of starting and a brake is fitted for rapid retardation when required.

CENTRIFUGE, MICRO-HAEMATOCRIT, *HAWKSLEY*, as specified, with standard head which accepts up to 24 disposable micro capillary tubes in radial numbered slots without the necessity of balancing. The head is fitted with an inner cover to reduce windage and consequent vibration. **Without** micro capillary tubes. For 220–240V a.c. single phase supplies.

CFM-300-T Centrifuge, micro-haematocrit **£121·00**

ACCESSORIES

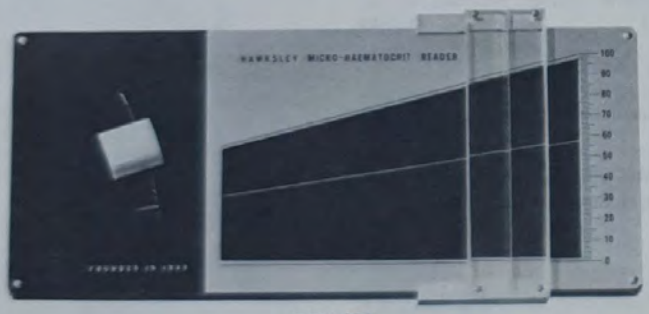
Micro capillary tubes, heparinised, 50μl capacity, for use with direct capillary blood.

CFM-330-010S Micro capillary tubes Pack of 1000 **£9·61**

Micro capillary tubes, plain, as CFM-330-010S but for venous blood.

CFM-330-030M Micro capillary tubes Pack of 1000 **£6·87**

MICRO-HAEMATOCRIT READERS



CFM-350

Precision micro capillary tube readers giving accurate readings of the percentage packed red cell volume.

BASIC READER

A micro capillary tube is inserted in the carrier slot so that the base line of the reader intersects the base of the red cells. The holder is moved so that the top line intersects the plasma-air interface. The angle of the cursor is adjusted until the white line intersects the red-white cell interface and then percentage packed red cell volume is read directly from the scale.

MICRO-HAEMATOCRIT READER, as specified, with carrier slot, holder, cursor and direct reading scale.

CFM-350-H Micro-haematocrit reader **£9·24**

ROTARY READER

The rotary reader enables up to 24 micro-haematocrit tubes to be read directly while still on the rotor of centrifuge CFM-300-T.

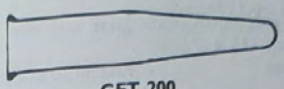
The spiral design of the reader provides for the line intersecting each boundary to be practically horizontal so increasing the precision of measurement.

ROTARY MICRO-HAEMATOCRIT READER, as specified, with direct reading scale, magnifier and stainless steel legs.

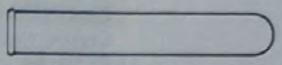
CFM-380-J Rotary micro-haematocrit reader **£29·59**

CENTRIFUGE TUBES

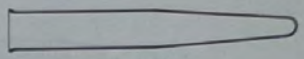
All capacities and dimensions quoted are nominal



CFT-200

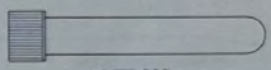


CFT-230



CFT-260

NOMINAL CAPACITY LESS THAN 15ml



CFT-290

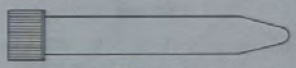
CENTRIFUGE TUBES, conical, BS 1428 Part E3, borosilicate glass with rim.

CFT-200-030R Centrifuge tubes, 0·5 ml, 60 × 6·3 mm
Pack of 10 **£3·60**

CFT-200-050L Centrifuge tubes, 1 ml, 63 × 8·5 mm
Pack of 10 **£3·60**

CFT-200-070F Centrifuge tubes, 2 ml, 68 × 11·25 mm
Pack of 10 **£3·60**

CFT-200-090W Centrifuge tubes, 3 ml, 76 × 11·25 mm
Pack of 10 **£3·71**



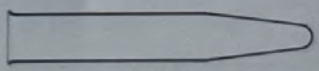
CFT-310

CENTRIFUGE TUBES, cylindrical, polypropylene with rim. Capacity 3 ml, overall dimensions 76 × 11 mm. (F)

CFT-230-F Centrifuge tubes Pack of 10 **£1·70**

CENTRIFUGE TUBES, conical, borosilicate glass with rim. Capacity 5 ml, overall dimensions 103 × 13·5 mm.

CFT-260-H Centrifuge tubes Pack of 12 **£4·31**



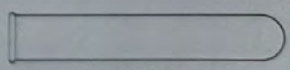
CFT-340

CENTRIFUGE TUBES, cylindrical, polystyrene with polythene cap, sterile. Capacity 10 ml, overall dimensions 100 × 16 mm.

CFT-290-J Centrifuge tubes Pack of 450 **£16·16**

CENTRIFUGE TUBES, conical, polystyrene with polythene cap, sterile. Capacity 10 ml, overall dimensions 100 × 16 mm.

CFT-310-L Centrifuge tubes Pack of 450 **£16·16**



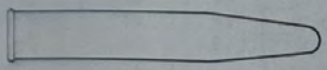
CFT-360

CENTRIFUGE TUBES, conical, polypropylene with rim. Capacity 10 ml, overall dimensions 110 × 16 mm.

CFT-340-N Centrifuge tubes Pack of 10 **£1·17**

CENTRIFUGE TUBES, cylindrical, polypropylene with rim. Capacity 12 ml, overall dimensions 100 × 16 mm. (F)

CFT-360-W Centrifuge tubes Pack of 5 **£1·33**

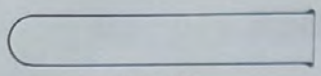


CFT-390

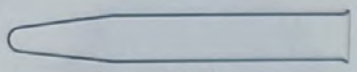
CENTRIFUGE TUBES, conical, soda-lime glass with rim. Capacity 13 ml, overall dimensions 111 × 17 mm.

CFT-390-B Centrifuge tubes Pack of 10 **£1·04**

Gallenkamp



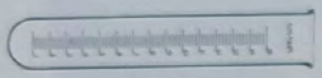
CFT-420
CFT-480



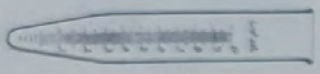
CFT-510



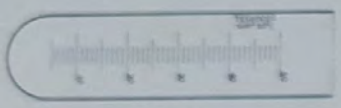
CFT-530



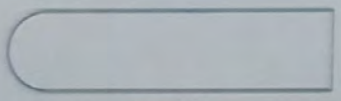
CFT-560



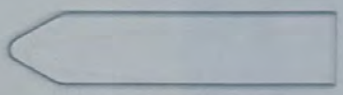
CFT-590



CFT-660



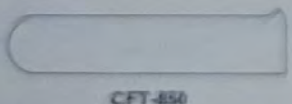
CFT-680
CFT-770



CFT-710



CFT-740



CFT-850



CFT-890

NOMINAL CAPACITY 15ml

CENTRIFUGE TUBES, cylindrical, polypropylene with rim. Capacity 15ml, overall dimensions 116 × 15·8mm. (F)
CFT-420-T Centrifuge tubes Pack of 5 **£1·09**

CENTRIFUGE TUBES, cylindrical, soda-lime glass with rim. Capacity 15ml, overall dimensions 111 × 17mm.
CFT-480-A Centrifuge tubes Pack of 10 **£0·83**

CENTRIFUGE TUBES, conical, borosilicate glass with rim. Capacity 15ml, overall dimensions 111 × 17mm.
CFT-510-S Centrifuge tubes Pack of 10 **£1·63**

CENTRIFUGE TUBES, conical, soda-lime glass with rim. Capacity 15ml, graduated 0 to 10 × 0·1ml, overall dimensions 111 × 17mm. (F)
CFT-530-E Centrifuge tubes Pack of 10 **£5·74**

CENTRIFUGE TUBE, cylindrical, soda-lime glass with rim. Capacity 15ml, graduated 1 to 15 × 0·2ml, overall dimensions 111 × 17mm. With permanent graduations and inscriptions in amber stain.
CFT-560-G Centrifuge tube **£0·92**

CENTRIFUGE TUBE, conical, *PYREX* glass with rim. Capacity 15ml, graduated 0 to 3 × 0·1ml and 3 to 10 × 0·5ml, overall dimensions 110 × 17mm.
CFT-590-Y Centrifuge tube **£0·84**

NOMINAL CAPACITY 50ml

CENTRIFUGE TUBE, cylindrical, soda-lime glass, rimless. Capacity 50ml, graduated 50 × 1ml, overall dimensions 118 × 29mm. With permanent graduations and inscriptions in amber stain.
CFT-660-V Centrifuge tube **£1·97**

CENTRIFUGE TUBES, cylindrical, borosilicate glass, rimless. Capacity 50ml, overall dimensions 118 × 29mm.
CFT-680-H Centrifuge tubes Pack of 5 **£1·22**

CENTRIFUGE TUBE, conical, soda-lime glass, rimless. Capacity 50ml, overall dimensions 118 × 29mm.
CFT-710-C Centrifuge tube **£0·45**

CENTRIFUGE TUBE, conical, soda-lime glass, rimless. Capacity 50ml, graduated 50 × 1ml, overall dimensions 118 × 29mm. With permanent graduations and inscriptions in amber stain.
CFT-740-E Centrifuge tube **£1·97**

CENTRIFUGE TUBE, cylindrical, polypropylene, rimless. Capacity 50ml, overall dimensions 111 × 29mm.
CFT-770-G Centrifuge tube **£0·74**

NOMINAL CAPACITY 100ml

CENTRIFUGE TUBE, cylindrical, borosilicate glass. Capacity 100ml, overall dimensions 135 × 40mm.
CFT-850-M Centrifuge tube **£0·66**

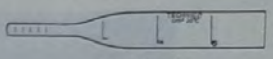
BOTTLE

CENTRIFUGE BOTTLE, polypropylene, with screw cap. Capacity 250ml, overall dimensions 125 × 61mm. (F)
CFT-890-H Centrifuge bottle **£2·53**

SPECIAL PURPOSE TUBES

CENTRIFUGE TUBE, Hopkins vaccine, graduated 0 to 0·05×0·01ml with marks at 1, 5 and 10ml, overall dimensions 117×17·5mm. With permanent graduations and inscriptions in amber stain.

CFT-970-N Centrifuge tube **£3·60**



CFT-970

Gerber tubes	*See DBH-300 et seq.*
Filter holder, Hemmings	*See FDF-600-F*
Filter tube, Sintaglass	*See FDK-450-F*
Wintrobe tube, BS 4316	*See CMV-250-J*
Digestion/centrifuge tube	*See NKT-870-S*
Water and sediment tube, ASTM D1796-IP75	*See PEM-770-A*

CUSHIONS

CUSHIONS, rubber, for 15ml buckets.
CFW-200-T Cushions Pack of 10 **£0·62**

CUSHIONS, rubber, for 50ml buckets when using round bottom tubes.
CFW-230-V Cushions Pack of 10 **£5·01**

CUSHIONS, rubber, for 50ml buckets when using short conical tubes CFT-710-C to CFT-740-E only.
CFW-250-H Cushions Pack of 10 **£3·09**

CUSHIONS, rubber, for 50ml buckets when using universal container BTS-430-S.
CFW-290-C Cushions Pack of 10 **£2·25**

CUSHIONS, rubber, for 100ml buckets.
CFW-320-U Cushions Pack of 10 **£4·11**

ADAPTERS

Supplied as balanced pairs

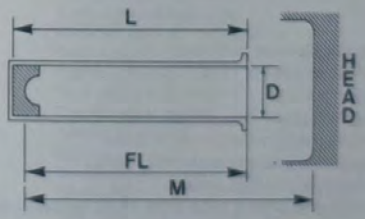
ADAPTERS, ebonite, for using tubes CFT-200 to CFT-230-F in 15ml buckets.
CFW-460-H Adapters Pair **£7·54**

ADAPTERS, ebonite, for using 5ml tubes CFT-260-H in 15ml buckets.
CFW-480-Q Adapters Pair **£3·94**

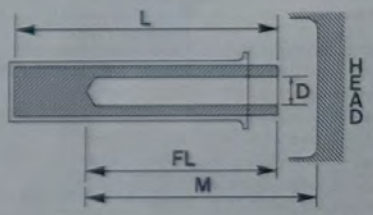
ADAPTERS, ebonite, for using Wintrobe tubes CMV-250-J in 15ml buckets.
CFW-530-U Adapters Pair **£3·94**

ADAPTERS, ebonite, for using 15ml tubes in 50ml buckets.
CFW-570-P Adapters Pair **£5·63**

FITTINGS CHART



BUCKET WITH CUSHION



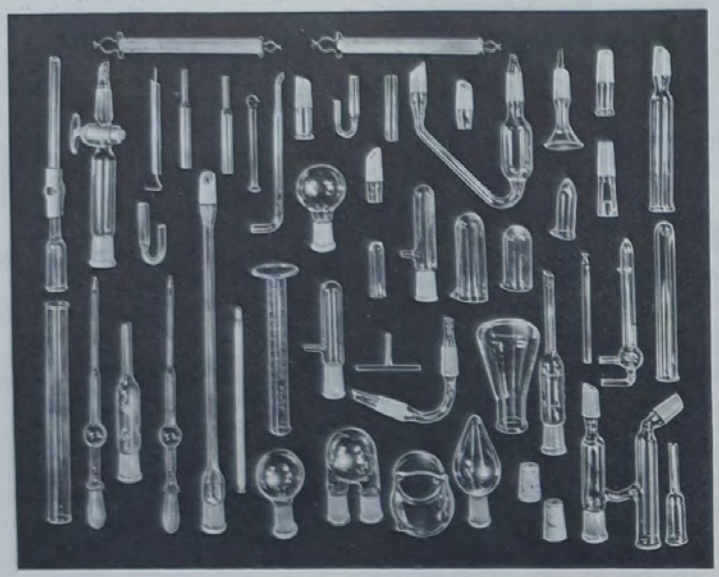
BUCKET WITH ADAPTER

Centrifuge	Bucket	Nominal Capacity ml	Using cushion	Using adapter	Dimensions, mm L.	FL.	D.	M.
CFC-300	CFC-370-504T	15	CFW-200-T	–	93	82	17·8	116
			–	CFW-460-H	108	66	11·6	81
			–	CFW-460-H	112	59	8·7	70
			–	CFW-480-Q	108	98	14·6	113
	CFC-420-524R	50	CFW-230-V/CFW-250-H	–	95	85	30·0	118
			–	CFW-570-P	98	93	17·8	118
CFD-400	CFC-370-504T	15	CFW-200-T	–	93	82	17·8	113
			–	CFW-460-H	108	66	11·6	78
			–	CFW-460-H	112	59	8·7	67
			–	CFW-480-Q	108	98	14·6	110
	CFC-420-524R	50	CFW-230-V/CFW-250-H	–	95	85	30·0	125
			–	CFW-570-P	98	93	17·8	125
	CFD-530-536Y	100	CFW-320-U	–	100	97	41·0	135
	CFD-610-610G	250	–	–	102	–	63·0	125

Gallenkamp

Griffin SEMI-MICRO ORGANIC SET

A complete set of semi-micro apparatus with 14/23 ground glass joints throughout



CHJ-200

Designed in conjunction with J. T. Stock, M.Sc., Ph.D., F.R.I.C., of the University of Connecticut and M. A. Fill, F.R.I.C., formerly of Brighton College, the set enables a wide variety of experiments to be carried out. The apparatus has been carefully designed to ensure that assembly and dismantling times, together with the working area required, are a minimum.

Set contents:

- 1 Separating funnel with 14/23 socket and stopper
- 1 Thermometer, 150mm long, range −10 to 200 × 2°C
- 1 Cold finger condenser
- 1 Stillhead with 14/23 joints
- 1 Flask, 35ml, two neck, with 14/23 sockets
- 1 Receiver with 14/23 socket and side arm
- 1 Flask, 35ml, pear shape, with 14/23 socket
- 1 Condenser, air, with 14/23 joints
- 1 Take-off bend with 14/23 cones
- 1 Air jacket for condenser
- 2 Flasks, 30ml, round bottom, with 14/23 socket
- 1 Beaker, 50ml, with lip and ears
- 1 Funnel, Willstätter, with 14/23 cone and 'nail'
- 1 Adapter, condenser, or drying tube with 14/23 cone
- 1 Microfilter, improved Schwinger pattern
- 1 Pestle and mortar, micro
- 1 Tube, crystallising 47mm long × 15mm diameter
- 1 Tube, crystallising 72mm long × 24mm diameter
- 2 Dispensing pipettes with teat
- 2 Adapters, for rubber tube
- 1 T-piece, glass
- 1 Stirring rod, glass
- 1 Filter tube, receiver with 14/23 socket
- 2 Thermometer pockets with 14/23 joints
- 1 Splash head with 14/23 cones
- 1 Extraction and drying tube with 14/23 socket, complete with thimble
- 1 Inlet tube, glass
- 3 Tube sleeves, PVC, 30mm long × 8mm diameter
- 2 Corks, bored, for air jacket
- 1 Suction adapter, glass
- 2 Spring clamps with hardwood handle
- 1 Flask, conical, wide mouth, 50ml
- 1 Test tube, 125 × 16mm
- 1 Measuring cylinder, 10ml

SEMI-MICRO ORGANIC SET, *GRIFFIN*, as specified, with tensioner, plunger, extractor holder, two corks, elastic band and instructions.

CHJ-200-M Semi-micro organic set **£50·34**

QUICKFIT MULTI-JOINT SETS

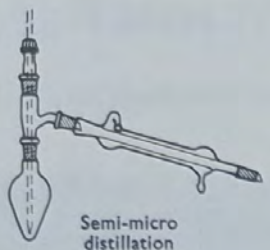
Sets of glassware with interchangeable ground glass joints for distillation and preparative organic chemistry

A comprehensive range of 101 items of Quickfit apparatus for use in organic chemistry. For the convenience of the user, the apparatus is supplied as a series of sets allowing work from the 30g up to 1kg scales to be carried out.

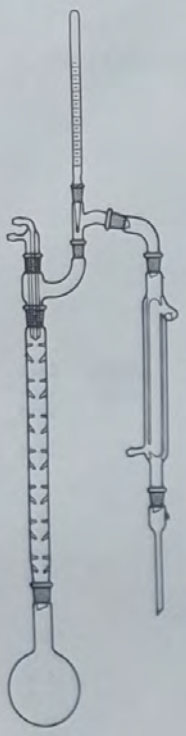
The complete range of items comprises:

Item No.	Quickfit No.	Description	Socket size	Cone size
1	SH4/22	Stillhead	14/23	19/26
2	RA2/23	Receiver adapter	19/26	24/29
3	MF15/2	Air leak/steam inlet tube	–	19/26
4	C1/12	Liebig condenser	19/26	19/26
5	D1/22	Dropping funnel, 100ml	19/26	19/26
6	DA23	Reduction adapter	19/26	24/29
7	MA4/23	Multiple adapter	19/26	24/29
8	FR50/3S	Flask, round bottom, 50ml	24/29	–
9	FE250/3	Flask, Erlenmeyer, 250ml	24/29	–
10	FR250/3S	Flask, round bottom, 250ml	24/29	–
11	SB19	Stopper	–	19/26
12	SB19	Stopper	–	19/26
13	SH4A	Thermometer pocket	–	14/23
14	RA1/12	Receiver adapter, bent	19/26	–
15	FR100/3S	Flask, round bottom, 100ml	24/29	–
16	SB24	Stopper	–	24/29
17	ST1/1	Stirrer, link	–	–
18	ST2/2	Stirrer guide	19/26	19/26
19	SH7/02	Splash head	–	19/26
20	D2/42	Pear-shaped funnel, 500ml	19/26	19/26
21	MF18/3	Adapter with 'T' connection	19/26	24/29
22	MF23/2	Drying tube	–	19/26
23	MF23/2	Drying tube	–	19/26
24	FR500/3U	Flask, round bottom, 500ml	24/29	–
25	ST5/2	Stirrer gland	–	19/26
26	MF15/2	Air leak/steam inlet tube	–	19/26
27	ST1/4	Stirrer, collapsible paddle	–	–
28	C2/22	Air condenser	19/26	19/26
29	C5/22	Double surface condenser	19/26	19/26
30	MF15/2	Air leak/steam inlet tube	–	19/26
31	ST20/2	Ground sleeve stirrer gland	–	19/26
32	DA23	Reduction adapter	19/26	24/29
33	FC3/13	Vigreux column	24/29	24/29
34	MF31/2	Thermometer, 0 to 250°C	–	14/23
35	MF16/2	Thermometer pocket	–	19/26
36	MF10/2B	Adapter, bent	–	19/26
37	SB24	Stopper	–	24/29
38	SB19	Stopper	–	19/26
39	MF24/2/6	Test tube	19/26	–
40	MF24/2/6	Test tube	19/26	–
41	FRIL/3S/22A	Flask, round bottom, 1 litre, three necks	24/29 and 19/26	–
42	FR250/3S/2A	Flask, round bottom, 250ml, two necks	24/29 and 19/26	–
43	FR2L/3US/22P	Flask, round bottom, 2 litres, three necks	24/29 and 19/26	–
44	ST10P	Stirrer pulley	–	–
45	FE250/3	Flask, Erlenmeyer, 250ml	24/29	–
46	FRIL/3UM	Flask, round bottom, 1 litre	24/29	–
47	RA1/22	Receiver adapter, straight	19/26	–
48	DA35	Reduction adapter	24/29	34/35
49	DA25	Reduction adapter	19/26	34/35
50	C3/12	Coil condenser	19/26	19/26
51	FC8/23	Plain fractionating column	34/35	24/29
52	FC8/06	Raschig rings, 250ml	–	–
53	CX3/35	Coil condenser, reversible	–	24/29 and 34/35
54	MF1/1	Non-return valve cap	14/23	–
55	MF1/D	Non-return valve disc	–	–
56	MF40A	Stainless steel springs (2)	–	–
57	MF1/12	Non-return valve body	–	14/23 and 19/26
58	EX13/12	Packing support, 16mm diameter	–	–
59	EX13/25	Packing support, 29mm diameter	–	–
60	FC14/00	Immersion condenser	–	19/26
61	MF31/3	Thermometer, 0 to 360°C	–	14/23
62	EX5/53	Soxhlet extractor, 60ml	34/35	24/29
63	SH4/23	Stillhead	14/23	24/29 and 19/26
64	MF24/3/8	Test tube	24/29	–
65	MF28/3/250	Drechsel bottle head	–	24/29
66	RA6/23	Intermediate vacuum receiver (Perkin)	19/26	24/29
67	CC3/35	Conical/spherical adapter	S35 cup	24/29
68	SB3/35	Conical/spherical adapter	24/29	S35 ball
69	JC3	Spherical joint clip	–	–
70	SB19	Stopper	–	19/26
71	MF25/3	Washbottle head	–	24/29
72	MA1/3	Multiple adapter	19/26	24/29
73	RA9/22	Bend	19/26	19/26
74	RA3/23	Vacuum receiver adapter	19/26	24/29
75	FB100/2	Flask, Buchner, 100ml	19/26	–
76	FE50/2	Flask, Erlenmeyer, 50ml	19/26	–
77	FE500/3	Flask, Erlenmeyer, 500ml	24/29	–
78	FR150/3S	Flask, round bottom, 150ml	24/29	–
79	FR500/3S	Flask, round bottom, 500ml	24/29	–
80	FR100/3S	Flask, round bottom, 100ml	24/29	–
81	FE150/3	Flask, Erlenmeyer, 150ml	24/29	–
82	FF500/3UM	Flask, flat bottom, 500ml	24/29	–
83	MF29/3/250	Drechsel bottle, 250ml	24/29	–
84	FR500/3S/2A	Flask, round bottom, 500ml, two necks	24/29 and 19/26	–
85	FP50/1	Pear-shaped flask, 50ml	14/23	–
86	SB14	Stopper	–	14/23
87	D31/1/50	Dropping funnel, 50ml	14/23	14/23
88	SH4/11	Stillhead	14/23	14/23
89	C1/11	Liebig condenser	14/23	14/23
90	ST51/13	Screw-cap adapter	–	14/23
91	MF5	Air leak/steam inlet tube	–	14/23
92	RA1/11	Receiver adapter, bent	14/23	–
93	11608	Thermometer	–	–
94	FR25/1S	Flask, round bottom, 25ml	14/23	–
95	C2/11	Air condenser	14/23	14/23
96	MF23/1	Drying tube	–	14/23
97	ST51/18	Screw-cap adapter	–	14/23
98	MF15/1	Air leak/steam inlet tube	–	14/23
99	FP50/1/1A	Pear-shaped flask, 50ml, angled side neck	14/23	–
100	MF17/1	Adapter with 'T' connection	14/23	14/23
101	3730/04	Sintered glass funnel	–	–

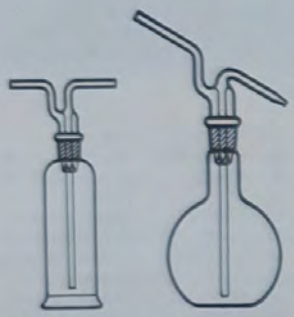
Gallenkamp



Semi-micro distillation



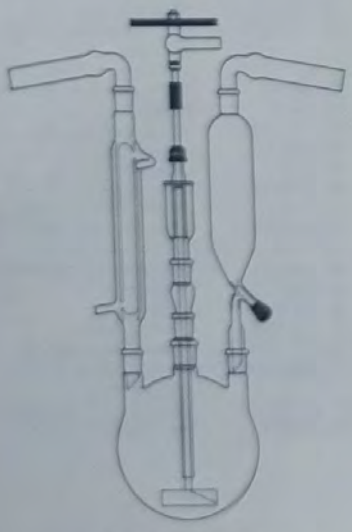
Fractional distillation with reflux control



Wash bottles



Extraction



Reflux with stirring and addition of reactants

CHEMISTRY SET *QUICKFIT* **34BU,** a starting set, comprising item Nos. 1 to 16, which includes the necessary equipment for a wide range of preparations up to the 150g scale. Supplied in box 460 × 380 × 110mm with plastics storage tray.

CHK-230-E Quickfit set 34BU **£30·48**

CHEMISTRY SET *QUICKFIT* **34X,** an extension set comprising item Nos. 17 to 26, which when used with the 34BU set permits work up to the 300g scale to be carried out. Supplied in box 460 × 380 × 180mm with plastics storage tray.

CHK-260-G Quickfit set 34X **£24·38**

CHEMISTRY SET *QUICKFIT* **33X,** an extension set comprising item Nos. 27 to 46 which when used with sets 34BU and 34X permits work up to the 1kg scale to be carried out. Supplied in two boxes, 460 × 380 × 110mm and 460 × 380 × 180mm, with plastics storage trays.

CHK-290-Y Quickfit set 33X **£66·70**

CHEMISTRY SET *QUICKFIT* **32X/M,** an extension set comprising item Nos. 47 to 101, which when used with sets 34BU, 34X and 33X permits work from the 30g scale up to the 1kg scale to be carried out. Supplied in five boxes, two 460 × 380 × 110mm, two 380 × 230 × 70mm and one 460 × 380 × 180mm, all with plastics storage trays.

CHK-330-T Quickfit set 32X/M **£139·10**

CHEMISTRY SET *QUICKFIT* **29BU/M,** for preparations on the 30g scale. A single joint size 14/23 is used throughout.

Set contents:

Quickfit No.	Description
C1/11	Liebig condenser
FP50/1	Pear-shaped flask, 50ml
RA1/11	Receiver adapter
SH4/11	Stillhead
ST51/13	Screw-cap adapter

In cardboard box 300 × 180 × 120mm, with instructions.

CHK-380-H Quickfit set 29BU/M **£8·86**

CHEMISTRY SET *QUICKFIT* **27BU/M,** for preparations on the 30g scale. A single joint size 14/23 is used throughout.

Set contents:

Quickfit No.	Description
FP50/1	Pear-shaped flask, 50ml
SH4/11	Stillhead
C1/11	Liebig condenser
ST51/13	Screw-cap adapter
RA1/11	Receiver adapter
MF5	Air leak/steam inlet tube
D31/1/50	Rotaflo dropping funnel, 50ml
SB14	Stopper
11608	Thermometer, 0 to 360°C × 2°C

Complete in cardboard box 380 × 230 × 70mm, with instructions.

CHK-420-S Quickfit set 27BU/M **£20·31**

CHEMISTRY SET *QUICKFIT* **27X/M,** an extension set of eight components which convert the 27BU/M into the 23BU/M set.

Set contents:

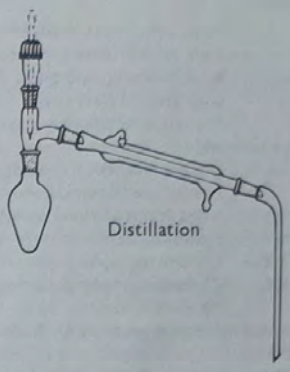
Quickfit No.	Description
FR25/15	Round bottom flask, 25ml
C2/11	Air condenser/drying tube
3730/04	Sintered glass funnel
MF23/1	Drying tube
FP50/1/1A	Pear-shaped flask, 50ml, with angled side neck
MF5	Air leak/steam inlet tube
MF17/1	Adapter with 'T' connection
ST51/18	Screw-cap adapter

Complete in cardboard box 380 × 230 × 70mm, with instructions.

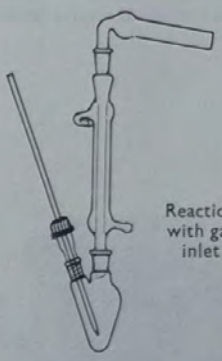
CHK-450-U Quickfit set 27X/M **£14·89**



Gas evolution



Distillation



Reaction with gas inlet



Chromatography

CHEMISTRY SET *QUICKFIT* **23BU/M,** containing all the components of the sets 27BU/M and 27X/M. Supplied in two boxes, each 380 × 230 × 70mm, complete with advanced instructions booklet.

CHK-490-P Quickfit set 23BU/M **£35-13**

CHEMISTRY SET *QUICKFIT* **10BU,** comprising 22 components with 10/19 joints and a plastics drawing stencil in box 280 × 230 × 70mm. The two-piece box lid converts to a stand on which assemblies can be mounted. With instructions.

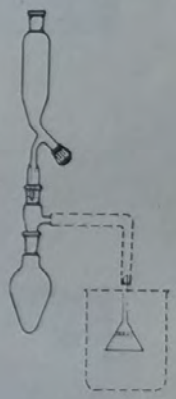
Set contents:

Quickfit No.	Description
C1/00	Liebig condenser
C2/00	Air condenser
D1/00	Tap funnel
FP25/0	Flask, pear shape
FP25/0AP	Flask, pear shape, 3 necks
FR5/0S	Flasks, round bottom (3)
MD60	Receiver tube
MF15/0	Air leak/steam inlet tube
MF31/0/250	Thermometer
MF33C	Rubber teat
MU/WN	Wilstätter nail
MU8/0	Stirrer
MU9/00	Gas inlet tube
MU23/0	Drying tube
MU33	Dropping pipette
MU39/10/0	Filter funnel
RA2/00	Receiver adapter
SB10	Stoppers (2)
SH4/0	Stillhead
STQ	Drawing stencil

CHK-560-F Quickfit set 10BU **£58-03**



Reflux with liquid addition



Gas evolution

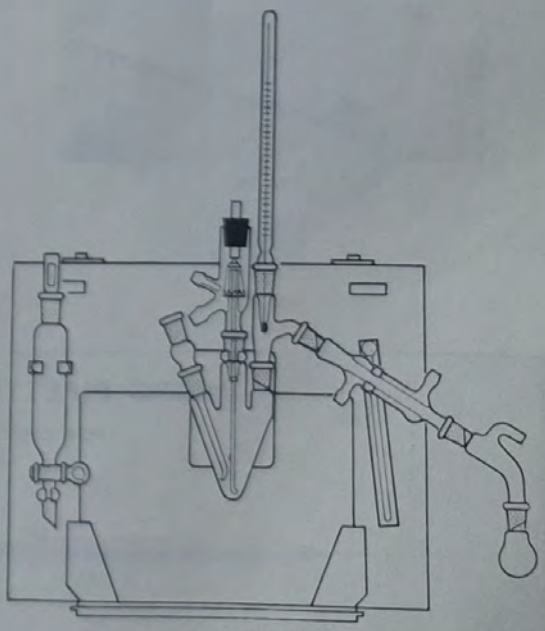
CHEMISTRY SET *QUICKFIT* **17BU,** a basic set of seven parts using only 10/19 and 10/13 standard joints, for the introduction to the first principles of preparative chemistry. With instructions.

Set contents:

Quickfit No.	Description
C1/00	Liebig condenser
D1/00	Tap funnel
FP25/0	Flask, pear shape
MF31/0/250	Thermometer
RA1/10	Receiver adapter
SB10	Stopper
SH4/0	Stillhead

Complete in box 230 × 160 × 90mm, mass 0·5kg.

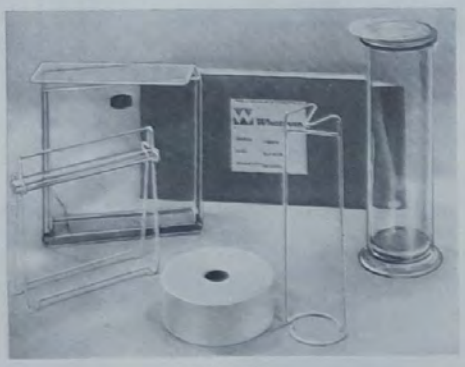
CHK-610-J Quickfit set 17BU **£18-92**



CHK-560

CHROMATOGRAPHY

PAPER CHROMATOGRAPHY KIT, *GRIFFIN*, to introduce the theory and principles of ascending, descending and reverse phase paper chromatography.



CJA-200

Kit contents:

1	Tank, cylindrical, glass, 89mm diameter × 305mm high, with ground glass cover
1	Tank, rectangular, glass, 229 × 76 × 229mm high, with ground glass cover
1	Trough, semicircular, glass, 205mm long × 24mm wide
1	Wire frame, nylon coated, to accommodate trough and for use in rectangular tank
1	Wire frame, nylon coated, cylindrical, for use in cylindrical tank
Reel of 100m	Chromatography paper strip, 50mm wide
Box of 100	Chromatography paper sheets, 200 × 200mm

With manual of experiments by D. R. Browning, B.Sc., F.R.I.C., A.R.T.C.S.

CJA-200-L Paper chromatography kit **£23·18**

SPARE PARTS

CJA-220-030L	Tank, cylindrical, with cover	**£3·35**
CJA-220-050F	Tank, rectangular, with cover	**£8·33**
CJA-220-070W	Trough, semi-circular	**£2·39**
	Chromatography paper strip	*See CJF-230-050R*
	Chromatography paper sheets	*See CJF-250-030J*

ACCESSORIES

Capillary tubes	*See MFB-210-538L*
Dryer, electric	*See CJD-550-X*
Filter paper sheets, 460 × 570mm	*See FDH-240-330X*
Glass rod, 10 to 11mm diameter	*See RND-300-110S*
Oven	*See OVB-300-010N*



CJA-350

RADIAL CHROMATOGRAPHY KIT, *GRIFFIN*, to introduce the theory and principles of radial paper chromatography.

Kit contents:

1	Plate glass sheet, 300 × 300mm
1	Plate glass sheet, 300 × 300mm, with central aperture fitted with one-hole rubber stopper
3	Syringes, plastics, 2ml
1	Three-way plastics stopcock
4	Clips

With manual of experiments by D. R. Browning, B.Sc., F.R.I.C., A.R.T.C.S.

CJA-350-X Radial chromatography kit **£6·56**

SPARE PARTS

Syringes	*See XCE-390-070D*
Rubber stopper	*See SYH-530-120M*

ACCESSORIES

Dryer, electric	*See CJD-550-X*
Filter paper circles, 27cm diameter	*See FDH-240-230S*
Oven	*See OVB-300-010N*
Syringe, glass, for use with concentrated organic solvents	*See SZR-200-050K*

MICRO PIPETTES AND SYRINGES

FOR CHROMATOGRAPHY



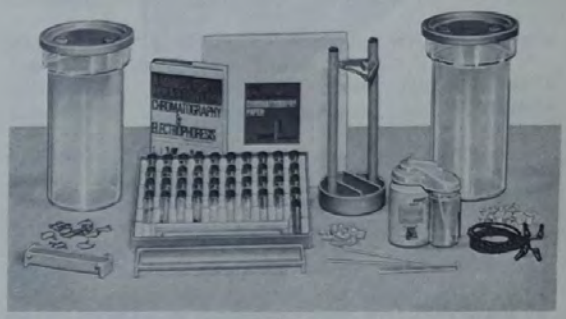
- **Pipettes, range 5 to 250µl** *See PMP-550 et seq*
- **Syringe, range 10 to 500µl** *See SZR-500 et seq*

CHROMATOGRAPHY AND ELECTROPHORESIS KIT, *SHANDON UNIKIT*, an integrated system of apparatus, with chemicals and reagents, and a fully illustrated manual, on the theory and practice of paper chromatography and electrophoresis.

Kit contents:

2	Cylindrical glass tanks, 135mm diameter × 280mm high, with 150mm gallery at the top and polythene lid
12	Polythene stoppers for lid
1	Polythene solvent trough for descending paper chromatography, with two straight and one right-angled glass rods for holding paper
12	Polythene clips for securing paper cylinders
12	Stainless steel clips for suspending papers in drying oven
1	Spray gun consisting of a 105ml glass reservoir jar connected to an aerosol power unit by a plastics bridge-piece incorporating a release button and a spray nozzle. The aerosol power unit contains non-flammable, liquefied dichlorodifluoromethane gas at a pressure of 480kN/m² and will spray 600 to 900ml of any liquid having a consistency up to that of light oil
1	Polythene dip tray
1	Electrophoresis assembly of polythene tray incorporating two buffer compartments, two sheathed electrodes, adjustable paper-holding support and length of twin flex fitted with shrouded socket connectors
Box of 100	Chromatography paper sheets, 250×250mm
Box of 100	Chromatography paper sheets, 300×100mm
1	Desk-type pack containing 40 vials of chemicals, two spare vials, iridium wire loop and 10µl pipette
1	Teaching Level Manual for *Chromatography and Electrophoresis* by J. G. Feinberg and Ivor Smith

CJA-470-P Chromatography and electrophoresis kit **£63·25**



CJA-470

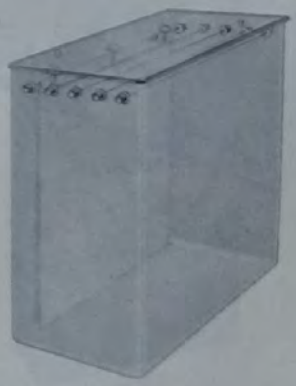
SPARE PARTS

CJA-490-030P	Spray gun with aerosol power unit	**£5·56**
CJA-490-050J	Aerosol power units	Pack of 6 **£8·53**

ACCESSORY

Power supply, *UNIKIT*, with four pairs of output sockets for operating up to four apparatus simultaneously. Output 350V, and a short circuit current of 10mA through a 35KΩ protective resistor. For 100–125V or 200–250V a.c. supplies.

CJA-490-504T Power supply **£77·00**



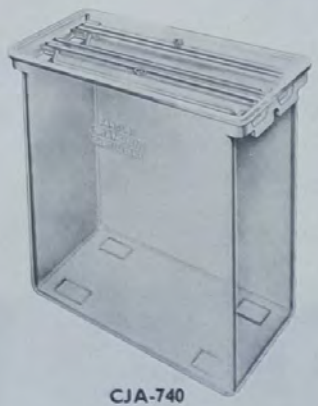
CJA-650

TANK, glass, for ascending, descending and two-dimensional paper chromatography. Dimensions 345mm wide × 370mm high to accommodate paper sheets 315×335mm. Five removable stainless steel wires, which can be tensioned externally, are fitted in holes on opposite narrow sides of the tank. Neoprene washers render the holes airtight. For descending chromatography, the central wire can be replaced by a pair of stainless steel brackets which support a glass solvent trough, 315mm long. With glass paper holder 290mm long. The rims and glass cover are ground and the cover has three solvent filling holes.

CJA-650-N Tank **£58·85**

SPARE PARTS

CJA-670-030N	Solvent trough	**£10·67**
CJA-670-050H	Paper holder	**£0·99**
CJA-670-070B	Brackets, with fittings	Pair **£2·77**



CJA-740

TANKS, glass, for ascending, descending and two-dimensional paper chromatography when solvent vapours preclude the use of metal or other corrodible materials. Dimensions 200mm wide × 560mm high. With recessed shoulders for the twin solvent troughs and glass support rods. Additional recesses are provided for rods over which paper sheets may be draped to accelerate equilibrium. The rims and glass cover are ground to provide an airtight fit with greasing, and the cover has two solvent filling holes. With two glass troughs, two glass anchor rods, four anti-siphon glass rods, two drape paper rods, glass cover and twelve plastics stoppers.

Internal length	300mm	510mm
Usable length of glass troughs	290mm	500mm

CJA-740-M	Tank, 300 × 200 × 560mm	**£111·01**
CJA-760-V	Tank, 510 × 200 × 560mm	**£154·00**

SPARE PARTS

CJA-780-030V	Trough, 290mm, for CJA-740-M	**£8·38**
CJA-780-050P	Trough, 500mm, for CJA-760-V	**£12·47**

TANK, multisheet, for obtaining simultaneously a large number of two-dimensional ascending chromatograms under identical conditions. Comprises glass tank 380mm wide × 255mm high, with ground edges and glass cover, aluminium framework to take 12 filter paper sheets 200 × 200mm with a punched hole in each corner, and aluminium solvent dish.

CJA-830-L Tank **£91·30**



CJA-830

CLIPS, stainless steel, with white plastics label, for holding chromatography paper, when drying.

CJD-310-M Clips Pack of 10 **£4·89**

SPRAY, all-glass, for producing a fine even aerosol of chromatography reagents and dyes. Comprises spray head with 24/29 cone, 100ml conical flask with horns, rubber blowball and two spring connectors.

CJD-390-C Spray **£8·10**

SPARE PARTS

CJD-410-030S	Spray head	**£4·21**
CJD-410-050M	Flask, 100ml	**£1·98**

BLOWER, hot air, portable, for general drying purposes, comprising motor and 500 W heater, mounted in an insulated case. With a handle which incorporates a slide switch having settings to provide cold, warm and hot air flows. A thermostat is fitted to limit the temperature rise if the air inlet or outlet are restricted. Maximum air flow temperature approximately 70°C. For 220–240V 50Hz single phase supplies.

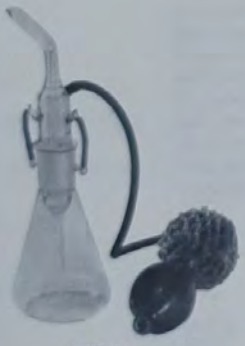
CJD-550-X Blower **£26·16**

SPARE PARTS

CJD-570-010U	Heating element, 220–240V	**£4·11**
CJD-570-030X	Brushes, for motor	Set **£1·13**



CJD-310



CJD-390



CJD-550

CHROMATOGRAPHY PAPER

PAPER STRIPS, for chromatography, *WHATMAN* **Grade 1.** Suitable for qualitative one- and two-dimensional separations. Medium flow rate. In reels of 100m.

CJF-230-030A	Paper strips, 30mm wide	Reel **£1·76**
CJF-230-050R	Paper strips, 50mm wide	Reel **£2·45**
CJF-230-070L	Paper strips, 75mm wide	Reel **£3·70**
CJF-230-130T	Paper strips, 190mm wide	Reel **£7·99**

PAPER SHEETS, for chromatography, *WHATMAN* **Grade 1,** as CJF-230 but in sheet form.

CJF-250-030J	Paper sheets, 200 × 200mm	Pack of 100 **£1·53**
CJF-250-050D	Paper sheets, 460 × 570mm	Pack of 100 **£9·16**
CJF-250-070U	Paper sheets, 580 × 680mm	Pack of 100 **£13·81**

PAPER SHEETS, PUNCHED, for chromatography, *WHATMAN* **Grade 1,** as CJF-250 but with hole punched in each corner. Sheet size 200 × 200mm.

CJF-280-U	Paper sheets, 200 × 200mm	Pack of 100 **£2·31**

PAPER SHEETS, SLOTTED, for chromatography, *WHATMAN* **Grade 1,** suitable for multiple analyses. The 213 × 110mm sheet is cut to form 12 strips 15mm wide with a 3mm slot between. Each slot is 90mm long to leave a 10mm band at the top and bottom of the sheet. In use, the sheet is formed into a cylinder and stood in a dish.

CJF-310-P	Paper sheets, 213 × 110mm	Pack of 100 **£3·06**

PAPER SHEETS, for chromatography, *WHATMAN* **Grade 3.** A rough, thick paper with medium flow rate suitable for inorganic and electrophoretic separations.

CJF-400-050W	Paper sheets, 460 × 570mm	Pack of 100 **£20·30**
CJF-400-070Q	Paper sheets, 580 × 680mm	Pack of 100 **£30·47**

PAPER STRIP, for chromatography, *WHATMAN* **Grade 3MM.** A soft, smooth thick paper suitable for inorganic separations and where large quantities of solutions are to be analysed. In reel of 100m.

CJF-480-E	Paper strip, 50mm wide	Reel **£3·71**

PAPER SHEETS, for chromatography, *WHATMAN* **Grade 3MM,** as CJF-480-E but in sheet form.

CJF-500-050X	Paper sheets, 460 × 570mm	Pack of 100 **£13·75**
CJF-500-070Y	Paper sheets, 580 × 680mm	Pack of 100 **£20·74**

PAPER SHEETS, for chromatography, *WHATMAN* **Grade 4.** A faster running paper than Grade 1 but of the same thickness. Ensures fast development times when using slow running solvents and suitable for the analysis of amino acids and sugars.

CJF-600-050G	Paper sheets, 460 × 570mm	Pack of 100 **£9·16**
CJF-600-070A	Paper sheets, 580 × 680mm	Pack of 100 **£13·81**

PAPER SHEETS, for chromatography, *WHATMAN* **Grade 54.** A hardened version of Grade 4, of high wet strength. Suitable for two-dimensional chromatographic separations of sugars. Recommended for impregnation with absorbents such as alumina, starch and magnesia.

CJF-690-E	Paper sheets, 460 × 570mm	Pack of 100 **£17·81**

Gallenkamp DRYING OVENS

Suitable for drying chromatography paper



- **Maximum temperature 200°C**
- **Direct reading hydraulic thermostat**
- **Gravity convection**
- **Aluminium interior**

See OVB-300



- **Maximum temperature 120°C**
- **Direct reading hydraulic thermostat**
- **Accessory clips for holding chromatography paper**
- **Optional exhaust fan**

See OVL-220

Gallenkamp

Griffin THIN LAYER CHROMATOGRAPHY KIT



CJK-300

THIN LAYER CHROMATOGRAPHY KIT, *GRIFFIN*, to introduce the principles of adsorption chromatography using the thin layer technique.

Kit contents:

1 Applicator, for plate material, to accept glass plates 150 × 75 mm and microscope slides 75 × 25 mm
5 Glass plates, 150 × 75 mm
100 Microscope slides, 75 × 25 mm
1 Glass tank, rectangular, with cover
1 Coplin jar
100 Capillary tubes

With manual of experiments by D. R. Browning, B.Sc., F.R.I.C., A.R.T.C.S

CJK-300-S	Thin layer chromatography kit	**£33·75**

SPARE PARTS

CJK-320-010B	Glass plates, 150 × 75 mm	Pack of 25 **£1·35**
	Microscope slides	*See HJE-220-M*
	Glass tank, with cover	*See CJA-220-050F*
	Coplin jar	*See HJL-390-A*
	Capillary tubes	*See MFB-210-538L*

ACCESSORIES

Dryer, electric	*See CJD-550-X*
Separating funnel, 250 ml	*See FPM-600-090G*
Oven	*See OVB-300-010N*

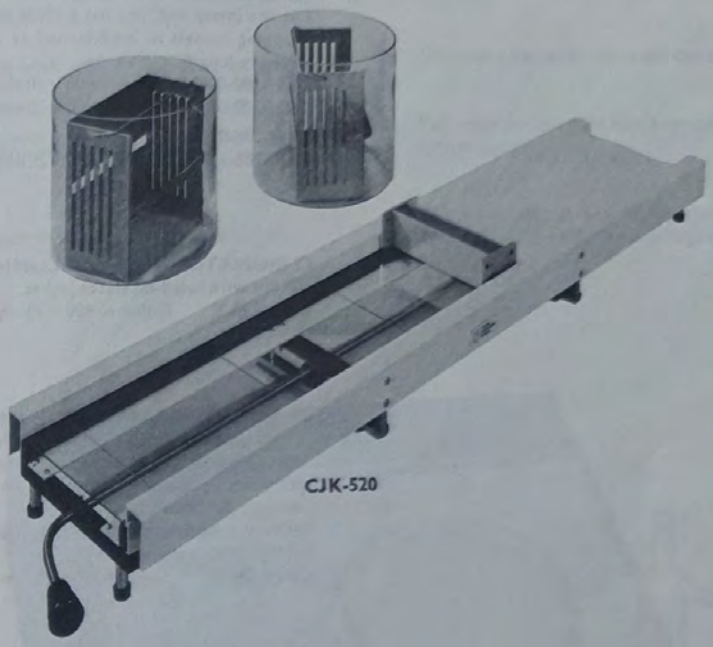


ULTRAVIOLET LAMP FOR CHROMATOGRAPHY

- Dual range 366 and 254 nm
- Integral filters
- Can be hand held or bench mounted

See LCF-750-Q

THIN LAYER CHROMATOGRAPHY



CJK-520

THIN LAYER CHROMATOGRAPHY KIT, *QUICKFIT* **8CR.** for carrying out thin layer chromatography experiments quickly, economically, and accurately. The outfit is designed for use with glass plates which can be processed in batches of five. The spreader has four accurately machined slots for coating plates with absorbent layers 0·25, 0·5, 0·75, and 1 mm thick. The plastics spotting template is notched for sample application points 10 and 15 mm apart, and is ruled at 5 mm intervals for measuring Rf values on developed plates.

Kit contents:

1	CR7/1	Automatic plate leveller
1	CR7/2	Spreader
2	CR7/3	Racks, for plates 200 × 200 mm
1	CR7/4	Spotting template
1	CR7/5	Scriber
2	CR7/6	Developing tanks/desiccators
2	CR7/7	Tank lids
2	CR8/5	Glass plates, 200 × 50 mm
2	CR8/10	Glass plates, 200 × 100 mm
10	CR8/20	Glass plates, 200 × 200 mm
1	7CR	Spray, complete, comprising spray body, flask and adapter
1	PM5/1	Micropipette, 0·005 ml subdivided 0·001 ml
1	PM10/2	Micropipette, 0·010 ml subdivided 0·0025 ml
1		Sample pack of Chromedia cellulose powder CC41
CJK-520-L		Thin layer chromatography kit **£161·10**

SPARE PARTS

CJK-540-030L	Automatic plate leveller, CR7/1	£78·93
CJK-540-040Y	Spreader, CR7/2	£15·09
CJK-540-050F	Rack, CR7/3, for plates 200 × 200 mm	£11·58
CJK-540-060C	Spotting template, CR7/4	£3·87
CJK-540-080T	Developing tank/desiccator, CR7/6	£9·37
CJK-540-090Q	Tank lid, CR7/7	£1·55
CJK-540-110N	Plates, 200 × 50 mm, 82CR	Pack of 20 £7·48
CJK-540-130H	Plates, 200 × 100 mm, 84CR	Pack of 20 £10·79
CJK-540-150B	Plates, 200 × 200 mm, 88CR	Pack of 10 £7·52
CJK-540-170S	Spray complete, 7CR	£5·29
CJK-540-180P	Spray head only, CR7/9	£2·56
CJK-540-210J	Micropipette, 0·005 ml, PM5/1	£1·58
CJK-540-220G	Micropipette, 0·010 ml, PM10/2	£1·19

SPOT COLLECTOR FUNNEL, an aerodynamically shaped bulb in borosilicate glass with a porosity three sintered disc sealed across the centre. A vacuum line is attached to one end of the bulb and the other end is used to scrape the spot from the plate. The powder is sucked into the collector and deposited on the sintered disc. After removing the air line, the powder can be rinsed out into a suitable container for UV or spectrophotometric analysis. Overall length 200 mm, plate diameter 40 mm.

CJK-650-F Spot collector funnel **£5·09**



CJK-650

Gallenkamp

COLUMN CHROMATOGRAPHY



CKH-200

CHROMATOGRAPHY COLUMNS, borosilicate glass, for gravity elution. Fitted with a sintered glass support disc of porosity 1 at the lower end, and has a 19/26 socket with spring hooks for dropping funnels to be attached at the upper end. Dimensions given are length × diameter.

CKH-200-030N	Column, 400 × 10 mm	£2·90
CKH-200-050H	Column, 400 × 20 mm	£3·09
CKH-200-070B	Column, 400 × 30 mm	£3·75
CKH-200-110P	Column, 800 × 20 mm	£4·48

CHROMATOGRAPHY COLUMN, borosilicate glass, as CKH-200 but with fused-on water jacket.

CKH-220-Y	Column, 400 × 30 mm	£9·68



CKH-220

CHROMATOGRAPHY COLUMN, borosilicate glass, for suction elution, particularly suitable for separations of methylated oestrogens. Surmounted by a 40 ml reservoir and with a sintered disc, porosity 4, fused into the lower end to support the column packing. A 19/26 cone with pump connection surrounds the delivery tube and allows the elutriate to be collected in flasks having 19/26 sockets.

CKH-250-K	Column, 50 × 10 mm	£3·99

CHROMATOGRAPHY COLUMNS, borosilicate glass, for pressure elution. The jacketed columns are terminated by screw joints with PTFE inserts for connection to glass or metal tubing.

Length × dia., mm	400 × 11·5	400 × 16·5
Dia. through screwhead, mm	7·5	10·5
CKH-290-030T Column, 400 × 11·5 mm		£4·96
CKH-290-050N Column, 400 × 16·5 mm		£6·29



CKH-250



CKH-290

CHROMATOGRAPHY COLUMN, *QUICKFIT*

See QCA-100-U and QCA-300-E

POROUS POLYTHENE SHEET, for use as support plates in chromatography columns

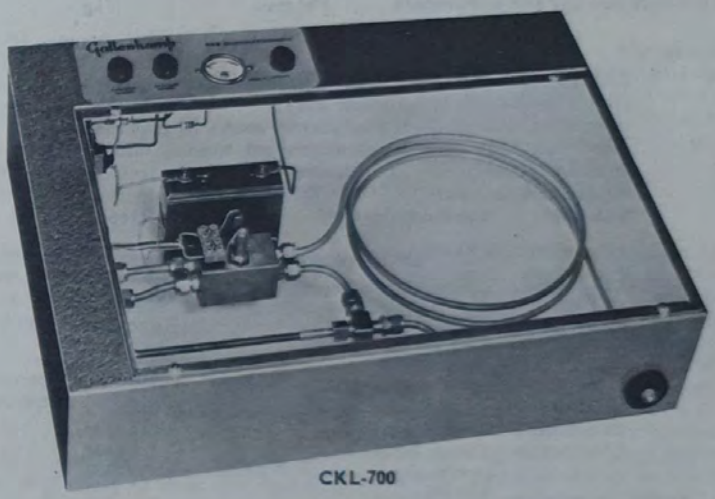
See SHC-250-Q

PERISTALTIC PUMPS, for use with chromatography columns

See PYH-670-W

Gallenkamp GAS CHROMATOGRAPH

- Suitable for a wide range of routine analyses
- For gases and liquids with boiling points up to 80°C
- Battery operated – simple controls
- Can be used with recorder or galvanometer
- Produces sharply defined peaks
- Column and katharometer designs obviate 'tailing'
- Full view removable top window for easy access to components
- Teaching manual describing nine experiments supplied with each chromatograph



CKL-700

An efficient but simple apparatus suitable for a wide range of industrial analyses and ideal for demonstrations and individual investigations in teaching laboratories.

As the result of careful design, the response is practically linear, undesirable effects such as tailing of peaks and zero drift have been virtually eliminated and repeatability is excellent.

Although intended for operating at room temperature the open layout of the components makes it simple for the user to extend the temperature range of the chromatograph by wrapping heating tapes around the column and detector.

The open layout, full view window and simple controls are especially useful in teaching laboratories where analyses of unknown mixtures and the effects of varying parameters are being demonstrated and studied.

Bibliography:

A programmed introduction to gas-liquid chromatography, B. Pattison. Pub: Heyden, London. 1969

INDUSTRIAL APPLICATIONS

The apparatus may be used for basic industrial training, for routine determinations where more complex equipment is unnecessary and as a quick-check method of analysis prior to more precise determination on larger more expensive chromatographs.

EDUCATIONAL APPLICATIONS

The apparatus may be used in colleges as a simple, rapid analyser and to teach or study the important concepts of gas chromatography including:

- Retention times and volumes of organic solvents
- Effects of varying katharometer bridge currents
- Effects of varying carrier gas flow rates
- Effects of varying column lengths
- Effects of changing column packing

and for comparing the relative accuracies of peak height and peak area methods of quantitative determinations.

Gallenkamp GAS CHROMATOGRAPHY

(continued)

DESIGN FEATURES

Sample injection is by hypodermic syringe through a replaceable silicone rubber seal.

Column. The standard apparatus incorporates a 1200mm general purpose column packed with silicone-impregnated Celite. The column is connected by simple screw couplings. Unfilled columns are available with instructions for filling for special applications.

Gas Flow System. The carrier gas reference stream can be balanced to the column stream by means of the adjustable needle valve. For most purposes the two streams may be compared by bubbling their outlets into a beaker of water but flowmeters may be used when flowrates are required to be known accurately. Normally nitrogen from a cylinder with pressure regulator is used but other gases (except hydrogen) may be used if needed.

Detector. This is an accurate, robust, thermal conductivity katharometer designed to minimise base line drift and temperature sensitivity. The sensing elements are a pair of matched thermistors which are powered by a battery through a suitable control circuit.

Technical data

For guidance, the following approximate values give satisfactory results when the chromatograph is used with a 5mV recorder. These values do not represent the full range of the instrument and precise values will depend upon individual columns and samples.

Bridge current	5mA
Gas flow	20 to 100ml/min
Sample volume – liquids	10μl
gases	0·5 to 1ml
Detection limit	10^{-7}g
Overall dimensions	510 × 400 × 140mm high
Net mass	7kg

GAS CHROMATOGRAPH, *GALLENKAMP*, as specified, with thermal conductivity katharometer and control circuit, matched thermistors, 1200mm Celite filled column, needle valve, silicone rubber seal, 4·5V battery, instruction and teaching manual. **Without** galvanometer or recorder, carrier gas pressure regulator and flowmeter.

CKL-700-L	Gas chromatograph	**£166·50**

SPARE PARTS

CKL-720-030L	Column, 1200mm long, Celite filled	**£5·18**
CKL-720-070W	Thermistors, matched pair	Pair **£36·51**
CKL-720-130H	Injection port seals, silicone	Pack of 10 **£0·79**
	Battery	*See BMT-240-C*

ACCESSORIES

	Columns, unfilled, complete with couplings.	
CKL-720-502T	Column, 1200mm long	**£2·87**
CKL-720-512Q	Column, 3600mm long	**£4·67**
	Needles, all-metal, size No. IV, for use with SZR-200 and SZR-260.	
CKL-720-526F	Needles	Pack of 10 **£1·69**
	Flowmeter, 0 to 100ml/min (two required)	*See FJC-550-060Q*
	Pressure regulator, variable	*See GGM-440-Q*
	Pressure tubing, 6·5mm bore	*See TWR-520-150M*
	Hose clip, 15 to 19mm	*See CNK-640-030F*
	Galvanometer	*See EHG-690-P*
	Recorder	*See RDS-240-L*
	Syringe, 1ml, for routine work	*See SZR-260-110W*
	Syringes, plastics, for routine work	*See SZR-200*
	Syringes, microlitre	*See SZR-500*

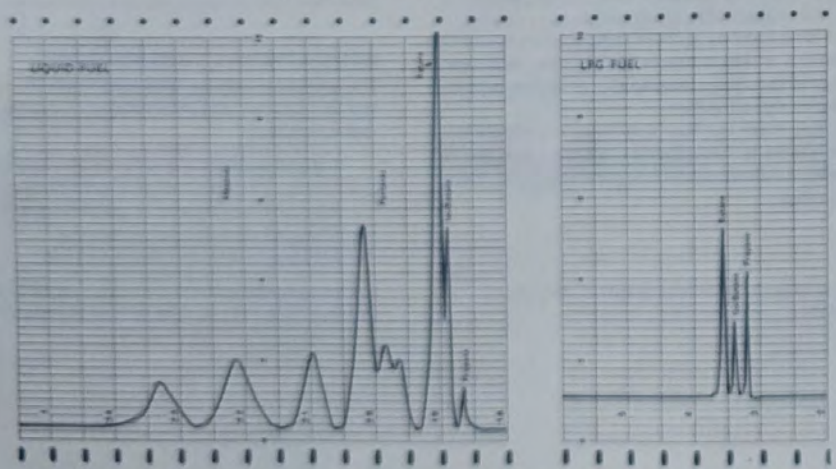


Chart records obtained using the Gallenkamp Gas Chromatograph with a recorder

CLEANING

CLOTHS AND TISSUES

All dimensions quoted are nominal

CLOTHS, drying, linen, 760 × 510mm.
CMC-300-T Cloths, drying — Pack of 3 **£2·97**

CLOTHS, dusting, check pattern, 560 × 510mm.
CMC-330-V Cloths, dusting — Pack of 3 **£1·70**

CLOTHS, polishing, yellow, soft, close texture, 510 × 510mm.
CMC-360-A Cloths, polishing — Pack of 5 **£1·70**

CLOTH, polishing, antistatic, 350 × 350mm for dissipating electrostatic charges formed on non-conducting surfaces.
CMC-390-C Cloth, polishing — **£0·68**

CLOTHS, polishing, *SELVYT*, soft, close texture, thick pile.
CMC-420-010R Cloth, 250 × 250mm — **£0·65**
CMC-420-030L Cloth, 350 × 350mm — **£1·01**

CLOTHS, *SCOTCHBRITE*, 240 × 150mm, very fine grade for cleaning, scouring and sundry uses.
CMC-450-W Cloths, Scotchbrite — Pack of 10 **£5·09**

CLOTHS, wiping, resin bonded cellulose fibre, 500 × 250mm, soft in texture and absorbent. May be used dry or moistened for wiping and cleaning purposes. Will withstand careful washing.
CMC-480-B Cloths, wiping — Pack of 50 **£1·28**

CLOTHS, swabbing, open mesh, 560 × 460mm.
CMC-510-T Cloths, swabbing — Pack of 12 **£1·91**

CLOTH, *BRILLO*, 290 × 270mm, close textured cloth of cotton fibre and cellulose mixture. Will absorb 12 times own mass of water. (F)
CMC-540-V Cloth, Brillo — **£0·34**

LEATHER, chamois, approximately 460 × 430mm.
CMC-570-A Chamois leather — **£2·62**

SPONGES, cellulose, toughened with fibre, approximately 140 × 115 × 40mm high. (F)
CMC-600-S Sponges — Pack of 3 **£1·09**

TISSUES, paper, white, absorbent, 2-ply for general laboratory use. In dispensing boxes containing 75 tissues in the 220 × 120mm size and 100 tissues in the 220 × 240mm size.
CMC-650-010D Tissues, 220 × 120mm — 12 boxes **£1·47**
CMC-650-030U Tissues, 220 × 240mm — Box **£0·32**

TISSUES, paper, strong, absorbent, 430 × 250mm, having a low lint value. Suitable for cleaning aqueous spillages, oils and greases. In dispensing pack containing 150 tissues.
CMC-680-Y Tissues, 430 × 250mm — Pack **£0·96**

TOWEL, paper, heavy duty, 2-ply for wiping, drying and cleaning purposes. In perforated roll comprising 100 tear-off sheets approximately 450 × 250mm.
CMC-720-T Towel, paper — Roll **£1·01**

ACCESSORY

Holder, wall mounting, comprising roll retainer in rigid metal dust cover. Accepts one roll CMC-720-T.
CMC-730-502L Holder — **£3·26**

TISSUES, *WHATMAN* **105,** lens cleaning.
CMC-750-010S Tissues, 150 × 100mm — Pack of 625 **£4·83**
CMC-750-030M Tissues, 300 × 200mm — Pack of 100 **£1·77**

CLEANING COMPOUNDS

CLEANER, *BY-PROX*, a liquid bio-degradable detergent effective in hard, soft and salt water. Removes grease films and cleans surfaces leaving a bright finish. In polythene container, contents 5 litres.
CMD-300-J Cleaner, By-Prox — 5 litres **£1·87**

CLEANER, *ALCOJET*, a bio-degradable powder detergent developed for use in laboratory washing machines. When used in the usual 0·1% solution it has a pH of about 10·7 and low foam properties. Equally effective in hard or soft water and will remove most difficult stains from glassware, porcelain and metals. In can containing 2·2kg of powder.
CMD-350-U Cleaner, Alcojet — 2·2kg **£3·85**

CLEANER, *DECON* **90 concentrate,** a powerful, bio-degradable, non-corrosive, phosphate free, general purpose laboratory surfactant with a pH of 11 in 2% solution. Will remove stubborn contaminants such as silicone and Apiezon oils and greases, polymer resins, blood, tars, cedarwood oil, Canada balsam and various other substances not removed by water, ordinary solvents or acid cleaning mixtures. Cleans glass, most metal and plastics laboratory apparatus without leaving a residue after rinsing. The concentrate has anti-bacterial properties particularly suitable for use in pathology and bacteriology laboratories, and tissue culture and enzymological equipment can be cleaned without fear of any temporary or cumulative toxic effects. Recommended for use with ultrasonic cleaners and for decontamination from radioactive isotopes. In polythene container.

Content, kg	1	5
Approx. volume, litres	0·9	4·5

CMD-400-010V Cleaner, Decon — 1kg **£2·86**
CMD-400-030P Cleaner, Decon — 5kg **£11·83**

CLEANER, for stainless steel. Cleans and polishes the surface when applied with wet cloth. In dispenser containing approximately 200g of powder.
CMD-450-M Cleaner, 200g — **£1·29**

POLISHES

POLISH, wax emulsion, with silicone additives and propellant. Suitable for cleaning and polishing wood and metal surfaces. In aerosol can containing approximately 400g.
CMD-600-Y Polish, aerosol — Can **£0·97**
Available for export by Sea Freight only.

POLISH, wax, for the preservation and polishing of laboratory bench tops and furniture. In can containing approximately 3kg.
CMD-630-K Polish, wax — Can **£3·47**

POLISH, wax, with silicone additive for extra protection of polished wooden surfaces. In can containing approximately 3kg.
CMD-650-T Polish, wax — Can **£4·19**

Gallenkamp

CLINICAL TEST APPARATUS



CMV-220



CMV-250

WESTERGREN BLOOD SEDIMENTATION TUBES, *TECHNICO*, **BS 2554.** Overall length 300mm. Graduated from top zero to 20cm at the jet with subdivisions of 1mm. The jet is bevelled so that the graduations below 195mm do not appear.

CMV-220-H Westergren tubes **£0·46**

WINTROBE BLOOD SEDIMENTATION TUBES, *TECHNICO*, **BS 4316.** Overall length 110mm. Graduated from top zero to 10cm with subdivisions of 1mm.

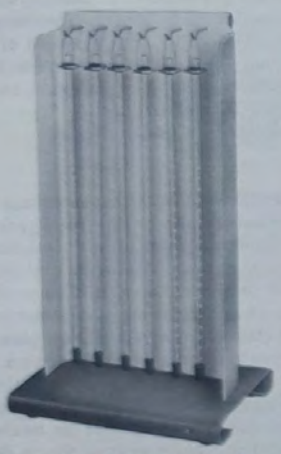
CMV-250-J Wintrobe tubes Pack of 10 **£4·61**

STAND, *GALLENKAMP*, stove enamelled aluminium, with hangers to suspend six Westergren tubes CMV-220-H or Wintrobe tubes CMV-250-J with axes vertical. Supplied with PVC grommets and six rubber policemen 6mm i.d.

CMV-280-L Stand **£10·46**

SPARE PARTS

CMV-290-010B Hangers with grommet Pack of 6 **£2·64**
Rubber policemen *See RND-800-070K*



CMV-280 with CMV-220

HAEMATOCRIT SEDIMENTATION TUBE, overall length 50mm with top zero, graduated in mm to the jet which is ground to a bevel.

CMV-330-P Haematocrit tube **£1·22**

BLOOD SUGAR TUBE, Folin-Wu, *TECHNICO*, graduated at 12·5 and 25ml. With constricted tube 40mm long × 8mm diameter leading to bulb of 4ml capacity.

CMV-360-R Blood sugar tube **£0·74**

HAEMOGLOBINOMETER, Sahli, with haemoglobin standard, comparator, graduated tube, pipette, lancets and dropping bottle in case.

CMV-390-T Haemoglobinometer **£9·24**

SPARE PART

Pipette, haemoglobinometer *See PMK-790-010H*



CMV-330



CMV-360



CMV-390

MICRODIFFUSION ANALYSIS

The apparatus described is used for the analysis by microdiffusion of a wide range of organic substances, particularly proteins, enzymes and other metabolic compounds. The technique depends upon the absorption of a volatile component of the sample by an absorbing fluid which is then titrated

MICRODIFFUSION DISHES

MICRODIFFUSION DISH, Conway No. 1, 67mm diameter with 70mm square glass lid, for ammonia determinations in fluids from 0·0001mg upwards and for determining a wide variety of other substances in blood and body fluids.

CMV-450-Q Microdiffusion dish, No. 1 **£0·72**

MICRODIFFUSION DISH, Conway No. 2, 44mm diameter with 46mm square glass lid, particularly suitable for determinations of blood sugar but may also be applied to many other determinations using smaller quantities than the No. 1 unit can handle.

CMV-470-C Microdiffusion dish, No. 2 **£1·01**

MICRODIFFUSION DISH, Conway No. 2A, 58mm diameter with ground flange 8mm wide. The 60mm square lid has a 5mm diameter hole drilled 17mm from one side for adding reagent. With two 10×10mm glass cylinders. For precise micro carbon dioxide and bicarbonate determinations, and for blood sugar and many other microdiffusion analyses.

CMV-490-L Microdiffusion dish, No. 2A **£1·64**

Micro burette *See BWJ-800-S*



CMV-450



CMV-470



CMV-490

OSCILLATING TABLE

Comprises two glass plates, one supported above the other by three steel spheres. When the uppermost plate, on which the dishes are placed, is deflected and released, it oscillates freely in all directions in the horizontal plane and slightly in the vertical plane. This produces the necessary agitation for the contents of up to 12 microdiffusion dishes.

The two glass plates each have three depressions in which the steel spheres are centred. The lower plate is secured to a plinth which houses a geared unit driven at 4 rev/min. An adjustable spring arm fixed to the gear unit periodically strikes a peg carried by the upper glass plate and thus sets the table in motion. The mechanism is silent and consumes approximately 6 W. A combined ON-OFF switch and indicator lamp is mounted on the front panel. To prevent the dishes slipping off the table, the top plate is fitted with a rubber mat. Overall dimensions 300×240×75mm high.



CMV-530 with dishes

OSCILLATING TABLE, *GALLENKAMP*, as specified, with spare steel spheres. For single phase supplies.

CMV-530-010T Table, 200–250V 50Hz **£63·00**

CMV-530-030N Table, 110–120V 60Hz **£64·13**

Reference:

Microdiffusion Analysis and Volumetric Error by Edward J. Conway, F.R.S., M.B., D.Sc.

Gallenkamp PROTEINOMETER STANDARDS

For turbidimetric estimation of albumen in urine, CSF and other body fluids

PROTEINOMETER STANDARDS SET, *GALLENKAMP*, comprising 10 sealed and labelled albumen standards covering the range 10 to 100mg/100ml and five sample tubes. These tubes are mounted in a comparator block which has an anodised aluminium plate with a central black band running the length of the plate to aid the visual comparison of sample and standard. Supplied with one 1ml and one 3ml dropping pipette attached to the wooden block by spring clips, and cover with instruction plate. Requires but does not include sulpho-salicylic acid.

CMV-660-Q Proteinometer set **£13·16**

SPARE PARTS

CMV-680-030Q Sample tubes Pack of 10 **£0·46**

CMV-680-070E Albumen standards Set **£3·09**



CMV-660

Reference:

E. J. King and H. Wiggins, 2nd International Congress of Biochemistry, Paris, 1952, Resumé de Communications, p. 352.

Gallenkamp



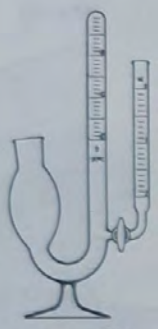
CMV-740



CMV-770



CMV-820
without cover



CMV-880



CMV-910



CMV-970

SAMPLE CONTAINERS

CARTONS, plastics, with press-on cap. For collecting samples for TB tests. Capacity approximately 150ml.

CMV-740-W Cartons — Pack of 100 **£2·95**

Other sample containers
See under Bottles, Jars and Tubes

TUBES

TUBE, Thunberg, Keilin modification with hollow stopper for addition of reagent. Capacity 10ml.

CMV-770-B Tube, Thunberg — **£2·00**

Thunberg tubes	*See also QTX-020-L*
Bacteriological test tubes	*See TEW-300*
Dreyer agglutination tube	*See TEW-340-U*
Kahn tube	*See TES-240*

URINE TESTING

ALBUMINOMETER, Esbach, for estimating the amount of albumen in urine. Comprises graduated glass tube, plastics cover and base.

CMV-820-F Albuminometer — **£0·44**

SPARE PARTS

CMV-830-010S Graduated tubes — Pack of 10 **£0·99**

UREOMETER, Doremus-Hind, for the estimation of urea in urine by the hypobromite method. From the side tube, which is graduated from 0 to 2×0·1ml, urine is transferred to the closed vertical tube where it reacts with a solution of sodium hypobromite. Nitrogen is liberated and measured in the closed tube which is directly calibrated both to 0·03g urea/100ml urine in 0·001g divisions and to 0·5 grains urea/100ml urine in 0·01gr divisions. Mounted on a glass foot.

CMV-880-J Ureometer, Doremus-Hind — **£7·20**

UREOMETER, Maclean, for the estimation of urea by the hypobromite method. Comprises bottle with mark at 25ml, test tube with mark at 5ml and a 50ml gas burette subdivided in 0·1ml fitted with stopcock and side tube.

CMV-910-E Ureometer, Maclean — **£11·61**

Reservoir, 150ml — *See MGH-480-010J*

Reference:
Practical Clinical Biochemistry by H. Varley, 1963.

URINE TEST GLASSES, conical shape, with spout.

CMV-970-030W Urine glass, 125ml — **£0·79**
CMV-970-050Q Urine glass, 200ml — **£0·97**
CMV-970-070K Urine glass, 300ml — **£1·17**



Gallenkamp COLORIMETERS

Suitable for a wide range of biochemical determinations

- **Range 450 to 670nm**
- **Interchangeable filter discs**
- **Choice of meter or digital readout**

See COL-400 et seq.

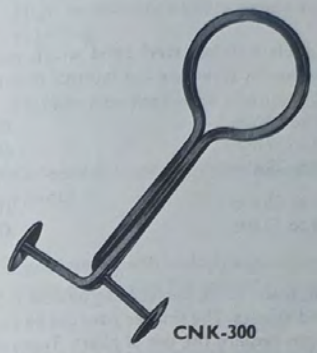
CLIPS



CNK-315



CNK-380



CNK-300



CNK-340



CNK-410-010
CNK-410-090

CLIPS, Mohr, plated metal, for compressing flexible tubing, etc. Dimension given indicates maximum diameter of tubing accepted.

CNK-300-010R	Clips, 11mm	Pack of 5 **£1·07**
CNK-300-030L	Clips, 15mm	Pack of 5 **£1·60**

CLIPS, spring, acetal polymer and stainless steel for compressing flexible tubing. Similar in application to a Mohr clip. Dimension given indicates maximum diameter of tubing accepted.

CNK-315-010D	Clips, 8mm	Pack of 10 **£2·42**
CNK-315-030U	Clips, 12mm	Pack of 10 **£3·87**

CLIPS, polypropylene, one-piece with snap-on ratchet closure. Suitable for use with flexible tubing up to 10mm diameter. Similar in application to a Mohr clip.

CNK-340-P	Clips, 10mm	Pack of 5 **£0·80**

CLIPS, open sided, plated metal screw clip with broad pressure plate for use on flexible tubing up to 12mm diameter.

CNK-380-K	Clips, 12mm	Pack of 5 **£1·89**

CLIPS, Hoffman, plated metal, with clamping screw. 15 and 40mm sizes have a hinged bottom plate. Remaining sizes have a hinged side. Dimension given is the distance between the bars.

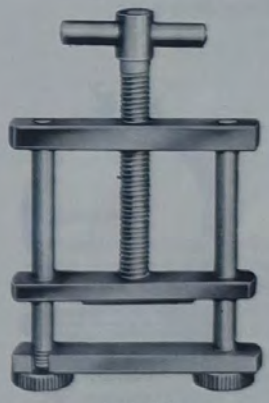
CNK-410-010C	Clips, 15mm	Pack of 5 **£2·14**
CNK-410-030T	Clips, 20mm	Pack of 5 **£2·18**
CNK-410-050N	Clips, 25mm	Pack of 5 **£2·27**
CNK-410-070H	Clips, 32mm	Pack of 5 **£2·40**
CNK-410-090B	Clips, 40mm	Pack of 5 **£3·83**

CLIP, Hoffman, extra strong, for heavy wall flexible tubing. Distance between bars 32mm.

CNK-440-H	Clip, 32mm	**£1·89**

CLIPS, Hoffman type, acetal resin, with hinged side and screw adjustment of top clamping bar. Maximum distance between clamping bars 14mm.

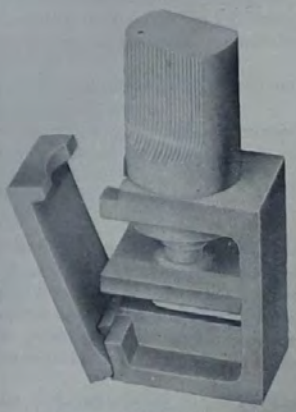
CNK-480-C	Clips, 14mm	Pack of 5 **£1·52**



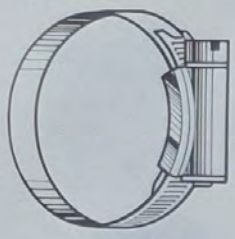
CNK-440



CNK-410-030
CNK-410-050
CNK-410-070



CNK-480



CNK-600

CLIPS, tubing, worm drive, BS 3628, zinc plated steel, with band and deep square milled thread, for securing flexible tubing to water taps, etc. Dimensions given are the internal diameter range.

CNK-600-010Q	Clips, 13 to 19mm	Pack of 10 **£1·55**
CNK-600-030K	Clips, 19 to 25mm	Pack of 10 **£1·62**
CNK-600-050E	Clips, 25 to 35mm	Pack of 10 **£1·77**
CNK-600-070V	Clips, 32 to 48mm	Pack of 10 **£1·89**



CNK-640

CLIPS, tubing, with double stainless steel band which totally encircles the tubing. Dimensions given are the internal diameter range.

CNK-640-010L	Clip, 10 to 14mm	**£0·51**
CNK-640-030F	Clip, 13 to 17mm	**£0·51**
CNK-640-050W	Clip, 18 to 22mm	**£0·51**
CNK-640-070Q	Clip, 21 to 25mm	**£0·51**
CNK-640-090K	Clip, 26 to 30mm	**£0·51**



CNK-680

CLIPS, tubing, snap-on, acetal resin, for securing flexible tubing on glass or metal tubes and nipples. The smaller sizes can be closed by hand but the larger sizes require the use of pliers. Teeth slide sideways to release. Dimensions given are the internal diameter range.

CNK-680-010G	Clips, 9 to 11mm	Pack of 10 **£0·92**
CNK-680-030A	Clips, 12 to 14mm	Pack of 10 **£0·92**
CNK-680-050R	Clips, 14 to 16mm	Pack of 10 **£0·92**
CNK-680-070L	Clips, 16 to 18mm	Pack of 10 **£0·92**
CNK-680-090F	Clips, 18 to 20mm	Pack of 10 **£1·16**
CNK-680-110C	Clips, 20 to 22mm	Pack of 10 **£1·16**
CNK-680-130T	Clips, 22 to 24mm	Pack of 10 **£1·16**
CNK-680-150N	Clips, 26 to 28mm	Pack of 10 **£1·43**
CNK-680-170H	Clips, 32 to 34mm	Pack of 10 **£1·43**

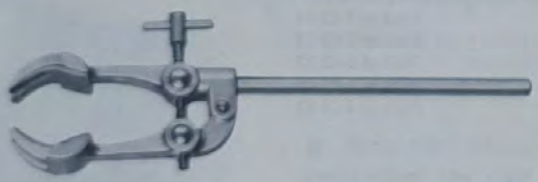


CNK-720

CLIPS, spring, closed type, polythene coated metal which provides a tough resilient surface, prevents scratching and resists corrosion. Complete with screws. Dimension given is the nominal grip diameter.

CNK-720-010R	Clips, 6mm	Pack of 10 **£0·65**
CNK-720-030L	Clips, 10mm	Pack of 10 **£0·65**
CNK-720-050F	Clips, 13mm	Pack of 10 **£0·81**
CNK-720-070W	Clips, 16mm	Pack of 10 **£0·97**
CNK-720-090Q	Clips, 19mm	Pack of 10 **£1·08**
CNK-720-110N	Clips, 25mm	Pack of 10 **£1·08**
CNK-720-130H	Clips, 32mm	Pack of 10 **£1·26**
CNK-720-150B	Clips, 38mm	Pack of 10 **£1·74**
CNK-720-170S	Clips, 51mm	Pack of 10 **£2·42**

CLAMPS



In addition to the general purpose retort stand clamps versions are available for supporting beakers, burettes, condensers, electrodes, thermometers, etc.

See STE-300 et seq.

Gallenkamp COLONY COUNTER

A compact and accurate colony counter for counting bacterial and mould colonies in biology, zoology, bacteriology, pathology and public health laboratories

- **High sensitivity needle probe for direct contact counting**
- **Marker pen probe for counting in closed dishes**
- **Coloured marker probe inserts for coding sequential counts**
- **Hand held push switch accessory can be plugged-in in place of a probe for remote counting operations**
- **Interchangeable probe sockets for right and left handed operators**
- **Contact needles easily removed for sterilising – holder fitted for spare needles**
- **Solid state counting circuit for long term reliability**
- **Digital display of up to 9999 colony counts**
- **Bright but glare-free peripheral illumination reduces operator fatigue**
- **Colonies clearly defined against light or dark backgrounds**
- **Easily cleaned outer case remains cool during prolonged counting**
- **Sloping front provides comfort during prolonged counting**
- **Full view ×2 magnifier accessory facilitates counting of small colonies**
- **Wolffhuegel guide plate available**
- **Removable dish holder 124mm diameter**
- **Accessory set of rings to accommodate smaller Petri dishes**

A MAINS switch controls the supply of electricity to all circuits and a LAMP switch controls the built-in circular fluorescent lamp. Both switches are push type which light when ON.

ILLUMINATION

A circular fluorescent lamp surrounds the dish holder. Against the dark field it provides indirect illumination ideal for showing up diffuse, pale coloured colonies. With a white reflecting screen covering the dark field, illumination is ideal to silhouette dense colonies, particularly if cultured on dark media.



CNW-300 with graticule and magnifying lens

COUNTING

For contact counting, the flip-over stationary electrode and the needle probe are used. These two contacts complete a circuit through the medium, causing the counter to operate once each time the needle probe is made to touch the medium or a colony. The electrical resistance of the medium can be up to 10kΩ which permits most common media to be used. Both the electrode and probe needles are easily detached for sterilising.

For counting through the lid or base of the dish, the marker probe alone is used. This contains a replaceable fibre-tipped pen (available in several colours for sequence counting and coding) and a sensitive microswitch which completes the counter circuit. Using normal writing pressure, the counter operates each time a mark is made on the dish.

The pen cartridges are fitted with a non-smear quick drying ink specially selected for writing on glass and plastics.

When not in use for routine plate counting, the colony counter may be used as a tally counter by substituting the pushbutton hand switch for either probe.

COLONY COUNTER, *GALLENKAMP*, as specified, with solid state, digital readout counting circuit, peripheral fluorescent illumination, provision for light and dark ground viewing and sockets for right and left handed operation. Includes 124mm diameter dish holder, needle probe, hinged contact probe, steriliser well and marker probe with black insert pen. For single phase supplies.

CNW-300-010M Colony counter, 220–240V 50Hz **£153·56**
CNW-300-030G Colony counter, 110–120V 60Hz **£155·81**

Continued overleaf

Gallenkamp

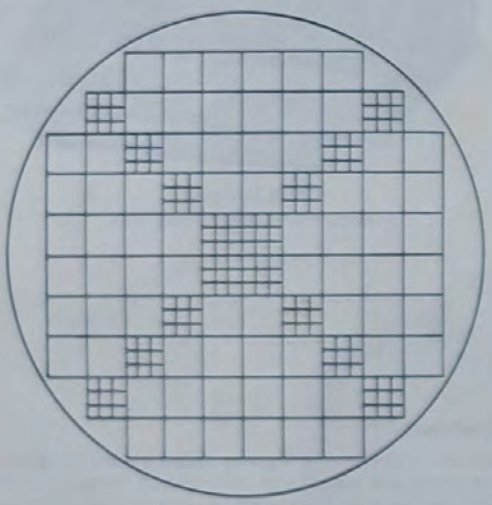
CONCEALED PERIPHERAL FLUORESCENT ILLUMINATION with optional dark field provides the operator with ideal counting conditions:

- Freedom from dazzle minimises eye strain and the resulting fatigue.
- Small or uncoloured colonies, which 'disappear' when illuminated by the traditional tungsten filament lamp and opal diffuser, show up clearly on the GALLENKAMP Colony Counter – see photograph.



Technical data

	H	W	D
Overall dimensions	200	300	360 mm
Net mass	5·5 kg		
Power rating, max.	100 W		



CNW-320-516

SPARE PARTS

Pens, fibre tipped, for marker probe, in pack containing three each black, blue, green and red.

CNW-320-030P	Pens	Pack £2·98
CNW-320-040M	Dish holders, moulded acrylic	Pack of 5 £5·51
CNW-320-050J	Circular fluorescent lamp, 220–240 V	£5·32
CNW-320-052F	Circular fluorescent lamp, 110–120 V	£5·32

Needles, in pack containing 10 each hinged contact electrode and probe needles.

CNW-320-090U	Needles	£3·26

ACCESSORIES

Adapter rings, transparent plastics, in set of five, internal diameters nominally 57, 70, 76, 90 and 101 mm which enable smaller sizes of Petri dishes to be mounted centrally in the dish holder.

CNW-320-504T	Adapter rings	Set £9·23

Graticule, Wolffhuegel pattern, clear acrylic plastics, 120 mm diameter with black filled 1 cm^2 grid. To fit dish holder.

CNW-320-516M	Graticule	£5·79

Pushbutton hand switch, for counting operations not requiring probes. With lead and plug.

CNW-320-524N	Pushbutton switch	£4·44

Magnifying lens, ×2, 130 mm diameter, with movable arm for mounting on the colony counter case.

CNW-320-532X	Magnifying lens	£20·59
	Petri dishes	*See DHP-220 et seq.*

Bibliography:
An electric colony counter, W. D. Linsell, M.D. Lond., F.C. Path., *Journal of Clinical Pathology*, 1953, vol. 6, p. 91.



CNW-610

PETRI DISH ILLUMINATOR, *GRIFFIN*, to enable convenient examination or comparison of the contents of two Petri dishes. Also ideal for use as a simple colony counter or as an illuminated base for stereomicroscope work. Comprises a simple lamphouse with two circular windows, each ruled with 10 mm squares, over which Petri dishes of up to 100 mm diameter may be placed. The windows are clear areas in the removable obscured plastics plate which forms the top surface of the illuminator. Each window is illuminated from beneath by a 12 V 5 W lamp and the illuminator is fitted with a pair of 4 mm sockets for connection to a 12 V a.c./d.c. supply. Overall dimensions 290 × 140 × 75 mm high.

CNW-610-H	Illuminator	£9·90

SPARE PART

Lamp	*See XGH-380-030R*

ACCESSORIES

Tally counter	*See CTL-340-T*
Multitap transformer	*See EFT-350-F*

LOVIBOND COLORIMETRIC ANALYSERS

The Lovibond system of colorimetric analysis has earned a world-wide reputation by providing simple test methods which employ easy-to-use, rugged apparatus

The principle is simple; samples are prepared by clearly described proven methods and are compared visually with accurately coloured glass standards. Standards are available for many tests in the fields of chemistry, chemical pathology, quality grading and public health control among which are the following examples.

Details of these and other available standards, together with information on the full capabilities of the analysers and accessories, are contained in a catalogue which will be forwarded on request.

CHEMISTRY

Aluminium	Lead	Silver	Pesticides
Ammonia	Magnesium	Sodium	Detergents
Bromine and bromide	Manganese	Sulphate	Nicotine
Chlorine and chloride	Nickel	Sulphite	Organic acids
Chromium	Nitrate	Tin	Phenols
Cobalt	Nitrite	Titanium	Pyridine
Copper	Oxygen	Amines	Sugar
Fluoride	Phosphate	Carbohydrates	Thiocyanate
Iron	Silica	Chlorinated hydrocarbons	Thiophen

and many airborne toxic gases and vapours

CHEMICAL PATHOLOGY AND PUBLIC HEALTH

p-Amino salicyclic acid	Cholinesterase	Morphine	Sugar
Bilirubin	Haemoglobin	Nicotinic acid	Sulphonamide
Carboxyhaemoglobin	Lead	Phosphate	Urea
Cholesterol	Mepacrine	Protein	

QUALITY GRADING

Petroleum product colours	Vegetable oil colours	Milk product colours	Varnish colours
Beer colours	FAC scale	Milk testing	Swimming pool and water testing
Solvent colours	Gardner scale	Rubber latex	
BOD	Hazen scale	Sand quality	
Butter colours	Relative humidity	Sand colour	

LOVIBOND '1000' COMPARATOR

When fitted with accessories the comparator provides a versatile system for visual colorimetric analysis capable of:

- **Measurements with cells up to 40mm optical path length**
- **Measurements on dilute solutions using special Nessler cylinders up to 250mm sample depth**

Comprises a hinged, black plastics case which will accommodate a disc containing a number of permanent colour standards and two glass cells of up to 13·5mm optical path length, one for the sample and one for the blank control solution. Additional compartments are provided in the case for storing spare cells. Each test requires the use of a disc containing standards representing the range of colours produced by different concentrations of the sample under test. The disc is rotated by hand and a click-stop locates each colour standard in the viewing aperture.

Comparisons must be made in good north daylight or where this is not available, a white light cabinet accessory can be used.

For observing the two fields of view together, a prism attachment is available for convenient and accurate matching. A large cell attachment accessory enables larger cells with an optical path length of between 15 and 40mm to be accommodated.

Nessler cylinders can be accommodated in the Nessler attachment accessory.



COH-300 with COH-320-508 and cells

COMPARATOR, *LOVIBOND* **1000,** as specified, with instructions. **Without** cells, disc and accessories.
COH-300-Q Comparator **£9·46**

Gallenkamp

LOVIBOND '1000' COMPARATOR

(continued)



COH-320-502
with comparator



COH-320-514 with
comparator and disc



COH-320-520



COH-350

ACCESSORIES

White light cabinet, bench mounting, providing a source of simulated Illuminant C artificial daylight. Ensures standardisation of viewing conditions essential for precise colour comparisons. May be used with comparator and all accessory additions. With daylight correction blue glass filter and ON-OFF switch. Overall dimensions 290 × 180 × 140mm high. With legs to allow comparator to be presented at any convenient viewing angle. For 220–240V a.c. single phase supplies.

COH-320-502B White light cabinet **£31·41**

Prism attachment, clips to front of comparator and brings the sample and colour standard fields of view together for convenient and accurate comparison.

COH-320-508M Prism **£9·30**

Large cell attachment, slots into the back of the comparator to allow cells of 15 to 40mm optical path length to be fitted.

COH-320-514R Large cell **£2·15**

Nessler attachment, for examining dilute solutions of pale colour. Hinged metal case accepts two Nessler cylinders of up to 250mm optical path length and the comparator slots on to the top. Overall dimensions without comparator 110 × 100 × 370mm high. **Without** Nessler cylinders and Nessleriser disc.

COH-320-520W Nessler attachment **£25·69**

Nessler cylinders, glass, 250mm optical path length.

COH-320-530T Nessler cylinders, 250mm Pair **£7·48**

Nessler cylinders, glass 113mm optical path length
See COH-570-010R

Nessleriser discs *See COH-580*

Cells, glass, precision, square section. Dimension given is the optical path length.

COH-320-570H	Cells, 5mm	Pair **£6·05**
COH-320-576S	Cells, 10mm	Pair **£5·50**
COH-320-582A	Cells, 13·5mm	Pair **£1·43**
COH-320-588L	Cells, 25mm	Pair **£6·27**
COH-320-594Q	Cells, 40mm	Pair **£8·14**

Discs, for use with the basic comparator. In plastics case with appropriate indicator solution and instructions.

Code	Test	Range	Method
2/1A	pH	1·2 to 2·8 × 0·2	Thymol blue
2/1B	pH	2·8 to 4·4 × 0·2	Bromophenol blue
2/1E	pH	4·4 to 6 × 0·2	Methyl red
2/1H	pH	6 to 7·6 × 0·2	Bromothymol blue
2/1J	pH	6·8 to 8·4 × 0·2	Phenol red
2/1L	pH	8 to 9·6 × 0·2	Thymol blue
2/1ZE	pH	Standards for 1, 3, 5, 6, 7, 8, 9, 11 and 13	BDH full range
3/40B	Chlorine in water	0·2 to 4ppm	DPD
3/12	Phosphate in boiler water	0 to 80ppm	Hydroquinone

COH-350-502D	Disc, 2/1A	£12·10
COH-350-512A	Disc, 2/1B	£12·10
COH-350-522U	Disc, 2/1E	£12·10
COH-350-532R	Disc, 2/1H	£12·10
COH-350-542X	Disc, 2/1J	£12·10
COH-350-552L	Disc, 2/1L	£12·10
COH-350-570J	Disc, 2/1ZE	£12·10
COH-350-600D	Disc, 3/40B	£12·10
COH-350-650L	Disc, 3/12	£12·10

BDH LOVIBOND MARK III NESSLERISER

NESSLERISER, *BDH LOVIBOND* **Mark III,** for visual colorimetric analysis of dilute solutions using a large depth of sample. Comprises plastics body which will accommodate a rotatable disc containing nine permanent colour standards above two 113mm Nessler cylinders, one for the sample under test and one for the blank control solution. The cylinders are viewed from above against an inclined white reflector. A prism unit is incorporated so that the two fields of view are brought together for convenient matching and high discrimination. A light source with a daylight correction filter, to enable day or night use, together with an ON-OFF switch are housed in the base. For 220–240V a.c. single phase supplies. With two Nessler cylinders but **without** disc.

COH-550-L Nessleriser, Mark III **£37·24**



COH-550

SPARE PARTS

Nessler cylinders, 113mm optical path length.

COH-570-010R Nessler cylinders, 113mm Pair **£4·95**

ACCESSORIES

Nessler cylinder, modified for oxygen in boiler water determinations by the indigo carmine method.

COH-570-502T Nessler cylinder, modified **£5·92**

Discs.

Code	Test	Range	Method
NLF	pH	8 to 9·6	Thymol blue
NAA	Ammonia	0·02 to 0·2ppm	Nessler's reagent
NAB	Ammonia	0·2 to 0·56ppm	Nessler's reagent
NAC	Ammonia	0·56 to 1·2ppm	Nessler's reagent
NOE	Oxygen in boiler water	0 to 0·12ml/litre	Indigo carmine
NOH	Hydrazine in boiler water	0 to 10μg	–

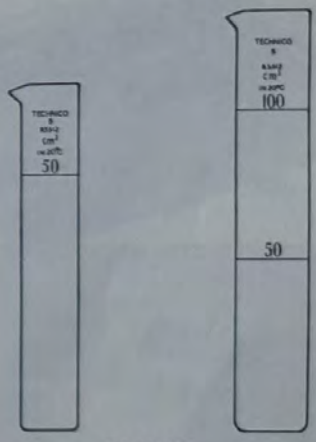
COH-580-540E Disc, NLF **£12·10**
COH-580-560V Disc, NAA **£12·10**
COH-580-570S Disc, NAB **£12·10**
COH-580-580P Disc, NAC **£12·10**
COH-580-610J Disc, NOE **£12·10**
COH-580-650U Disc, NOH **£12·10**

NESSLER CYLINDERS AND STANDS

CYLINDERS, Nessler, *TECHNICO,* **BS 612,** lead free glass with polished base. In packs of six with graduation marks matched to within ±1mm.

Capacity, ml	50	100
Graduation marks, ml	50	50 and 100

COH-700-010E Cylinders, 50ml Pack of 6 **£8·86**
COH-700-030V Cylinders, 100ml Pack of 6 **£10·12**

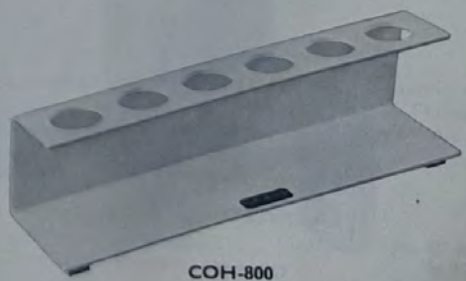


COH-700
COH-740 are similar

CYLINDERS, Nessler, *EMIL,* **BS 612,** made from tubing with a shadowless base. In pairs with graduation marks matched to within ±1mm.

Capacity, ml	50	100
Graduation marks, ml	50	50 and 100

COH-740-010W Cylinders, 50ml Pair **£1·15**
COH-740-030Q Cylinders, 100ml Pair **£1·40**



COH-800

STANDS, Nessler cylinder, white PVC, for six cylinders.

COH-800-010T Stand, 50ml cylinders **£3·43**
COH-800-030N Stand, 100ml cylinders **£3·68**

Gallenkamp



COH-900

LOVIBOND TINTOMETERS

Provide a reliable and straightforward means of specifying the colours of liquid samples in standard cells or of solid samples.

Double beam instruments with built-in light sources and a range of colour filters and controls which allow progressive assembly of standard tints until the resulting colour matches that of the sample. The sample and matching filters are viewed side-by-side in one eyepiece for precise comparison. Matching is done visually because no satisfactory physical substitute has been found for so accurately judging the subjective property of colour. Stating the filters required to match the sample specifies the sample colour.

Three models are available, two with provision for internal sample examination and one with flexible optics and test head for external evaluation when the sample cannot be placed within the instrument.

TINTOMETER, Standard Model AF 700, for general laboratory and works' use on liquids or solids of light to medium colour up to 20 Lovibond units in red, yellow and blue. Complete with 10mm and 1in. cells, 60 colour filters and 12 neutral tints, white light cabinet and box containing cleaning, setting-up and maintenance accessories and tools. For 200–240V a.c. single phase supplies.

COH-900-X	Tintometer, AF 700	**£423·50**



COH-960

TINTOMETER, Universal Model AF 702, as COH-900-X but with 12 extra colour filters to extend range to deeper colours up to 70 Lovibond units in red and yellow, and 40 units in blue, e.g. paints, inks, cosmetics, etc. For 200–240V a.c. single phase supplies.

COH-920-A	Tintometer, AF 702	**£522·50**

SPARE PART

White light cabinet, complete with two lamps, two magnetic chucks, two magnesium carbonate blocks, porcelain tray, presser and frame for powders, book of analysis forms and separate accessories box.

COH-930-010N	White light cabinet	**£86·90**

TINTOMETER, Flexible Optics Model AF 751, for work on very large or small samples or samples which must be examined under controlled environmental conditions. Colour range up to 70 Lovibond units in red and yellow and 50 units in blue. With 405mm optical leads, standard surface viewing head, liquid viewing (cell holder) head, 73 colour filters, 10 and 40mm cells, spare lamp and box containing cleaning, setting-up and maintenance accessories and tools. For 200–240V a.c. single phase supplies.

COH-960-S	Tintometer, AF 751	**£734·80**



COH-990

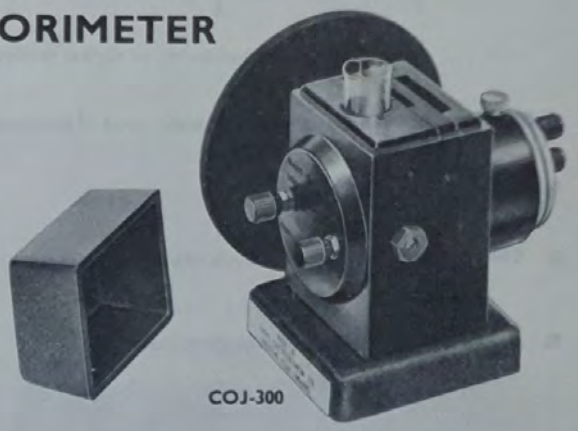
ACCESSORIES for COH-900-X to COH-960-S

Cells, fused glass, for liquid samples. Dimension given is the optical path length.

COH-990-502T	Cell, 5mm	**£3·03**
COH-990-508H	Cell, 10mm	**£2·97**
COH-990-514M	Cell, 25mm	**£2·75**
COH-990-520R	Cell, 40mm	**£4·13**
COH-990-540L	Cell, 1in.	**£2·75**
COH-990-546W	Cell, 5¼in.	**£5·45**
COH-990-552E	Cell, 6in.	**£5·45**

Griffin COLORIMETER

- Especially suitable for student use
- Operates from 2V supply
- Minimum sample volume 8ml



COJ-300

COLORIMETER, *GRIFFIN*, compact unit with plastics body having light-tight metal cover and mounted on cast metal base. Incorporates lamp and reflector, 30mm wide filter slot, light shutter controlled by handwheel, test tube holder and selenium barrier photocell. Lamp and photocell have terminals for connection to 2V battery and microammeter respectively. With instructions but **without** test tube, colour filter, battery and meter.

COJ-300-T Colorimeter **£31·22**

ACCESSORIES

COJ-330-502U Test tubes Pack of 144 **£7·88**

Colour filters, unmounted, 73 × 24mm, in set comprising one each having the following characteristics:

Filter No.	Colour
302	Blue
406	Green
110	Yellow
204	Red

COJ-340-502N Filters Set **£4·56**

NOTE: These filters must be used in conjunction with a microammeter of low sensitivity such as EHA-830-J.

Colour filters, unmounted, 73 × 24mm, in set comprising one each having the following characteristics:

Filter No.	Colour	Peak wavelength, nm
621	Violet	455
622	Blue	465
623	Blue-green	495
624	Green	520
625	Yellow-green	540
626	Yellow	570
607	Orange	600
608	Red	660

COJ-340-564X Filters Set **£10·46**

NOTE: These filters must be used in conjunction with a galvanometer or microammeter of high sensitivity such as EHG-520-D.

Accumulator, 2V *See BMP-550-030C*
Microammeter, 0 to 50μA *See EHA-830-J*

Griffin STUDENT COLORIMETER

- Direct readings of transmission and absorbance
- Stable operation, low drift
- Narrow band spectrum filters
- Accommodates 125 × 16mm Nuffield test tubes



COJ-500

Light from a 6V, 0·3A MES lamp is collected by a condensing lens, passes through a filter, then through the sample tube and emerges on to a photo-resistive cell. The resistance of the cell varies in inverse proportion to the illumination and a 77mm scale meter, connected in series with it, is calibrated in percentage transmission and absorbance (optical density). The meter is set by a three-position sensitivity switch and a fine adjustment control.

The sample tube and a filter selected from a set of seven are inserted through apertures in the instrument case. A tube cover to exclude stray light is supplied, together with a clip-on holder for the filters and cover when not in use.

Each of the filters, Ilford 602 to 608 inclusive, has an aperture which gives approximately the same effective light transmission to all filters, thus simplifying operation with different filters.

A pair of 4mm sockets at 19mm spacing provide an output of 100mV at high impedance for connection to an external recorder, to record effects such as colour changes occurring over a period.

Brief operating instructions are printed on the case. Overall dimensions 270 × 105 × 85mm high, mass 2kg.

COLORIMETER, *GRIFFIN* **STUDENT,** as specified, for 200–250V 50–60Hz supplies. With seven colour filters, filter holder, tube cover and instructions manual but **without** sample tube.

COJ-500-D Colorimeter **£61·03**

ACCESSORIES

Sample tubes *See TES-200-150Y, TES-600-090X*
Recorder *See RDS-240-L*

Gallenkamp

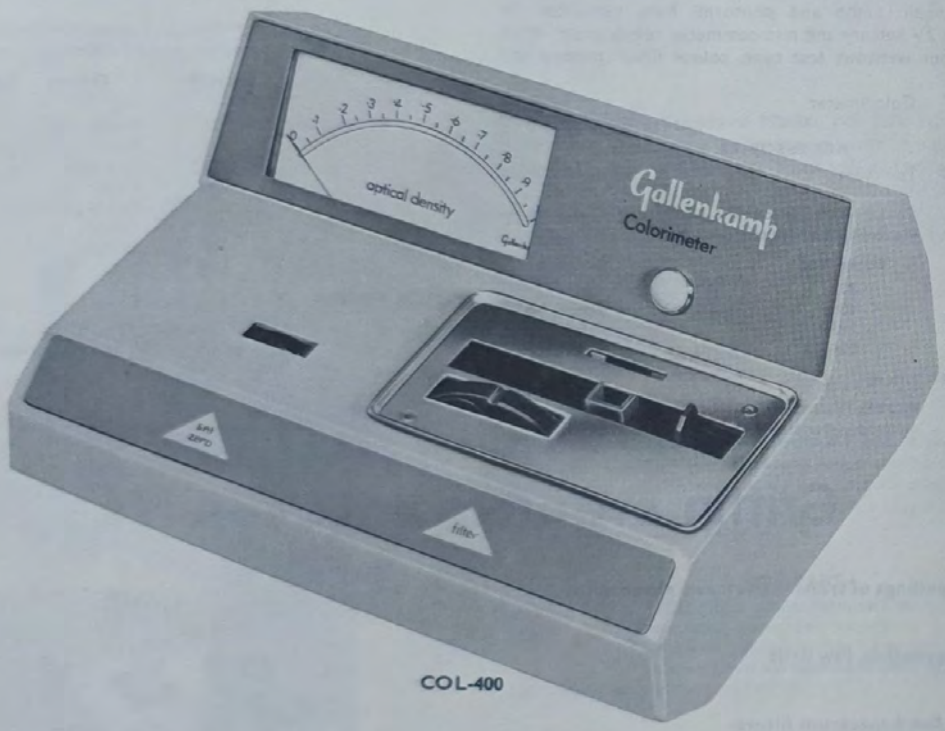
Gallenkamp LINEAR SCALE COLORIMETERS

With choice of meter or digital readout and interchangeable built-in filter discs

Stable, reliable colorimeters for a wide range of chemical and biochemical determinations in the range 450 to 670nm

Applications include:

- **Clinical and biochemical analysis of body fluids**
- **Analysis of foodstuffs and biological materials**
- **Inorganic and organic chemical analyses**
- **Metallurgical analyses**



COL-400

Design features include:

- **Stable operation with negligible drift**
- **Short warm-up period**
- **Linear optical density readout from a pointer meter or a digital display**
- **Interchangeable built-in colour filter disc**
- **Option of wide and narrow band pass filter discs**
- **Three-position self-indexing cell holder for 10mm cells**
- **Flowthrough cell accessory**
- **Adapters for test tubes and disposable cells**
- **Analogue recorder output on all models plus BCD output on digital models**

Gallenkamp LINEAR SCALE COLORIMETERS

PRINCIPLE OF METHOD

The component of a solution to be determined is treated with chemical reagents to produce a coloured compound which is specific to that component and which has an intensity of colour proportional to the concentration of the component. With the colorimeter, the colour intensity and hence the concentration of the component can readily be estimated by comparison with standard solutions or a blank. Methods for most determinations are published in standard textbooks.

DESIGN

Principle. Light from a tungsten filament lamp passes through the sample and a colour filter and falls on to a photocell. The output from the photocell is amplified and linearised before being displayed on a pointer meter or as a digital display, according to model, as the optical density of the sample solution relative to a standard solution or a blank.

Lamp. The lamp, which is pre-focused, is mounted in an efficient reflector. It is operated at less than its rated voltage to give long life and is readily accessible when replacement becomes necessary.

Because of the prefocus feature, lamps COL-520-010M must be used.

Heat filter. To reduce sample heating to a minimum, a heat absorbing filter is fitted between the lamp and the sample holder.

Cell holder. A three-position, polypropylene, self-indexing holder accepts 10mm optical path length rectangular glass cuvettes, and adapters for test tubes, disposable plastics cells and the flowthrough cell. A drain beneath the holder prevents accumulation of spillage within the colorimeter case.

Filters. Colour filters are mounted in directly interchangeable discs. Each filter is masked to minimise the extent of zero adjustment necessary when changing from one filter to another. The filters used provide the instrument with adequate reserve sensitivity for blank solutions of up to 0·4 optical density.

Three discs are available:

COL-560-502J contains the three most commonly used Ilford Bright Spectrum filters Nos. 608, 622 and 625, and is fitted as standard in colorimeter COL-400.

COL-560-522D contains the Ilford Bright Spectrum series filters Nos. 607, 608, 621, 622, 623, 624, 625 and 626, and is fitted as standard in colorimeters COL-410 and COL-440.

COL-560-542U contains the Ilford Spectrum series filters Nos. 602, 603, 604, 605, 606 and 608, which have narrower bandpass than the Bright Spectrum series. The bandpass of the Spectrum series of filters at half peak transmission is nominally a half that of the Bright Spectrum series. This is fitted as standard in colorimeters COL-420 and COL-450.

Photocell. The photocell is encapsulated in a epoxy resin which gives it excellent resistance to liquids and vapours likely to be present in or around the colorimeter.

Meter. The colorimeter is available with readout from either a pointer meter or a digital display.

The pointer meter has a 115mm scale, with linear calibration from 0 to 1 optical density (o.d.). Parallax errors are minimised by the use of a mirror scale and a knife edge pointer. The scale is numbered at every 0·1 o.d. with subdivisions of 0·01 o.d., starting from a left hand zero.

The digital display has easy to read 12mm high numerals and shows a range of 0 to 1 × 0·01 o.d.

Zero control. Zero optical density (or other reference level) is set by means of a potentiometer which controls lamp brightness by varying the applied voltage. The lamp supply voltage is electronically stabilised so that, once set for a reference solution, the setting needs only infrequent checking.

Recorder output facilities. All models have a plug and socket fitted from which may be obtained a 10mV analogue output suitable for a high input impedance chart recorder.

In addition the digital models have a plug and socket for BCD output for a printer.



Digital display

PERFORMANCE

Linear readout. The instrument has electronic linearisation for greater accuracy (especially at the top end of the scale) and for ease of reading. For solutions which obey Beer's Law, this provides a linear reading directly proportional to concentration. Many solutions do not, however, obey the Law precisely and for every test method meter readings must always be checked over a range of solutions of standard concentration.

In general, the narrower pass bands of the Spectrum filters in disc COL-560-542U result in readings which are more nearly linear and/or more sensitive to concentration changes than those obtained with the corresponding Bright Spectrum filters in discs COL-560-502J and COL-560-522D.

Wavelength range

Bright Spectrum disc	COL-560-502J	470, 540 and 670nm
Bright Spectrum disc	COL-560-522D	450 to 670nm in 8 steps
Spectrum disc	COL-560-542U	470 to 670nm in 6 steps

Stability. The temperature stability is better than 0·002 o.d. per 1°C change in ambient temperature. The instrument requires only 5 to 10 minutes from switch on to stabillse. A 10% change in mains electricity supply voltage results in a change in reading of less than 0·005 o.d. A ±5Hz variation in mains frequency produces a change in reading of less than 0·005 o.d.

Sample heating. Over a 2 hour period a standard or blank solution left in the holder heats up by less than 10°C with the lamp voltage at its highest setting.

Flowthrough cell. For multiple, routine testing of similar samples, the flowthrough cell is recommended. With this, up to four tests per minute may be performed. The cell is supplied complete with squeeze bottle and connecting tube for emptying.

DIMENSIONS AND MASS

	H	W	D
Overall	150	310	250mm
Mass, net	6kg		

Gallenkamp

Gallenkamp METER READOUT COLORIMETER



COL-400

COLORIMETER, linear scale, *GALLENKAMP*, as specified, with Ilford Bright Spectrum 3 filter disc COL-560-502J, solid state stabiliser circuit, direct reading linear mirror scale meter, three-position self-indexing cell holder, processed lamp and encapsulated photocell. With dust cover and instructions but **without** test cells. For single phase supplies.

COL-400-010L	Colorimeter, 220–240V 50Hz	**£234·56**
COL-400-030F	Colorimeter, 110–120V 60Hz	**£236·25**

COLORIMETER, linear scale, *GALLENKAMP*, as COL-400 but with Ilford Bright Spectrum 8 filter disc COL-560-522D in place of COL-560-502J. For single phase supplies.

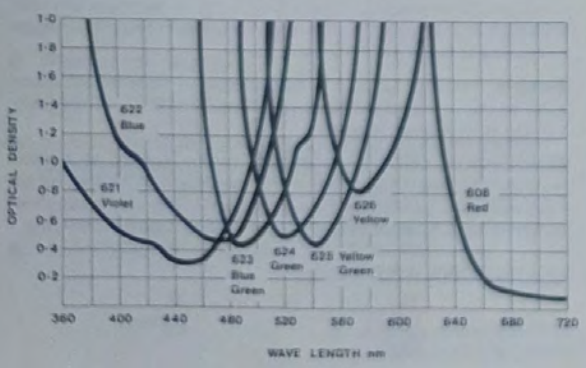
COL-410-010E	Colorimeter, 220–240V 50Hz	**£268·88**
COL-410-030V	Colorimeter, 110–120V 60Hz	**£270·56**

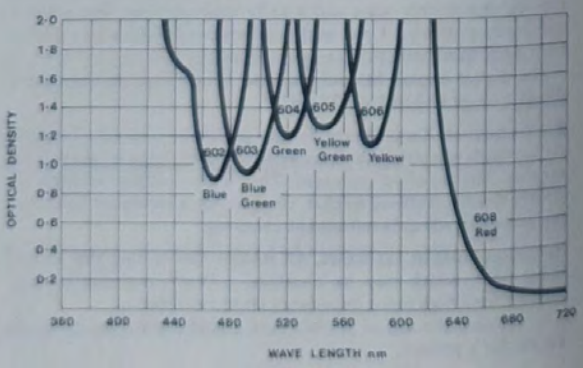
COLORIMETER, linear scale, *GALLENKAMP*, as COL-400 but with Ilford Spectrum 6 filter disc COL-560-542U in place of COL-560-502J. For single phase supplies.

COL-420-010U	Colorimeter, 220–240V 50Hz	**£259·88**
COL-420-030X	Colorimeter, 110–120V 60Hz	**£261·56**

SPARE PARTS

Lamp	*See COL-520-010M*
Photocell	*See COL-520-050M*





Gallenkamp DIGITAL READOUT COLORIMETER



COL-440

COLORIMETER, linear scale, digital readout, *GALLENKAMP*, as specified, with Ilford Bright Spectrum 8 filter disc COL-560-522D solid state stabiliser circuit, digital linear readout meter, three-position self-indexing cell holder, processed lamp and encapsulated photocell. With instructions and dust cover but **without** test cells. For single phase supplies.

COL-440-010G	Colorimeter, 220–240V 50Hz	**£394·88**
COL-440-030A	Colorimeter, 110–120V 60Hz	**£396·56**

COLORIMETER, linear scale, digital readout, *GALLENKAMP*, as COL-440 but with Ilford Spectrum 6 filter disc COL-560-542U in place of COL-560-522D. For single phase supplies.

COL-450-010W	Colorimeter, 220–240V 50Hz	**£385·88**
COL-450-030Q	Colorimeter, 110–120V 60Hz	**£387·56**

SPARE PARTS

	Lamp, 6V 1A, prefocus, specially processed.	
COL-520-010M	Lamp	**£3·71**
COL-520-050A	Photocell	**£5·40**

ACCESSORY FILTER DISCS

FILTER DISC, with Ilford Bright Spectrum filters Nos. 608, 622 and 625.
COL-560-502J Filter disc **£28·69**

FILTER DISC, with Ilford Bright Spectrum filters Nos. 607, 608, 621, 622, 623, 624, 625 and 626.
COL-560-522D Filter disc **£63·00**

FILTER DISC, with Ilford Spectrum filters Nos. 602, 603, 604, 605, 606 and 608.
COL-560-542U Filter disc **£54·00**



COL-560-522

Gallenkamp LINEAR SCALE COLORIMETERS



COL-590-502



COL-590-530



COL-590-538



COL-590-550



COL-590-558

ACCESSORY TEST CELLS

TEST CELLS, polystyrene, disposable, 10mm optical path length, capacity 4ml.
COL-590-502L Test cells — Pack of 10 **£0·45**

COL-590-512Y Adapter for COL-590-502L — **£0·45**

TEST CELL, fused glass, 10mm optical path length, capacity 6ml.
COL-590-530G Test cell — **£1·69**

TEST CELLS, matched set of three cells COL-590-530G.
COL-590-534V Test cells — Set of 3 **£5·01**

RACK, to hold six test cells COL-590-530G.
COL-590-538N Rack — **£6·41**

TEST TUBES, 10mm internal diameter, 75mm long, selected for uniform internal diameter.
COL-590-550A Test tubes — Pack of 10 **£0·68**

TEST TUBES, set of 12 tubes, COL-590-550A marked at uniform transmission position.
COL-590-554P Test tubes — Set of 12 **£8·44**

ADAPTER, test tube, to hold tubes COL-590-550A in colorimeter COL-400.
COL-590-558H Adapter — **£0·84**

ADAPTERS, test tube, as COL-590-558H but matched set of three, numbered and marked.
COL-590-562Q Adapters — Set of 3 **£5·06**

RACK, plastics, to hold nine test tubes COL-590-550A and three adapters COL-590-558H.
COL-590-566Y Rack — **£4·22**

FLOWTHROUGH CELL, as specified, comprising cylindrical glass cell in holder, plastics connecting tubing and squeeze bottle for emptying. Internal diameter of glass cell approximately 9·5mm.
COL-592-502W Flowthrough cell, complete — **£5·91**
COL-592-506X Flowthrough cell, in holder only — **£3·38**



COL-592-502

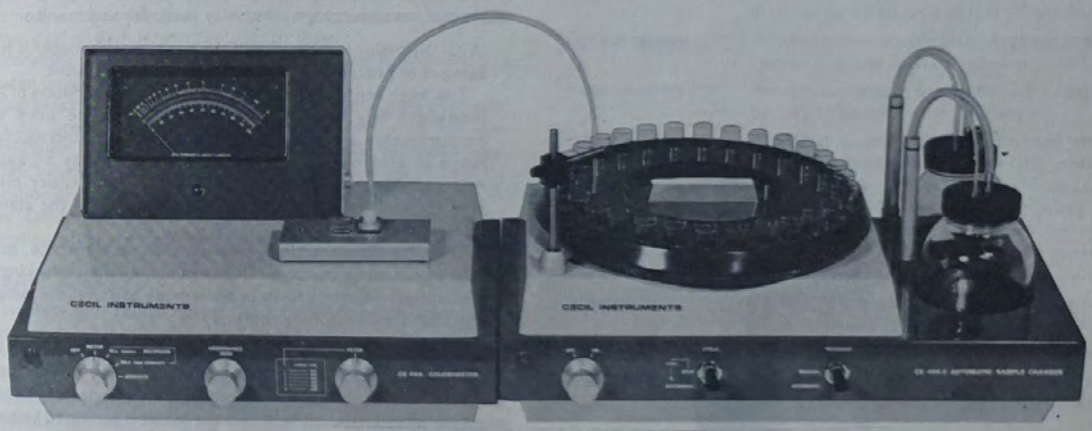
CECIL SERIES CE 404 COLORIMETER SYSTEMS

A modular series which provides effective instrumentation for both single and multiple determinations

The CE 404 System reduces operator fatigue to a minimum. Quality, reliability, convenience and ease of maintenance are major considerations in the design.

Applications:

- **Clinical chemistry**
- **Biochemistry**
- **Organic and inorganic analytical chemistry**
- **Industrial and quality control chemistry**
- **Agricultural chemistry**
- **Food analysis**
- **Metallurgy**
- **Monitoring automatic analyses**



COS-500-010 with COS-520-010 and accessories

Typical clinical chemistry analyses for which series CE 404 systems are suitable:

- Glucose, urea and haemoglobin in blood.
- Bilirubin, total protein and acid phosphatase in plasma.
- Inorganic phosphates in plasma and whole blood.
- Salicylates, creatinine, urea and ammonia in urine.
- Sugar in cerebro-spinal fluid.
- Acid or alkaline phosphates in serum.

Gallenkamp

CECIL SERIES CE 404 COLORIMETER SYSTEMS

PRINCIPAL MODULES



Colorimeter

COLORIMETER (CECIL CE 404)

A compact instrument with inclined, easily read meter graduated in absorbance and transmittance. Controls comprise monitor and recording selector switch, colour filter selector and absorbance zero control.

Main features of the colorimeter are: a high performance solid state electronic stabiliser which provides stability of the lamp output against large mains voltage and frequency changes, at the same time ensuring long term stability against temperature drift.

Wavelength is determined by one of six filters selected by a control knob. Filters are labelled on the control panel for easy identification.

The replaceable filter disc enables alternative filter selections to be used.

A highly collimated aspherical optical system enables reference solutions of about 0·8 optical density to be used with all standard filters.

The absorbance zero control provides both coarse and fine adjustment and long term stability is such that many samples can be processed without resetting.

An outlet is provided for a 10mV recorder.

The five-position main switch provides the following settings: off, meter, recorder, high sensitivity recorder and monitor:

With the mains switch in the OFF position, the meter is highly damped to protect it from possible damage in transit.

The 'High Sensitivity Recorder' setting enables filters of 20nm bandwidth (e.g. Ilford Spectrum Series) to be used when measurements are made with a recorder, thus increasing the range of problems to which the instrument may be applied. Alternatively samples up to about 1·4 optical density may be used in the high sensitivity recorder mode with the standard filters.

The 'Monitor' setting enables the performance of the instrument to be checked. This is valuable when checking that appropriate adjustments have been made and that the lamp and detector are functioning correctly.

A two-position cell slide accommodates rectangular cells of 5 and 10mm optical path length, test tubes, flowcell, and automatic flowcell. No cell cover is required in normal operation making rapid cell changing possible. A spillage outlet is provided below the cells.

Accessories such as the cell pump or automatic sample changer are connected to the power outlet provided on the colorimeter.

The interior of the instrument is accessible by removing a retaining screw which enables the top cover complete with meter to be hinged open.



Cell pump unit

CELL PUMP UNIT (CECIL CE 404-1)

This unit is modular with the colorimeter and contains a small vacuum pump which draws the used sample into a waste reservoir. The use of the cell pump unit makes it unnecessary to operate the instrument near a sink and water tap.

A patented system for connecting the PTFE tube to the cell and reservoir makes assembly and maintenance easy.

SAMPLE CHANGER (CECIL CE 404-2)

A self-contained module with programmer, sample probe mechanism, pumps, reservoirs and sample transport mechanism.

Up to 30 samples on a turntable are automatically presented to the colorimeter in sequence at the rate of three samples per minute.

An escapement mechanism on the sample turntable drive makes it impossible for a sample to be missed accidentally thus preventing incorrect synchronisation of data with sample.

The sample changer automatically stops when 30 samples have been processed.

CECIL SERIES CE 404 COLORIMETER SYSTEMS

AUTOMATIC COLORIMETRY

- **Three samples per minute**
- **Prewash cycle virtually eliminates cross contamination**
- **3ml minimum samples**
- **Up to 30 samples on preloaded turntables**
- **Absorbance values recorded on preprinted charts**
- **High sensitivity facility for measurements at 20nm bandwidth**
- **Manual override**
- **Automatic stop**



Sample changer with accessories

Automatic colorimetry with a CE 404 system can be matched to the workload. Initially the CE 404 manual colorimeter may be sufficient. As the workload grows an automatic sample changer and data recording system may be added without any modification to the colorimeter. All that is required is to plug the sample changer into the colorimeter and the recorder into the sample changer.

A prewash cycle in which the cell and sample tubes are washed with a small quantity of the actual sample to be measured, virtually eliminates cross contamination.

3ml of sample are required for a measurement. The samples are contained in disposable glass vials and the measurement is made in a 10mm optical path length rectangular flowcell.

Turntables may be preloaded away from the instrument and mounted on the sample changer when required.

Absorbance data recording on a 10mV recorder gives a series of peaks on preprinted charts with samples numbered for easy identification. Each chart corresponds with one turntable load. Manual override of the automatic system is provided for calibration or to measure special samples manually in the flowcell.

The sample reservoir has a capacity for 200 samples. All connecting tubes are easily assembled and replaced.

STREAM ANALYSIS

The stability and sensitivity of the CE 404 make it suitable for continuous monitoring of streams, or as the detector in automatic chemistry systems using System 7, or System 8 which includes a recorder.

With these systems an adjustable cell holder is fitted in place of the normal cell slide. A micro flowcell with optical path length 10mm and a working volume of 75μl is provided as standard.

MANUAL COLORIMETRY

Rectangular cells

Sample and reference cells each of 10mm or 5mm optical path length are located in the beam by a two-position cell slide.
Minimum sample requirement less than 1ml in 5mm cell.
Cell faces are not scratched by insertion into the instrument.
Cell covers normally not required, allowing rapid cell changing.
Cell slides are made of anodised aluminium.

Test tubes

Simple PTFE adapter locates 13mm test tubes without damaging the optical surface.
Selected matched glass test tubes are available.
Minimum sample volume required is 1·5ml.
Effective optical path length of test tubes is about 10mm.

Flowcells

To increase the speed and convenience of operation, samples may be measured using the flowcell and cell pump to reduce the time required for emptying, cleaning and refilling cells.

The 10mm optical path length flowcell ensures low sample carryover. The cell is filled by pouring the sample into a metering funnel which allows the correct volume to be measured into the cell.

Technical data

Light source	4V 1A krypton filled tungsten lamp.
Electronics	All solid state lamp stabiliser.
Wavelength	Six filters, Ilford Nos. 621, 622, 624, 625, 626, 608, selected by a control knob.
Bandwidth	Typically 40nm defined by filters, source and detector responses; approximately 20nm when operating in the 'High Sensitivity Recorder' mode using Ilford Spectrum series filters on accessory filter disc.
Optical system	Wide aperture double plano-aspherical lens system provides high collimation.
Reserve sensitivity	Permits samples of up to about 0·8 optical density to be used with all filters.
Stability	Absorbance zero changes by less than $\pm$0·0008 absorbance for a 10% mains voltage change. Drift of the absorbance zero is less than $\pm$0·002 optical density in any 10 minute period after initial warm up, and normally less than $\pm$0·001 optical density on blue, green or yellow filters.
Absorbance zero	Set by single control giving both coarse and fine setting of a graded beam attenuator.
Reproducibility	Better than $\pm$0·2% of full scale deflection.
Meter readout	Scaled in both absorbance and transmission with antiparallax mirror. Absorbance scale length 115mm.
Recorder output	10mV at 1kΩ impedance, or 10mV at 5kΩ impedance on high sensitivity setting.
Cuvette holder	Two-position kinematic cell slide.
Cuvettes	10mm and 5mm optical path length rectangular cells. 13mm test tubes and 10mm flowcell.
Minimum sample volume	Less than 1ml in 5mm cell and less than 2ml in 10mm cell.
Sample temperature	Rises by 2°C in 30min from switch on.
Flowcell	10mm, minimum sample volume 2·5ml.
Cell pump unit	Contains vacuum pump and 650ml reservoir.
Cycle time	20s per sample.
Sample vials	5ml capacity, glass.
Sample capacity	30 samples per turntable.
Sample volume	Automatic operation less than 3ml.
Sample carryover	Negligible with wash cycle, i.e. with aqueous solutions less than 0·25%.

Dimensions and masses

Colorimeter	370 × 240 × 260mm	9kg
Cell pump	120 × 240 × 260mm	2·25kg
Sample changer	430 × 240 × 260mm	10kg

CECIL SERIES CE 404 COLORIMETER SYSTEMS

COLORIMETER, *CECIL* **CE 404,** System 1, manual. Comprises colorimeter, two 10mm optical path length cells, test tube adapter, pack of 10 selected test tubes, spare fuse and lamp and dust cover. For 200–250V 50Hz single phase supplies.
COS-300-V Colorimeter, System 1 **£227·70**

COLORIMETER, *CECIL* **CE 404,** System 2, flowcell. Comprises colorimeter, cell pump, 10mm optical path length flowcell with funnel, spare reservoir, spare fuse and lamp and dust cover. For 200–250V 50Hz single phase supplies.
COS-320-H Colorimeter, System 2 **£276·10**

COLORIMETER, *CECIL* **CE 404,** System 3, manual and flowcell. Comprises colorimeter, cell pump, two 10mm optical path length cells with lids, test tube adapter, one pack of 10 selected test tubes, 10mm optical path length flowcell with funnel, spare reservoir, spare fuse and lamp and dust cover. For 200–250V 50Hz single phase supplies.
COS-340-Q Colorimeter, System 3 **£290·40**

COLORIMETER, *CECIL* **CE 404,** System 4, automatic and manual. Comprises colorimeter, automatic sample changer, 10mm optical path length automatic flowcell, 500 glass sample vials, two 10mm optical path length cells with lids, spare reservoir, spare fuse and lamp and dust cover. For 200–250V 50Hz single phase supplies.
COS-360-C Colorimeter, System 4 **£668·80**

COLORIMETER, *CECIL* **CE 404,** System 5, automatic (with non-linear absorbance data recorder) and manual. Comprises outfit COS-360-C with non-linear absorbance recorder, pack of 100 preprinted charts and spare sample turntable, recorder signal lead and signal lead adapter. For 200–250V 50Hz single phase supplies.
COS-380-L Colorimeter, System 5 **£1170·40**

COLORIMETER, *CECIL* **CE 404,** System 6, automatic (with linear absorbance data recorder) and manual. Comprises outfit COS-360-C with linear absorbance recorder, pack of 100 preprinted charts and spare sample turntable, recorder signal lead and signal lead adapter. For 200–250V 50Hz single phase supplies.
COS-400-N Colorimeter, System 6 **£1303·50**

COLORIMETER, *CECIL* **CE 404,** System 7, stream analysis. Comprises colorimeter with six Ilford filters, stream analysis flowcell, adjustable flowcell holder, cell compartment cover, spare source and spare fuse. **Without** recorder. For 200–250V 50Hz single phase supplies.
COS-420-W Colorimeter, System 7 **£259·60**

COLORIMETER, *CECIL* **CE 404,** System 8, stream analysis. Comprises outfit COS-420-W together with linear transmittance pen recorder, two chart rolls ruled linear in transmittance, interconnection lead and a recorder lead adapter. For 200–250V 50Hz single phase supplies.
COS-440-Y Colorimeter, System 8 **£880·00**

COMPONENTS, SPARE PARTS AND ACCESSORIES FOR CE 404 COLORIMETER

COLORIMETER, complete with krypton filled tungsten lamp, lamp stabiliser, filter disc with six filters, photocell, two-position cell slide, mains cable and instructions manual.
COS-500-010C Colorimeter **£213·40**

CELL PUMP UNIT, complete with vacuum pump reservoir, PVC vacuum line, PTFE sample tube, mains cable and plug for connections to colorimeter.
COS-510-010S Cell pump **£46·20**

AUTOMATIC SAMPLE CHANGER, complete with two reservoirs, one sample turntable, sample probe, PVC vacuum line, PTFE sample tube, mains cable and plug for connection to colorimeter, output plug and lead.
COS-520-010L Sample changer **£419·10**

SAMPLE VIALS for COS-520-010L.
COS-540-010U Sample vials Pack of 500 **£9·24**

CHARTS, ruled non-linear absorbance.
COS-540-070C Charts Pack of 100 **£2·86**

CHARTS, ruled linear absorbance.
COS-550-070S Charts Pack of 100 **£3·08**

RECTANGULAR CELL, 10mm optical path length.
COS-560-030A Cell, 10mm **£4·07**
COS-560-040U Lid for COS-560-030A **£0·22**

RECTANGULAR CELL, 5mm optical path length.
COS-560-110C Cell, 5mm **£4·07**

FLOWCELL, 10mm optical path length with three funnels.
COS-560-230P Flowcell, 10mm **£19·58**

AUTOMATIC FLOWCELL, 10mm optical path length complete with PTFE stopper for vacuum and sample line connections.
COS-560-310R Flowcell, 10mm **£19·58**

TEST TUBES, selected, 100 x 13mm external diameter.
COS-560-430H Test tubes Pack of 10 **£4·73**

COS-560-440E Adapter for COS-560-430H **£1·21**

FILTERS, Ilford Spectrum Series Nos. 601, 602, 604, 605, 606 and 608 mounted on disc. Accessory set for use with high sensitivity recorder.
COS-560-510J Filters Set **£26·18**

SAMPLE TURNTABLE
COS-560-590Y Turntable **£17·38**

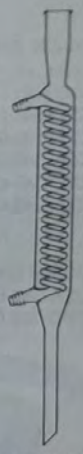
LAMP, 4V 1A.
COS-560-630W Lamp **£0·77**

CONDENSERS


CRN-300


CRN-330


CRN-360


CRN-390

CONDENSER, air, soda glass, with plain tube approximately 12mm o.d. having funnel top approximately 23mm o.d. Overall length 700mm.

CRN-300-P Condenser, air **£0·91**

CONDENSERS, Liebig, borosilicate glass, with narrow fused-on jacket for efficient cooling. Dimension given is the effective length.

CRN-330-010X Condenser, 250mm **£3·38**
CRN-330-030Y Condenser, 500mm **£3·49**

CONDENSER, Allihn, borosilicate glass, with fused-on jacket 500mm long × 37mm diameter.

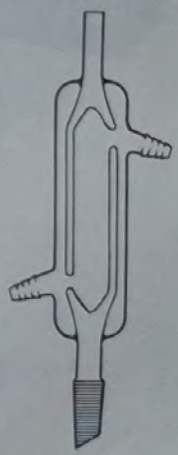
CRN-360-T Condenser, Allihn **£10·16**

CONDENSER, Graham, borosilicate glass, with cooling coil fused into jacket 250mm long × 37mm diameter.

CRN-390-V Condenser, Graham **£7·40**


CRN-420


CRN-450


CRN-470

CONDENSER, Thorpe, Inland Revenue pattern, borosilicate glass. Jacket 200mm long × 67mm diameter.

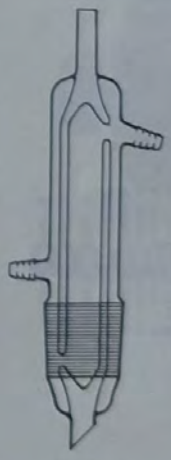
CRN-420-Q Condenser, Thorpe **£11·17**

CONDENSER, Davies, double surface pattern, borosilicate glass. Jacket 200mm long × 43mm diameter, approximate effective condensing surface area 300cm².

CRN-450-S Condenser, Davies **£11·32**

CONDENSER, Davies, double surface pattern, borosilicate glass, for reflux use. Jacket 150mm long with 29/32 cone joint.

CRN-470-E Condenser, Davies, 29/32 cone **£4·84**


CRN-490

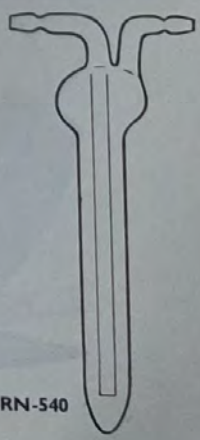
CONDENSERS, Davies, double surface pattern, borosilicate glass, for reflux use. Very compact design using a large cone joint which forms the lower portion of the outer jacket. Jacket 200mm long.

CRN-490-010K Condenser, Davies, 40/38 cone **£6·54**
CRN-490-030E Condenser, Davies, 50/42 cone **£6·92**


CRN-510

CONDENSER, Davies, double surface pattern, borosilicate glass, with 24/29 cone and 19/26 socket joints. Jacket 200mm long.

CRN-510-P Condenser, Davies, 24/29 cone **£6·66**


CRN-540

CONDENSER, reflux, cold finger, borosilicate glass, with finger 15mm diameter to fit into boiling vessel.

CRN-540-R Condenser, reflux **£3·22**

CORK

All dimensions quoted are nominal

CORK MATS, compressed, 120mm diameter × 12mm thick, for the protection of bench tops, etc. and also convenient for use as stands of easily variable height.

CSD-300-M	Cork mats	Pack of 5 **£1·49**

CORK RINGS, compressed, with mitred edge for supporting flasks, etc. Thickness 45mm. Dimensions given are external × internal diameters.

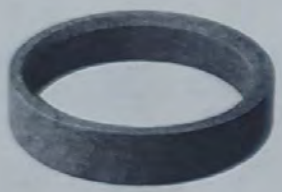
CSD-340-010E	Cork ring, 75 × 45mm	Pack of 5 **£2·06**
CSD-340-030V	Cork ring, 115 × 85mm	Pack of 5 **£3·75**
CSD-340-050P	Cork ring, 150 × 120mm	Pack of 3 **£4·03**
CSD-340-070J	Cork ring, 195 × 160mm	Pack of 3 **£5·18**
CSD-340-090D	Cork ring, 240 × 200mm	Pack of 3 **£6·58**

CORK SHEETS, compressed, 300 × 150mm.

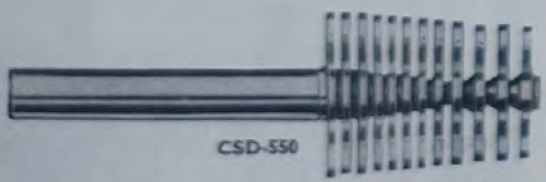
CSD-380-010W	Cork sheet, 3mm thick	Pack of 5 **£0·37**
CSD-380-030Q	Cork sheet, 13mm thick	Pack of 5 **£1·22**



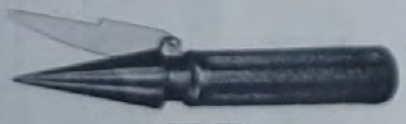
CSD-300



CSD-340



CSD-550



CSD-570

CORK SHEETS, compressed, 300 × 300 × 6mm thick, for entomological work.

CSD-390-S	Cork sheets	Pack of 5 **£3·95**

CORK STOPPERS, best quality, tapered. In packs of uniform size for convenient storage. Pack quantities given are approximate. (F)

Dia., small end, mm	6	8	9	11	12	14	15
Dia., large end, mm	9	11	12	14	15	17	18
Length, mm	16	18	23	23	27	27	27
Dia., small end, mm	17	18	21	23	24	26	28
Dia., large end, mm	20	21	24	26	27	29	31
Length, mm	27	32	32	32	32	32	32
Dia., small end, mm	30	32	35	38	41	44	47
Dia., large end, mm	33	35	38	41	44	47	50
Length, mm	32	32	32	32	32	32	32

CSD-460-010F	Cork stoppers, 6mm	Pack of 330 **£1·69**
CSD-460-030W	Cork stoppers, 8mm	Pack of 330 **£1·69**
CSD-460-050Q	Cork stoppers, 9mm	Pack of 300 **£1·69**
CSD-460-070K	Cork stoppers, 11mm	Pack of 280 **£1·69**
CSD-460-090E	Cork stoppers, 12mm	Pack of 225 **£1·69**
CSD-460-110B	Cork stoppers, 14mm	Pack of 190 **£1·69**
CSD-460-130S	Cork stoppers, 15mm	Pack of 150 **£1·69**
CSD-460-150M	Cork stoppers, 17mm	Pack of 110 **£1·69**
CSD-460-170G	Cork stoppers, 18mm	Pack of 80 **£1·69**
CSD-460-190A	Cork stoppers, 21mm	Pack of 65 **£1·69**
CSD-460-210U	Cork stoppers, 23mm	Pack of 50 **£1·69**
CSD-460-230X	Cork stoppers, 24mm	Pack of 45 **£1·69**
CSD-460-250Y	Cork stoppers, 26mm	Pack of 40 **£1·69**
CSD-460-270C	Cork stoppers, 28mm	Pack of 38 **£1·69**
CSD-460-290T	Cork stoppers, 30mm	Pack of 35 **£1·69**
CSD-460-310Q	Cork stoppers, 32mm	Pack of 30 **£1·69**
CSD-460-330K	Cork stoppers, 35mm	Pack of 25 **£1·69**
CSD-460-350E	Cork stoppers, 38mm	Pack of 20 **£1·69**
CSD-460-370V	Cork stoppers, 41mm	Pack of 15 **£1·69**
CSD-460-390P	Cork stoppers, 44mm	Pack of 12 **£1·69**
CSD-460-410M	Cork stoppers, 47mm	Pack of 11 **£1·69**

CORK STOPPERS, assorted pack, as CSD-460 comprising 24 each 9, 12, 15, 18 and 23mm and 6 each 26, 28, 32 and 35mm.

CSD-480-R	Cork stoppers	Pack **£3·66**

CORK BORERS, plated metal. Cutting tube mounted with safety under-flange in shaped handle ensuring that operator cannot be injured by a dislodged tube. With rod for clearing borers. Sizes numbered consecutively from 1 upwards in each set.

CSD-550-010E	Cork borers, 4 to 10mm	Set of 6 **£3·58**
CSD-550-030V	Cork borers, 4 to 18mm	Set of 12 **£8·11**
CSD-550-050P	Cork borers, 4 to 27mm	Set of 18 **£13·66**

CORK BORER SHARPENER, for borer diameters 4 to 27mm. Plated metal cone with hinged cutter blade set in slot and metal handle. Circular shape of borer maintained by cone. Edge cut to correct angle by depressing blade using thumb pressure button and rotating borer.

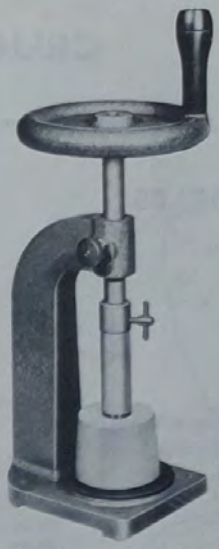
CSD-570-Q	Borer sharpener	**£1·52**

CORK BORING MACHINE, manual, for drilling holes from 3 to 25 mm diameter in cork or rubber stoppers. Heavy metal frame, with synthetic rubber platform 90mm diameter to support stopper, has four holes for fixing to bench top if required. The wheel spindle has a central hole which accommodates an ejector rod and permits the introduction of a suitable lubricant such as water or methylated spirit. Overall dimensions 150 × 150 × 430 mm high. With set of 15 plated steel borers.

CSD-600-L Boring machine **£49·53**

SPARE PARTS

CSD-604-010H Borers Set of 15 **£24·67**



CSD-600

CORK PRESS, for compression softening of corks up to 38mm diameter.

CSD-650-W Cork press **£8·04**



CSD-650

COTTON WOOL

COTTON WOOL, non-absorbent.

CTC-240-010L	Cotton wool, white	Pack of 0·5kg **£1·72**
CTC-240-020Y	Cotton wool, dark blue	Pack of 0·5kg **£2·16**
CTC-240-030F	Cotton wool, light blue	Pack of 0·5kg **£2·16**
CTC-240-040C	Cotton wool, dark green	Pack of 0·5kg **£2·16**
CTC-240-050W	Cotton wool, light green	Pack of 0·5kg **£2·16**
CTC-240-060T	Cotton wool, mauve	Pack of 0·5kg **£2·16**
CTC-240-070Q	Cotton wool, pink	Pack of 0·5kg **£2·16**
CTC-240-080N	Cotton wool, red	Pack of 0·5kg **£2·16**
CTC-240-090K	Cotton wool, yellow	Pack of 0·5kg **£2·16**

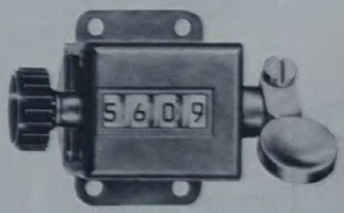
COTTON WOOL, absorbent.

CTC-270-Q	Cotton wool, white	Pack of 0·5kg **£1·14**

COUNTERS

COUNTER, tally, registering to four figures. With thumb lever for manual operation. One complete turn of the reset knob returns all figures to zero.

CTL-300-N Tally counter, lever **£4·86**



CTL-300

COUNTER, tally, registering to four figures with zero reset control. With pushbutton for manual operation and retaining cord.

CTL-340-Y Tally counter, pushbutton **£3·71**

COUNTER, tally, 5-unit, each counter registering to four figures and with pushbutton for manual operation. All are reset to zero simultaneously by rotation of end lever. Overall dimensions 150 × 29 × 60 mm high.

CTL-380-D Tally counter, 5-unit **£29·39**



CTL-340



CTL-380

CRUCIBLES

All capacities and dimensions quoted are nominal

METAL CRUCIBLES

CRUCIBLES, iron, sheet, tall form, with lid.

Capacity, ml	45	200
Dia. × height, mm	45 × 45	80 × 60

CWB-300-030C	Crucibles, 45ml	Pack of 5 **£6·30**
CWB-300-110E	Crucibles, 200ml	Pack of 5 **£8·21**

CRUCIBLES, nickel, 99% pure, tall form, **without** lid.

Capacity, ml	10	15	25	30	70	130
Diameter, mm	25	30	35	40	50	60
Height, mm	24	29	34	38	48	58

CWB-340-030U	Crucible, 10ml	**£0·86**
CWB-340-050X	Crucible, 15ml	**£0·92**
CWB-340-070Y	Crucible, 25ml	**£1·01**
CWB-340-090C	Crucible, 30ml	**£1·19**
CWB-340-110W	Crucible, 70ml	**£1·80**
CWB-340-130Q	Crucible, 130ml	**£2·48**



CWB-300



CWB-500



CWB-710 with CWB-720
CWC-290 with CWC-310

ACCESSORIES

CWB-348-030S	Lid for 10ml	**£0·50**
CWB-348-050M	Lid for 15ml	**£0·54**
CWB-348-070G	Lid for 25ml	**£0·57**
CWB-348-090A	Lid for 30ml	**£0·62**
CWB-348-110U	Lid for 70ml	**£0·74**
CWB-348-130X	Lid for 130ml	**£0·88**

CRUCIBLES, platinum, tall form, with lid. Quoted masses include lids.

Capacity, ml	10	15	20	25	30	50
Diameter, mm	26	29	34	35	38	47
Height, mm	27	32	34	36	39	46
Mass approx., g	11	16	21	25	30	49

CWB-400-030R	Crucible, 10ml	**£91·74**
CWB-400-050L	Crucible, 15ml	**£127·13**
CWB-400-070F	Crucible, 20ml	**£156·19**
CWB-400-090W	Crucible, 25ml	**£182·81**
CWB-400-110T	Crucible, 30ml	**£215·44**
CWB-400-130N	Crucible, 50ml	**£333·00**

CRUCIBLES, stainless steel, tall form, polished, **without** lid.

Capacity, ml	15	30	70
Dia. × height, mm	30 × 30	40 × 40	50 × 50

CWB-450-050W	Crucibles, 15ml	Pack of 3 **£2·84**
CWB-450-110H	Crucibles, 30ml	Pack of 3 **£3·35**
CWB-450-150S	Crucibles, 70ml	Pack of 3 **£4·46**

ACCESSORIES

	Lids, stainless steel.	
CWB-460-050P	Lids for 15ml	Pack of 3 **£0·80**
CWB-460-110A	Lids for 30ml	Pack of 3 **£1·07**
CWB-460-150L	Lids for 70ml	Pack of 3 **£1·22**

PLUMBAGO CRUCIBLES

CRUCIBLES, Salamander plumbago, 'A' shape, with pouring lip.

Capacity, ml	190	320	680
Top dia., mm	79	95	114
Height, mm	97	109	141

CWB-500-030J	Crucible, 190ml	**£3·83**
CWB-500-050D	Crucible, 320ml	**£4·31**
CWB-500-070U	Crucible, 680ml	**£5·40**

PORCELAIN CRUCIBLES

CRUCIBLES, porcelain, squat form, glazed inside and outside except base, **without** lid. (F)

Capacity, ml	8	15	25	45	90
Top dia., mm	32	40	46	57	68
Height, mm	19	23	27	37	45

CWB-710-010P	Crucibles, 8ml	Pack of 10 **£2·59**
CWB-710-030J	Crucibles, 15ml	Pack of 10 **£2·81**
CWB-710-050D	Crucibles, 25ml	Pack of 10 **£3·26**
CWB-710-070U	Crucibles, 45ml	Pack of 5 **£1·82**
CWB-710-110L	Crucibles, 90ml	Pack of 5 **£2·78**

ACCESSORIES

CWB-720-530F	Lids for 15ml (F)	Pack of 10 **£2·93**
CWB-720-550W	Lids for 25ml (F)	Pack of 10 **£2·36**
CWB-720-610H	Lids for 90ml (F)	Pack of 5 **£1·63**
	Lids for 8ml	*See CWB-780-030G*
	Lids for 45ml	*See CWB-780-090L*

CRUCIBLES, porcelain, tall form, glazed inside and outside except base, **without** lid. (F)

Capacity, ml	5	10	18	30	65	90
Top dia., mm	25	30	35	42	55	63
Height, mm	20	25	30	35	50	55

CWB-770-010T	Crucibles, 5ml	Pack of 10 **£2·36**
CWB-770-030N	Crucibles, 10ml	Pack of 10 **£2·59**
CWB-770-050H	Crucibles, 18ml	Pack of 10 **£2·70**
CWB-770-070B	Crucibles, 30ml	Pack of 10 **£3·26**
CWB-770-090S	Crucibles, 65ml	Pack of 5 **£2·10**
CWB-770-110P	Crucibles, 90ml	Pack of 5 **£2·97**

ACCESSORIES

CWB-780-010M	Lids for 5ml (F)	Pack of 10 **£1·74**
CWB-780-030G	Lids for 8, 10 and 18ml (F)	Pack of 10 **£2·03**
CWB-780-070R	Lids for 30ml (F)	Pack of 10 **£2·36**
CWB-780-090L	Lids for 45 and 65ml (F)	Pack of 5 **£1·24**
CWB-780-110Y	Lids for 90ml (F)	Pack of 5 **£1·44**

CRUCIBLE, fireclay, London No. 1, top diameter × height 58×75mm, with lid.

CWB-950-U	Crucible	**£1·89**



CWB-770 with CWB-780

SILICA CRUCIBLES

CRUCIBLES, translucent silica, squat form, glazed inside and outside, **without** lid.

Capacity, ml	5	10	15	25	50	80	150
Diameter, mm	29	38	41	47	57	67	82
Height, mm	19	19	25	28	37	45	51

CWC-290-010M	Crucible, 5ml	**£1·41**
CWC-290-030G	Crucible, 10ml	**£1·46**
CWC-290-050A	Crucible, 15ml	**£1·61**
CWC-290-070R	Crucible, 25ml	**£1·74**
CWC-290-090L	Crucible, 50ml	**£1·99**
CWC-290-110Y	Crucible, 80ml	**£2·81**
CWC-290-130C	Crucible, 150ml	**£3·44**

ACCESSORIES

Lids, translucent silica.

CWC-310-010X	Lid for 5ml	**£1·25**
CWC-310-030Y	Lid for 10ml	**£1·31**
CWC-310-050C	Lid for 15ml	**£1·31**
CWC-310-070T	Lid for 25ml	**£1·47**
CWC-310-090N	Lid for 50ml	**£1·76**
CWC-310-110K	Lid for 80ml	**£2·14**
CWC-310-130E	Lid for 150ml	**£2·40**

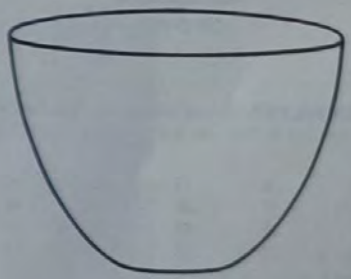


CWC-350 with CWC-360

CRUCIBLES, translucent silica, tall form, glazed inside and outside, **without** lid.

Capacity, ml	10	20	30	50	200
Diameter, mm	27	35	43	51	73
Height, mm	32	38	39	51	81

CWC-350-030D	Crucible, 10ml	**£2·33**
CWC-350-050U	Crucible, 20ml	**£2·60**
CWC-350-070X	Crucible, 30ml	**£2·62**
CWC-350-090Y	Crucible, 50ml	**£3·20**
CWC-350-110F	Crucible, 200ml	**£4·62**



CWC-410

ACCESSORIES

Lids, translucent silica.

CWC-360-030T	Lid for 10ml	**£1·13**
CWC-360-050N	Lid for 20ml	**£1·13**
CWC-360-070H	Lid for 30ml	**£1·20**
CWC-360-090B	Lid for 50ml	**£1·31**
CWC-360-110V	Lid for 200ml	**£2·22**



CWC-440

CRUCIBLES, translucent silica, with broad base, glazed inside and outside.

Capacity, ml	15	25	40
Dia. × height, mm	41×24	48×27	57×37

CWC-410-010G	Crucible, 15ml	**£1·95**
CWC-410-030A	Crucible, 25ml	**£1·99**
CWC-410-050R	Crucible, 40ml	**£2·81**

CRUCIBLES, translucent silica, glazed, for gold assay.

Capacity, ml	10	30
Dia. × height, mm	30×30	42×42

CWC-440-010Y	Crucible, 10ml	**£2·33**
CWC-440-030C	Crucible, 30ml	**£3·16**

SintAGlass FILTER CRUCIBLES

Manufactured in our own factory under accurately controlled conditions

DRYING AND IGNITION

Sintered crucibles are specially suitable for precipitates which have to be dried to constant mass at 110°C. They can be used with boiling liquids, placed directly in a drying oven up to 150°C, and then left to cool in a desiccator or in the open air. When ignition is required an electric furnace is necessary. The crucibles should be placed in the cold furnace, slowly heated to a temperature not exceeding 580°C and allowed to cool down below 200°C before removal from the furnace. In the case of filters with porosity 5 plates, greater care is needed when heating, especially when the filter plate is wet. These filters should always be placed in a cold oven and heated gradually, since the sudden evolution of steam from the fine pores may set up sufficient pressure within the filter to disrupt it.

- **Close tolerance porosity ranges**
- **Colour coded for porosity**
- **Non-friable sintered plates**
- **Made from borosilicate glass**
- **Reinforcing rim at top**



CWC-700



CWC-750

CRUCIBLES, FILTER, *SINTAGLASS*, squat form with short skirt below the filter plate. For use with funnels CWF-700 and rings CWF-790.

Capacity, ml	8	15	35	70	
Plate dia., mm	15	20	30	40	
Height, mm	35	40	45	50	
Mass, approx., g	8	15	25	35	
CWC-700-050A	Crucible, 8ml, porosity 1				£0·90
CWC-700-060U	Crucible, 15ml, porosity 1				£0·83
CWC-700-070R	Crucible, 35ml, porosity 1				£0·93
CWC-700-072N	Crucibles, 35ml, porosity 1				Pack of 10 £8·05
CWC-700-080X	Crucible, 70ml, porosity 1				£1·06
CWC-700-090L	Crucible, 8ml, porosity 2				£0·90
CWC-700-100L	Crucible, 15ml, porosity 2				£0·83
CWC-700-110Y	Crucible, 35ml, porosity 2				£0·93
CWC-700-112E	Crucibles, 35ml, porosity 2				Pack of 10 £8·05
CWC-700-120F	Crucible, 70ml, porosity 2				£1·06
CWC-700-130C	Crucible, 8ml, porosity 3				£0·90
CWC-700-140W	Crucible, 15ml, porosity 3				£0·83
CWC-700-150T	Crucible, 35ml, porosity 3				£0·93
CWC-700-152P	Crucibles, 35ml, porosity 3				Pack of 10 £8·05
CWC-700-160Q	Crucible, 70ml, porosity 3				£1·06
CWC-700-170N	Crucible, 8ml, porosity 4				£0·90
CWC-700-180K	Crucible, 15ml, porosity 4				£0·83
CWC-700-190H	Crucible, 35ml, porosity 4				£0·93
CWC-700-192D	Crucibles, 35ml, porosity 4				Pack of 10 £8·05
CWC-700-200H	Crucible, 70ml, porosity 4				£1·06
CWC-700-210E	Crucible, 8ml, porosity 5				£2·19
CWC-700-220B	Crucible, 15ml, porosity 5				£2·24
CWC-700-230V	Crucible, 35ml, porosity 5				£2·59
CWC-700-240S	Crucible, 70ml, porosity 5				£2·70

CRUCIBLES, FILTER, *SINTAGLASS*, with standard cone joint. For use with adapters CWF-860. Rubber adapters not required.

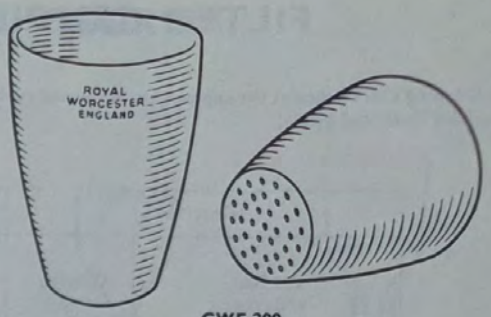
Capacity, ml	20	50	
Plate dia., mm	20	30	
Height, mm	55	65	
Mass, approx., g	25	35	
Cone size	29/22	40/25	
CWC-750-050L	Crucible, 20ml, porosity 1		£2·19
CWC-750-060Y	Crucible, 50ml, porosity 1		£2·13
CWC-750-070F	Crucible, 20ml, porosity 2		£2·19
CWC-750-080C	Crucible, 50ml, porosity 2		£2·13
CWC-750-090W	Crucible, 20ml, porosity 3		£2·19
CWC-750-110T	Crucible, 50ml, porosity 3		£2·13
CWC-750-120Q	Crucible, 20ml, porosity 4		£2·19
CWC-750-130N	Crucible, 50ml, porosity 4		£2·13
CWC-750-140K	Crucible, 20ml, porosity 5		£3·22
CWC-750-150H	Crucible, 50ml, porosity 5		£3·57

Porosity No.	Colour code	Sintaglass, range of maximum pore diameters
		μm
0	White	200–250
1	Yellow	100–120
2	Green	40–50
3	Black	20–30
4	Orange	5–10
5	Blue	1–1·8

GOOCH FILTER CRUCIBLES

CRUCIBLES, FILTER, Gooch, porcelain, with perforated base, glazed. With spare filter disc. (F)

Capacity, ml	10	25	35
Top dia. × height, mm	27 × 30	38 × 40	41 × 43
CWF-200-010W Crucible, 10ml			**£0·46**
CWF-200-030Q Crucible, 25ml			**£0·56**
CWF-200-050K Crucible, 35ml			**£0·70**



CWF-200

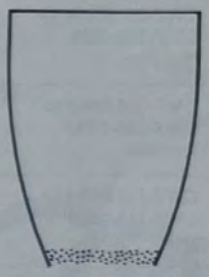
ACCESSORIES

Filter discs. (F)

CWF-220-502K	Filter discs for 10ml	Pack of 10 **£2·70**
CWF-220-512H	Filter discs for 25ml	Pack of 10 **£2·70**
CWF-220-522E	Filter discs for 35ml	Pack of 10 **£2·70**

CRUCIBLES, FILTER, porcelain, for filtration of fine precipitates and subsequent ignition. With porous base. (F)

Capacity, ml	25	34
Top dia. × height, mm	35 × 40	40 × 43
CWF-260-010D Crucible, 25ml		**£1·17**
CWF-260-030U Crucible, 34ml		**£1·26**



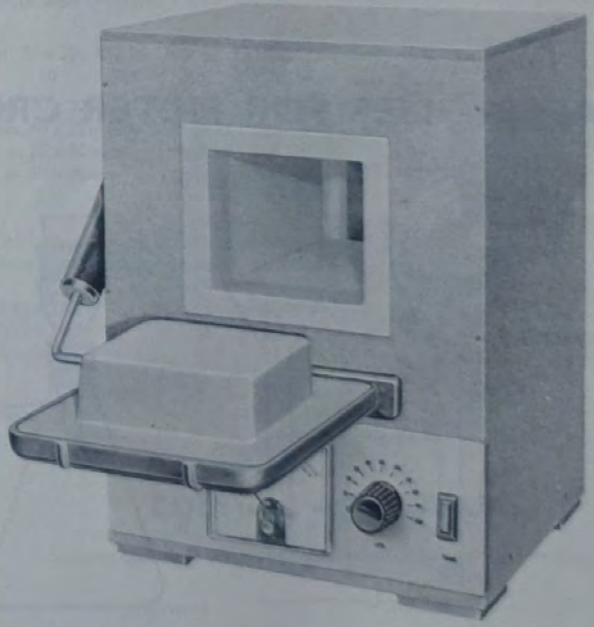
CWF-260
CWF-310

CRUCIBLES, FILTER and IGNITION, silica, tall (platinum) shape with base, porosity No. 4.

Capacity, ml	30	50
Top dia. × height, mm	38 × 44	47 × 51
Disc dia., mm	23	30
CWF-310-010H Crucible, 30ml		**£9·56**
CWF-310-030B Crucible, 50ml		**£13·50**

Gallenkamp MUFFLE FURNACES

For the ignition of crucibles



- **Alternative manual or automatic control**
- **Alternative door mechanisms**
- **Wide range of sizes**
- **Integral thermal fuse**

See FSE-250 et seq.

FILTER CRUCIBLE FITTING CHART

The following chart indicates the appropriate funnel and rubber adapter sizes required for particular crucibles when used in the various assemblies illustrated below.

Crucible		Assembly Fig. 1		Assembly Fig. 2	
		Funnel with Ring		Funnel with Cone	
List No. and type	Capacity, ml	CWF-700 Size	CWF-790 Size	CWF-700 Size	CWF-820 Size
CWC-700-050A to	8	33mm	17mm	29mm	30×20mm
CWC-700-340S	15	33mm	23mm	33mm	40×25mm
Sintered glass	35	43mm	33mm	43mm	50×30mm
	70	53mm	43mm	53mm	60×40mm
CWF-200-010W to	10	33mm	21mm	29mm	30×20mm*
CWF-200-050K	25	43mm	29mm	33mm	40×25mm*
Porcelain	35	53mm	29mm	43mm	50×30mm
CWF-260-010D to	25	43mm	25mm	33mm	40×25mm*
CWF-260-030U	34	43mm	29mm	43mm	50×30mm
Porcelain					
CWF-310-010H to	30	43mm	25mm	33mm	40×25mm
CWF-310-030B	50	43mm	33mm	43mm	40×25mm
Silica					

*In these instances the lower end of the rubber adapter will project below the base of the crucible and may be cut off if desired to avoid contact with the filtrate.

SPECIMEN ASSEMBLIES FOR FILTER CRUCIBLES

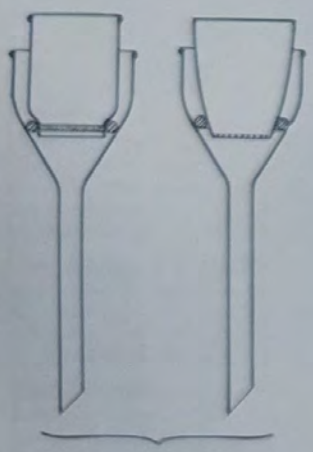


Fig. 1
Rubber ring CWF-790 with funnel CWF-700

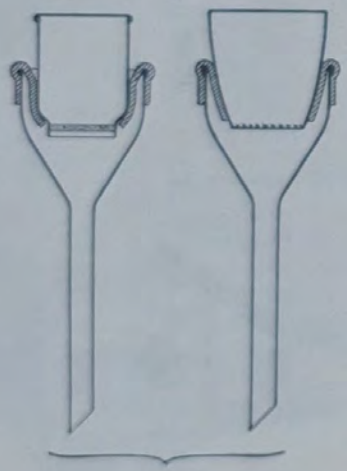


Fig. 2
Rubber cone CWF-820 with funnel CWF-700

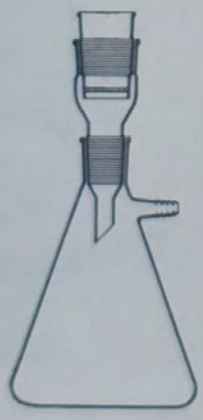


Fig. 3
Joint adapter CWF-860 with flask



Fig. 4
Rubber ring CWF-790 with funnel CWF-700 adapter CWF-740 and flask

CRUCIBLE ACCESSORIES

GOOCH FUNNELS AND ADAPTERS

FUNNELS, borosilicate glass, for use with filter crucibles as shown in fitting chart. Dimension given is the internal diameter.

CWF-700-010F	Funnel, 29mm	**£0·74**
CWF-700-030W	Funnel, 33mm	**£0·81**
CWF-700-050Q	Funnel, 43mm	**£1·01**
CWF-700-070K	Funnel, 53mm	**£1·74**



CWF-700



CWF-740 with funnel and flask

FLASK ADAPTERS, *GALLENKAMP*, pliable, moulded rubber sleeve to fit the conical part of Gooch crucible adapters and small Buchner funnels and make a vacuum-tight joint with the rim of a filter flask. Will not adhere to the funnel or flask and can be used repeatedly.

Suitable for use with:
- Gooch funnels, CWF-700
- Sintered glass funnels, FJP-300-150W to -280J
- Sintered glass funnels, FJP-330-050F to -180P
- Slit sieve funnel, FPL-300
- Porcelain funnels, FPL-390-050M and -070G

CWF-740-D	Flask adapters	Pack of 5 **£0·90**

RUBBER RING ADAPTERS, precision moulded, synthetic nitrile rubber, for use with filter crucibles in funnels CWF-700 as shown in filter chart. Dimension given is the internal diameter.

CWF-790-010L	Adapters, 17mm	Pack of 10 **£2·36**
CWF-790-030F	Adapters, 21mm	Pack of 10 **£2·36**
CWF-790-050W	Adapters, 23mm	Pack of 10 **£2·36**
CWF-790-070Q	Adapters, 25mm	Pack of 10 **£2·36**
CWF-790-090K	Adapters, 29mm	Pack of 10 **£2·36**
CWF-790-110H	Adapters, 33mm	Pack of 10 **£2·36**
CWF-790-130B	Adapters, 43mm	Pack of 10 **£2·36**



CWF-790

RUBBER CONES, for use with filter crucibles.

Internal dia., large end × small end, mm	30×20	40×25	50×30	60×40
Length, mm	40	45	50	55

CWF-820-030A	Rubber cones, 30×20mm	Pack of 10 **£3·60**
CWF-820-050R	Rubber cones, 40×25mm	Pack of 10 **£3·83**
CWF-820-070L	Rubber cones, 50×30mm	Pack of 10 **£4·84**
CWF-820-090F	Rubber cones, 60×40mm	Pack of 10 **£5·34**



CWF-820

CRUCIBLE ADAPTERS, borosilicate glass, standard joint for use with sintered glass crucibles CWC-750. Joint sizes given are socket × cone.

CWF-860-010B	Adapter, 29/22×24/29	**£1·89**
CWF-860-030S	Adapter, 40/25×24/29	**£2·93**
CWF-860-050M	Adapter, 40/25×29/32	**£3·20**



CWF-860

CULTURE APPARATUS

Suitable apparatus will be found under the following page headings:

Anaerobic jars	Cotton wool	Glove box	Pumps
Autoclaves	Dishes	Histology	Safety
Baths	Fermenters	Incubators	Shakers
Bottles	Filters	Microscopes	Sterilisers
Colony counter	Flasks	Ovens	Tubes

Gallenkamp

Technico GRADUATED GLASS CYLINDERS

With permanent graduations and inscriptions in amber stain

TECHNICO graduated glass cylinders (except CYL-370) are manufactured to comply with the requirements of BS 604. The volumetric tolerances are as shown below.

Extract from BS 604

To contain	ml	5	10	25	50	100
Subdivided in	ml	0·1	0·2	0·5	1	1
Tolerance	±ml	0·1	0·2	0·5	1	1
To contain	ml	250	500	1000	2000	–
Subdivided in	ml	2	5	10	20	–
Tolerance	±ml	2	5	10	20	–

NOTE: The graduations of CYL-370 do not conform strictly to BS 604.

TECHNICO stoppered cylinders up to 500ml have interchangeable socket necks to BS 572 fitted with polopropylene hexagonal head stoppers. These stoppers are inert to almost all reagents and provide protection against the rim of the cylinder becoming chipped. If on occasions, for special purposes, glass stoppers are essential then stoppers SYH-200 are suitable.

Cylinders of 1000 and 2000ml have well ground, individually fitted glass stoppers.

WORKS' CERTIFICATE

The works' certificate of examination, supplied with cylinders CYL-330 and CYL-450, states the volume of distilled water at 20°C contained between zero and each of five points on the graduated scale.

CYLINDERS, graduated, *TECHNICO*, **glass,** BS 604, with spout.

Capacity, ml	5	10	25	50	100
Subdivisions, ml	0·1	0·2	0·5	1	1
Capacity, ml	250	500	1000	2000	
Subdivisions, ml	2	5	10	20	

CYL-300-010B	Cylinder, 5ml	**£0·68**
CYL-300-030S	Cylinder, 10ml	**£0·81**
CYL-300-032X	Cylinders, 10ml	Pack of 10 **£6·10**
CYL-300-050M	Cylinder, 25ml	**£0·84**
CYL-300-052Y	Cylinders, 25ml	Pack of 10 **£6·33**
CYL-300-070G	Cylinder, 50ml	**£0·94**
CYL-300-072C	Cylinders, 50ml	Pack of 10 **£7·13**
CYL-300-090A	Cylinder, 100ml	**£0·99**
CYL-300-092T	Cylinders, 100ml	Pack of 10 **£7·82**
CYL-300-110U	Cylinder, 250ml	**£1·84**
CYL-300-112Q	Cylinders, 250ml	Pack of 10 **£15·18**
CYL-300-130X	Cylinder, 500ml	**£3·34**
CYL-300-132K	Cylinders, 500ml	Pack of 10 **£27·60**
CYL-300-150Y	Cylinder, 1000ml	**£4·26**
CYL-300-170C	Cylinder, 2000ml	**£7·13**

CYLINDERS, graduated, *TECHNICO*, **glass,** BS 604, with spout, as CYL-300 but with works' certificate.

Capacity, ml	5	10	25	50	100
Subdivisions, ml	0·1	0·2	0·5	1	1
Capacity, ml	250	500	1000	2000	
Subdivisions, ml	2	5	10	20	

CYL-330-010D	Cylinder, 5ml	**£2·39**
CYL-330-030U	Cylinder, 10ml	**£2·39**
CYL-330-050X	Cylinder, 25ml	**£2·44**
CYL-330-070Y	Cylinder, 50ml	**£2·53**
CYL-330-090C	Cylinder, 100ml	**£2·61**
CYL-330-110W	Cylinder, 250ml	**£3·94**
CYL-330-130Q	Cylinder, 500ml	**£5·06**
CYL-330-150K	Cylinder, 1000ml	**£6·20**
CYL-330-170E	Cylinder, 2000ml	**£8·60**

CYLINDERS, graduated, *TECHNICO*, **glass,** with spout, figured to read up and down.

Capacity, ml	10	25	50	100	
Subdivisions, ml	0·2	0·5	1	1	
Capacity, ml	250	500	1000		
Subdivisions, ml	2	5	10		

CYL-370-030P	Cylinder, 10ml	**£0·99**
CYL-370-050J	Cylinder, 25ml	**£1·01**
CYL-370-070D	Cylinder, 50ml	**£1·15**
CYL-370-090U	Cylinder, 100ml	**£1·22**
CYL-370-110R	Cylinder, 250ml	**£1·84**
CYL-370-130L	Cylinder, 500ml	**£3·45**
CYL-370-150F	Cylinder, 1000ml	**£4·60**



CYL-300



CYL-370

CYLINDERS, graduated, *TECHNICO,* **glass,** BS 604, with stopper.

Capacity, ml	5	10	25	50	100
Subdivisions, ml	0·1	0·2	0·5	1	1
Stopper size	10/13	10/13	14/15	14/15	19/17

Capacity, ml	250	500	1000	2000
Subdivisions, ml	2	5	10	20
Stopper size	24/20	24/20	–	–

CYL-420-010C	Cylinder, 5ml	**£0·92**
CYL-420-030T	Cylinder, 10ml	**£1·05**
CYL-420-032P	Cylinders, 10ml	Pack of 10 **£8·28**
CYL-420-050N	Cylinder, 25ml	**£1·25**
CYL-420-052J	Cylinders, 25ml	Pack of 10 **£9·89**
CYL-420-070H	Cylinder, 50ml	**£1·33**
CYL-420-072D	Cylinders, 50ml	Pack of 10 **£11·04**
CYL-420-090B	Cylinder, 100ml	**£1·47**
CYL-420-092U	Cylinders, 100ml	Pack of 10 **£12·19**
CYL-420-110V	Cylinder, 250ml	**£2·99**
CYL-420-112R	Cylinders, 250ml	Pack of 10 **£24·73**
CYL-420-130P	Cylinder, 500ml	**£5·29**
CYL-420-132L	Cylinders, 500ml	Pack of 10 **£43·70**
CYL-420-150J	Cylinder, 1000ml	**£6·33**
CYL-420-170D	Cylinder, 2000ml	**£8·74**



CYL-420

CYLINDERS, graduated, *TECHNICO,* **glass,** BS 604, with stopper, as CYL-420 but with works' certificate.

Capacity, ml	5	10	25	50	100
Subdivisions, ml	0·1	0·2	0·5	1	1
Stopper size	10/13	10/13	14/15	14/15	19/17

Capacity, ml	250	500	1000	2000
Subdivisions, ml	2	5	10	20
Stopper size	24/20	24/20	–	–

CYL-450-010E	Cylinder, 5ml	**£2·68**
CYL-450-030V	Cylinder, 10ml	**£2·68**
CYL-450-050P	Cylinder, 25ml	**£2·76**
CYL-450-070J	Cylinder, 50ml	**£3·11**
CYL-450-090D	Cylinder, 100ml	**£3·24**
CYL-450-110A	Cylinder, 250ml	**£5·38**
CYL-450-130R	Cylinder, 500ml	**£7·84**
CYL-450-150L	Cylinder, 1000ml	**£9·25**
CYL-450-170F	Cylinder, 2000ml	**£12·14**

PYREX GLASS GRADUATED CYLINDERS

CYLINDERS, graduated, *PYREX* **glass,** BS 604, with spout and hexagonal foot.

Capacity, ml	10	25	50	100
Subdivisions, ml	0·2	0·5	1	1

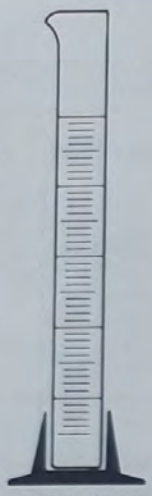
Capacity, ml	250	500	1000	2000
Subdivisions, ml	2	5	10	20

CYP-300-030B	Cylinder, 10ml	**£1·95**
CYP-300-032U	Cylinders, 10ml	Pack of 12 **£12·10**
CYP-300-050S	Cylinder, 25ml	**£2·08**
CYP-300-052X	Cylinders, 25ml	Pack of 12 **£22·71**
CYP-300-070M	Cylinder, 50ml	**£2·19**
CYP-300-072Y	Cylinders, 50ml	Pack of 12 **£23·86**
CYP-300-090G	Cylinder, 100ml	**£2·55**
CYP-300-092C	Cylinders, 100ml	Pack of 6 **£13·92**
CYP-300-110D	Cylinder, 250ml	**£3·44**
CYP-300-112W	Cylinders, 250ml	Pack of 6 **£18·75**
CYP-300-130U	Cylinder, 500ml	**£4·73**
CYP-300-132Q	Cylinders, 500ml	Pack of 6 **£25·76**
CYP-300-150X	Cylinder, 1000ml	**£6·16**
CYP-300-152K	Cylinders, 1000ml	Pack of 4 **£22·60**
CYP-300-170Y	Cylinder, 2000ml	**£8·08**
CYP-300-172E	Cylinders, 2000ml	Pack of 4 **£29·38**



CYP-300
CYP-700
CYP-730

Continued overleaf



CYP-350

CYLINDERS, graduated, *PYREX* **glass,** BS 604, as CYP-300 but with glass stopper.

Capacity, ml	10	25	50	100
Stopper size	10/13	14/15	14/15	19/17
Capacity, ml	250	500	1000	2000
Stopper size	24/29	24/29	34/35	34/35

CYP-320-030K	Cylinder, 10ml	**£3·21**
CYP-320-032G	Cylinders, 10ml	Pack of 12 **£34·96**
CYP-320-050E	Cylinder, 25ml	**£3·46**
CYP-320-052A	Cylinders, 25ml	Pack of 12 **£37·72**
CYP-320-070V	Cylinder, 50ml	**£3·65**
CYP-320-072R	Cylinders, 50ml	Pack of 12 **£39·79**
CYP-320-090P	Cylinder, 100ml	**£3·97**
CYP-320-092L	Cylinders, 100ml	Pack of 12 **£43·24**
CYP-320-110M	Cylinder, 250ml	**£5·03**
CYP-320-112Y	Cylinders, 250ml	Pack of 12 **£54·80**
CYP-320-130G	Cylinder, 500ml	**£6·69**
CYP-320-132C	Cylinders, 500ml	Pack of 12 **£73·03**
CYP-320-150A	Cylinder, 1000ml	**£8·74**
CYP-320-152T	Cylinders, 1000ml	Pack of 6 **£47·67**
CYP-320-170R	Cylinder, 2000ml	**£11·89**
CYP-320-172N	Cylinders, 2000ml	Pack of 4 **£43·24**



CYP-400

CYLINDERS, graduated, *PYREX* **glass,** with spout and detachable polythene foot.

Capacity, ml	50	100	250
Subdivisions, ml	1	1	2

CYP-350-070A	Cylinder, 50ml	**£0·95**
CYP-350-072T	Cylinders, 50ml	Pack of 12 **£9·95**
CYP-350-090R	Cylinder, 100ml	**£1·09**
CYP-350-092N	Cylinders, 100ml	Pack of 12 **£11·39**
CYP-350-110X	Cylinder, 250ml	**£1·40**
CYP-350-112K	Cylinders, 250ml	Pack of 12 **£15·35**

SPARE PARTS

Cylinders, glass body only.

CYP-370-070J	Cylinder, 50ml	**£0·82**
CYP-370-072F	Cylinders, 50ml	Pack of 12 **£8·11**
CYP-370-090D	Cylinder, 100ml	**£0·99**
CYP-370-092W	Cylinders, 100ml	Pack of 12 **£9·83**
CYP-370-110A	Cylinder, 250ml	**£1·27**
CYP-370-112T	Cylinders, 250ml	Pack of 12 **£13·17**

CYLINDERS, graduated, *PYREX* **glass,** with detachable polythene foot and plastics stopper.

CYP-400-070E	Cylinder, 50ml	**£1·33**
CYP-400-072A	Cylinders, 50ml	Pack of 12 **£14·49**
CYP-400-090V	Cylinder, 100ml	**£1·52**
CYP-400-092R	Cylinders, 100ml	Pack of 12 **£16·62**
CYP-400-110S	Cylinder, 250ml	**£2·09**
CYP-400-112X	Cylinders, 250ml	Pack of 12 **£22·89**

SPARE PARTS

Cylinders, glass body only.

CYP-420-070N	Cylinder, 50ml	**£1·09**
CYP-420-072J	Cylinders, 50ml	Pack of 12 **£11·44**
CYP-420-090H	Cylinder, 100ml	**£1·31**
CYP-420-092D	Cylinders, 100ml	Pack of 12 **£13·69**
CYP-420-110E	Cylinder, 250ml	**£1·68**
CYP-420-112A	Cylinders, 250ml	Pack of 12 **£18·34**



CYP-500

CYLINDER PROTECTORS (LIFEBUOYS), sponge rubber, to fit top of glass cylinder and protect against breakage.

Internal dia., mm	22	25	38	51
External dia., mm	48	51	76	89
For cylinder, ml	50	100	250	500

CYP-500-070T	Protectors, 22mm	Pack of 5 **£0·74**
CYP-500-090N	Protectors, 25mm	Pack of 5 **£0·83**
CYP-500-110K	Protectors, 38mm	Pack of 5 **£1·46**
CYP-500-130E	Protectors, 51mm	Pack of 5 **£1·91**

PLASTICS GRADUATED CYLINDERS

CYLINDERS, polypropylene, with spout and moulded graduations. (F)

Capacity, ml	10	25	50	100
Subdivisions, ml	0·1	0·5	1	1
Capacity, ml	250	500	1000	2000
Subdivisions, ml	2	5	10	20

CYP-700-030P	Cylinder, 10ml	**£0·41**
CYP-700-050J	Cylinder, 25ml	**£0·51**
CYP-700-070D	Cylinder, 50ml	**£0·57**
CYP-700-090U	Cylinder, 100ml	**£0·76**
CYP-700-110R	Cylinder, 250ml	**£1·04**
CYP-700-130L	Cylinder, 500ml	**£1·74**
CYP-700-150F	Cylinder, 1000ml	**£2·09**
CYP-700-170W	Cylinder, 2000ml	**£5·65**



CYP-700

CYLINDERS, polymethyl pentene, transparent, with spout and moulded graduations. (F)

Capacity, ml	10	25	50	100
Subdivisions, ml	0·1	0·5	1	1
Capacity, ml	250	500	1000	2000
Subdivisions, ml	2	5	10	20

CYP-730-030R	Cylinder, 10ml	**£0·55**
CYP-730-050L	Cylinder, 25ml	**£0·85**
CYP-730-070F	Cylinder, 50ml	**£0·91**
CYP-730-090W	Cylinder, 100ml	**£1·09**
CYP-730-110T	Cylinder, 250ml	**£1·82**
CYP-730-130N	Cylinder, 500ml	**£2·75**
CYP-730-150H	Cylinder, 1000ml	**£3·08**
CYP-730-170B	Cylinder, 2000ml	**£12·10**

Technico DISTILLATION RECEIVERS

DISTILLATION RECEIVER, *TECHNICO,* **glass,** Crow pattern, BS 658 Type 1 Class B. Capacity 100ml.

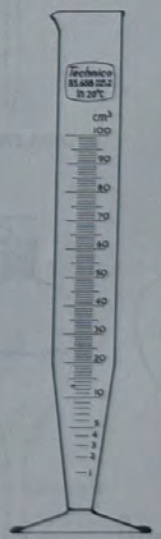
CYP-850-E	Receiver, 100ml	**£2·93**

DISTILLATION RECEIVERS, *TECHNICO,* **glass,** cylindrical pattern, BS 658 Type 2, Class B.

CYP-880-010D	Receiver, 100ml	**£1·96**
CYP-880-030U	Receiver, 200ml	**£2·82**

DISTILLATION RECEIVERS, *TECHNICO,* **glass,** cylindrical pattern, BS 658 Type 2, Class A.

CYP-890-010T	Receiver, 100ml	**£4·60**
CYP-890-030N	Receiver, 200ml	**£5·98**



CYP-850



CYP-880

DISTILLATION APPARATUS

Flasks, BS 658
See FHD-240-030 et seq.

Shields, ASTM D86-IP 123
See PED-930-010H et seq.

Thermometers, IP
See THT-260-330N et seq.

DAIRY PRODUCTS TESTING

FATS by GERBER METHOD, BS 696

BUTYROMETER TUBES, with plain neck.

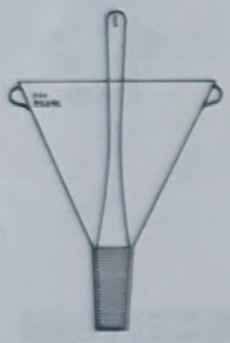
Application	Skim milk	Milk	Cheese	Cream	
Capacity	10·94ml	10·94ml	3g	5g	
Range %	0 to 4×0·1	0 to 8×0·1	0 to 40×1	0 to 70×1	
DBH-300-010G	Butyrometer, skim milk				£1·94
DBH-300-030A	Butyrometer, milk				£1·70
DBH-300-050R	Butyrometer, cheese				£1·94
DBH-300-070L	Butyrometer, cream				£1·69

ACCESSORIES

DBH-320-502R	Lock stoppers	Pack of 10 £3·07
DBH-320-512X	Lock stopper key	£1·87
	Cleaning brushes for DBH-300-050R and DBH-300-070	
DBH-320-522L	Cleaning brushes	Pack of 10 £1·80
	Stand, transparent plastics, to accommodate 12 tubes. With plastics cover to protect operator from acid splash.	
DBH-320-552C	Stand, 12 tube	£17·66



DBH-300



DBH-350



DBH-370-010



DBH-370-030

DBH-370-050



DBH-390-010



DBH-390-030

FUNNEL

FUNNEL, glass, for weighing cream or cheese for Gerber and Babcock tests. Fitted with 7/16 joint and hollow stopper.

DBH-350-U Funnel £5·51

WATER BATH

WATER BATH, *GALLENKAMP*, stainless steel interior, with solid state COMPENSTAT control to 100°C, internal depth 200mm.

See *BKM-400*

WATER BATH RACKS, *GALLENKAMP*, stainless steel, to hold 16 tubes 25mm diameter. Bath BKM-400 will accommodate six racks.

See *BKA-360-030W*

PIPETTES

PIPETTES, *TECHNICO*.

Capacity, ml	1	10	10·94
For	Amyl alcohol	Sulphuric acid	Milk
DBH-370-010D	Pipette, 1ml		£1·55
DBH-370-030U	Pipette, 10ml		£1·61
DBH-370-050X	Pipette, 10·94ml		£0·90

AUTOMATIC MEASURES

AUTOMATIC MEASURES, with stopcock.

Capacity, ml	1	10	
For	Amyl alcohol	Sulphuric acid	
DBH-390-010M	Automatic measure, 1ml		£18·17
DBH-390-030G	Automatic measure, 10ml		£23·01

Automatic measure, tilting dispenser type, capacity 10ml, for sulphuric acid *See PMR-780-080P*

GERBER CENTRIFUGE

CENTRIFUGE, Gerber, maximum speed approximately 1100rev/min. With speed regulating rheostat supplied as a separate unit but without head and speed indicator. For 230–250V a.c. single phase and d.c. supplies.

DBH-420-K Centrifuge, 230–250V £149·63

ACCESSORIES

DBH-430-502C	Head, 8 tube	£47·14
DBH-430-508N	Head, 12 tube	£53·66
DBH-430-514S	Head, 16 tube	£61·88
DBH-430-520A	Head, 24 tube	£65·03
DBH-430-602V	Speed indicator, bubble type	£16·26

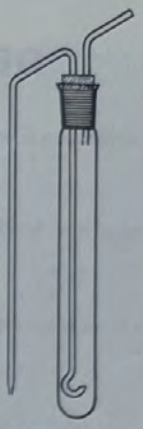


DBH-420

FATS BY RÖSE-GOTTLIEB METHOD, BS 1741

EXTRACTION TUBES, with 19/17 joint stopper and siphon tube.

DBH-470-010S Extraction tube, short siphon **£3·49**
DBH-470-030M Extraction tube, long siphon **£3·60**



DBH-470-030

HORTVET THERMOMETERS

For freezing point of milk

THERMOMETER, Hortvet, BS 3095, −2 to 1×0·01°C, for partial (175mm) immersion. Overall length 610mm, stem diameter 8 to 10mm. (F)

DBH-500-Q Thermometer **£20·81**

THERMOMETER, Hortvet, BS 3095, −5 to 5×0·5°C for partial (200mm) immersion. Overall length about 470mm, stem diameter 6 to 8mm. (F)

DBH-510-J Thermometer **£8·44**

HYDROMETER (Lactometer), BS 734

HYDROMETER, for use in normal milk, range 1·025 to 1·035×0·0002g/ml. Overall length 245mm.

DBH-540-L Hydrometer **£4·05**



DBH-540

SOLUBILITY INDEX

SOLUBILITY INDEX TUBE, 50ml, graduated 0·5 to 1×0·1ml, 1 to 3×0·02ml and 3 to 15×0·5ml. Can be accommodated in Gerber centrifuge DBH-420-K.

DBH-570-N Solubility index tube **£4·14**



DBH-570



DBH-600

METHYLENE BLUE REDUCTION TEST

For pasteurised milk

FLASK, 800ml, unstoppered, for the preparation of methylene blue solution.

DBH-600-Y Flask, 800ml **£2·16**

PIPETTE, blow-out, one mark, 1ml.

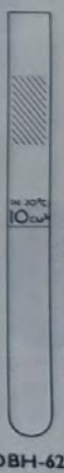
DBH-610-B Pipette, 1ml **£0·33**

TEST TUBE, rimless, 150×16mm diameter, with ring graduation at 10ml and sandblast badge for pencil notations.

DBH-620-R Test tube, 150×16mm Pack of 72 **£5·37**



DBH-610



DBH-620

PHOSPHATASE TEST

For pasteurised milk

PIPETTE, *TECHNICO,* blow-out, two mark, 0·5 and 1ml.

DBH-630-K Pipette, 1×0·5ml **£0·41**

Pipette, blow-out	*See DBH-610-B*
Test tube, 150×16mm	*See DBH-620-R*
Water bath, thermostatic	*See BKA-200-010J*
Rack, to hold test tubes	*See BKA-360-110B*

COLIFORM TEST

For detecting bacteria of the coli-aerogenes group

Pipettes, graduated	*See PMF-250*
Durham tubes, 35×8mm dia.	*See TEW-380-050A*
Test tubes, 150×16 and 150×19mm	*See TEW-300*
Water bath, thermostatic	*See BKA-200-010J*
Racks, to hold test tubes	*See BKA-360-070K and BKA-360-110B*

PLATE COUNT

For estimating numbers of bacteria in milk

Pipette, blow-out	*See DBH-610-B*
Petri dishes	*See DHP-220*
Colony counter	*See CNW-300-010M*
Incubator	*See INC-700-010X*
Sterilising box, for Petri dishes	*See SVF-730-N*

DEIONISERS

Water delivered by the following deionisers is not necessarily pyrogen free and is therefore unsuitable for clinical injections

DEIONISER, *ELGASTAT* **B114,** wall mounting with mixed bed resin in expendable cartridge.

Technical data

Output	30 to 200 litres of tap water depending on hardness
Flowrate	36 litres/hour
Supply pressure, maximum	63 kN/m²
Average effluent quality	0·5 to 1 μS
Effluent purity	0·1 ppm silica 0 ppm carbon dioxide
Effluent pH	6·6 to 7
Water purity meter	Battery operated
Inlet	Hose with tap fitting provided
Outlet	Nozzle for 6·35 mm bore flexible tubing
Overall dimensions	180 × 160 × 380 mm high
Mass	2·2 kg

With dry battery and four cartridges of resin.

DCF-300-S Deioniser, B114 **£38·50**



DCF-300

DEIONISER, *ELGASTAT* **B102 Mark II,** bench mounting with mixed bed resin in expendable cartridge.

Technical data

Output	30 to 300 litres of tap water depending on hardness
Flowrate	15 litres/hour
Supply pressure	Gravity feed from fitted reservoir tank
Average effluent quality	0·5 μS
Effluent purity	0·1 ppm silica 0 ppm carbon dioxide
Effluent pH	6·6 to 7
Water purity meter	Battery operated
Outlet	Nozzle for free flow
Overall dimensions	310 × 200 × 700 mm high
Mass	3·6 kg

With dry battery and four cartridges of resin.

DCF-330-U Deioniser, B102 **£96·80**

SPARE PARTS for DCF-300-S and DCF-330-U

DCF-350-010D Resin cartridges, ELGACAN C114 Pack of 4 **£7·98**

DEIONISER, *ELGASTAT* **B125** for UK only, bench mounting with mixed bed resin in cartridge. See note on resin regeneration.

Technical data

Output	70 to 900 litres of tap water depending on hardness
Flowrate	50 litres/hour
Supply pressure, maximum	63 kN/m²
Average effluent quality	0·25 μS
Effluent purity	0·1 ppm silica 0 ppm carbon dioxide
Effluent pH	6·5 to 7
Water purity meter	Battery operated
Inlet	Nozzle for 10 mm bore flexible tubing
Outlet	Nozzle for free flow
Overall dimensions	180 mm base diameter × 500 mm high
Mass	2·9 kg

With dry battery and one cartridge of resin.

DCF-380-Y Deioniser, B125 **£64·90**

SPARE PART

DCF-390-010V Resin cartridge **£22·00**



DCF-330



DCF-380

DEIONISER, *ELGASTAT* **B125B,** similar to DCF-380-Y but for export only. With dry battery and one cartridge of resin.

DCF-420-T Deioniser, B125B **£64·90**

SPARE PART

DCF-430-010U Resin sufficient for 20 charges Pack **£65·45**

DEIONISER, *ELGASTAT* **B113,** for UK only, wall mounting with mixed bed resin in cartridge. See note on resin regeneration.

Technical data

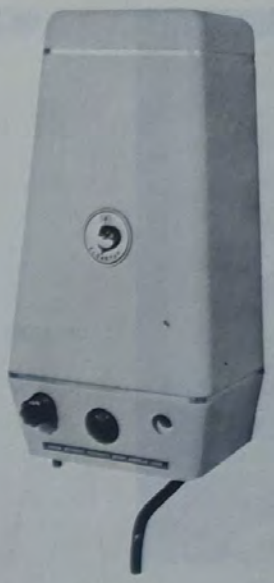
Output	160 to 4000 litres of tap water depending on hardness
Flowrate	90 litres/hour
Supply pressure, maximum	350kN/m²
Average effluent quality	0·5μS
Effluent purity	0·1 ppm silica 0 ppm carbon dioxide
Effluent pH	6·5 to 7
Water purity meter	Mains operated
Inlet and outlet	Nozzles for 12·5mm bore flexible tubing
Overall dimensions	270 × 240 × 510mm high
Mass	7·5kg

With one cartridge of resin. For use on 200–250V a.c. supplies.

DCF-450-V Deioniser, B113 **£94·60**

SPARE PART

DCF-460-010L Resin cartridge **£42·35**



DCF-450

DEIONISER, *IONMISER* **Mark 2C,** bench mounting with mixed bed resin in expendable cartridge.

Technical data

Output	30 to 1000 litres of tap water depending on hardness
Flowrate	60 litres/hour
Supply pressure, maximum	500kN/m²
Average effluent quality	0·5μS
Effluent purity	0·05ppm silica 0 ppm carbon dioxide
Effluent pH	6·6 to 7
Water purity indicator	Battery operated
Outlet	Nozzle for free flow
Overall dimensions	165 × 220 × 395mm high
Mass	3·3kg

With expendable cartridge of resin.

DCF-570-W Deioniser, Mark 2C **£44·00**

SPARE PART

DCF-590-010F Resin cartridges Pack of 2 **£12·20**



DCF-570

DEIONISER, *IONMISER* **Mark 3C,** wall or bench mounting with expendable mixed bed resin in cartridge.

Technical data

Output	110 to 1300 litres of tap water depending on hardness
Flowrate	Up to 120 litres/hour
Supply pressure, maximum	345kN/m²
Average effluent quality	1μS
Effluent purity	0·05ppm silica 0 ppm carbon dioxide
Effluent pH	6·5 to 7
Water purity meter	Battery operated
Inlet	Hose with tap fitting provided
Outlet	Nozzle for free flow
Overall dimensions	280 × 230 × 500mm high
Mass	9kg

With dry battery and one cartridge of resin.

DCF-600-R Deioniser, Mark 3C **£75·90**
Resin charge *See DCF-640-010J*



DCF-600

RESIN REGENERATION FOR DEIONISERS DCF-380-Y AND DCF-450-V

For resin regeneration, the cartridge must be returned to the manufacturer from whom cartridge exchange vouchers are available. To ensure continuity of deionised water supplies, the initial purchase of a spare cartridge of resin is, therefore, recommended.



DCF-630

DEIONISER, *IONMISER* **Mark 6C,** wall or bench mounting with expendable mixed bed resin in cartridge.

Technical data

Output	200 to 3000 litres of tap water depending on hardness
Flowrate	120 litres/hour
Supply pressure, maximum	345 kN/m²
Average effluent quality	1 μS
Effluent purity	0·05 ppm silica 0 ppm carbon dioxide
Effluent pH	6·5 to 7
Water purity meter	Battery operated
Inlet	Hose with tap fitting provided
Outlet	Nozzle for free flow
Overall dimensions	280 × 220 × 700 mm high
Mass	14·5 kg

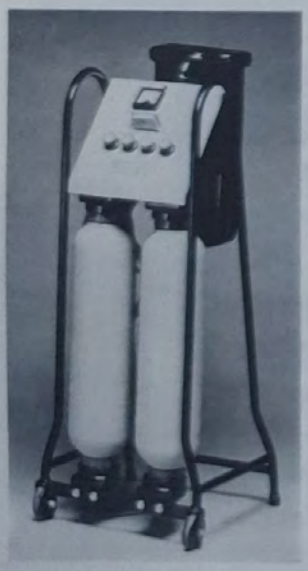
With dry battery and one cartridge of resin.

DCF-630-T Deioniser, Mark 6C **£110·00**

SPARE PARTS for DCF-600-R and DCF-630-T

Resin charges. For DCF-600-R one charge is sufficient for one complete regeneration of the cartridge and for DCF-630-T, two charges are required.

DCF-640-010J Resin charges Pack of 6 **£39·60**



DCF-670

DEIONISER, *IONMISER* **Mark 8,** twin column type, mounted on trolley. Can be regenerated *in situ*.

Technical data

Output	300 to 4000 litres of tap water depending on hardness
Flowrate	60 litres/hour
Supply pressure, maximum	345 kN/m²
Average effluent quality	5 to 10 μS
Effluent purity	0·2 ppm silica 0 ppm carbon dioxide
Effluent pH	8·5 to 9·5

The deioniser can be operated beyond the above output to produce water of lower quality, as follows:

Effluent quality	10 to 15 μS
Effluent purity	Silica and carbon dioxide as in raw water supply
Effluent pH	4·5 to 5·5
Water purity meter	Battery operated
Inlet	Hose with tap fitting provided
Outlet	Nozzle for free flow
Overall dimensions	420 × 460 × 1000 mm high 1500 mm high with regeneration support fitted
Mass	39 kg

With dry battery and resin.

DCF-670-X Deioniser, Mark 8 **£242·00**

DENSITY APPARATUS

DENSITY BOTTLES, *TECHNICO*, unadjusted with capillary stopper.

DCX-300-030N	Density bottles, 25ml	Pack of 5 **£6·75**
DCX-300-050H	Density bottles, 50ml	Pack of 5 **£7·09**

DENSITY BOTTLES, *TECHNICO*, BS 733, IP 190 Type I (b) and STPTC Schedule V 11. With inscription in permanent amber stain.

DCX-330-010V	Density bottle, 10ml	**£1·90**
DCX-330-030P	Density bottle, 25ml	**£2·07**
DCX-330-050J	Density bottle, 50ml	**£2·19**
DCX-330-070D	Density bottle, 100ml	**£3·22**

DENSITY BOTTLE, capacity 50ml, adjusted to within 5%, with thermometer 15 to 30 × 0·2°C and capped side arm.

DCX-360-D	Density bottle, 50ml	**£23·51**

DENSITY BOTTLE, conical shape, nominal capacity 50ml, with wide neck closed with ground glass disc, for use with viscous liquids such as syrups, etc.

DCX-400-X	Density bottle, 50ml	**£2·52**

DENSITY BOTTLE, *TECHNICO*, **Hubbard,** STPTC Schedule V12, capacity approximately 40ml.

DCX-430-Q	Density bottle, 40ml	**£4·60**

DENSITY BOTTLE, *TECHNICO*, **Armstrong,** nominal capacity 200ml, for rapid measurements of the volumes of irregular shaped solids. Comprises a wide neck stoppered bottle with a tubulure for connection to a burette. In use, the bottle is filled with water to a mark on the stem. The water is then sucked into the burette, the sample is placed in the bottle and the water allowed to return to the original mark. The difference in burette readings is the volume of the sample. **Without** burette.

DCX-460-S	Density bottle, 200ml	**£3·80**

DENSITY BOTTLES, *TECHNICO*, **Castell-Evans,** with stopper and cup.

DCX-490-030L	Density bottle, 25ml	**£3·57**
DCX-490-050F	Density bottle, 50ml	**£3·68**

DENSITY BOTTLE, *PYREX* **glass, Rees-Hugill,** BS 2701, for powdered and granular materials. Comprises 250ml flask with zero mark and neck graduated 2 to 2·7g/ml for 100g sample; the mass of sample can be varied for determinations in the range 1 to 5·4g/ml.

DCX-520-P	Density bottle, 250ml	**£16·22**

DENSITY BOTTLE, *TECHNICO*, **Reischauer,** capacity approximately 50ml, with 20mm scale on neck and 10/13 stopper.

DCX-550-R	Density bottle, 50ml	**£3·57**

PYKNOMETERS, *TECHNICO*, **Lipkin,** IP 189, subdivided in millimetres on each limb.

DCX-590-010J	Pyknometer, 0·25ml	**£5·31**
DCX-590-050U	Pyknometer, 1ml	**£5·82**
DCX-590-070X	Pyknometer, 5ml	**£6·07**
DCX-590-090Y	Pyknometer, 10ml	**£6·33**

PYKNOMETER, Nicol, capacity approximately 10ml.

DCX-620-H	Pyknometer, 10ml	**£1·45**

PYKNOMETER, *TECHNICO*, **Sprengel,** capacity approximately 25ml, with two ground-on caps.

DCX-650-J	Pyknometer, 25ml	**£5·82**



DCX-300



DCX-360



DCX-400



DCX-430



DCX-460



DCX-490



DCX-520



DCX-550



DCX-590



DCX-620



DCX-650



DCX-720

DENSITY BALANCE, Westphal, for the measurement of liquid densities up to 2·0999. With glass plummet which displaces 5g of distilled water at 15°C and has integral thermometer, range 10 to 30 × 1°C. In fitted wood case together with 60ml glass cylinder, platinum wire suspension, five rider masses and instructions.

DCX-720-W	Density balance	**£63·84**

SPARE PART

DCX-740-010F	Plummet, with suspension wire and hook. (F)	**£16·93**

Gallenkamp

DESICCATORS



DES-220

DESICCATORS, borosilicate glass, with knob cover and perforated metal disc.

Top internal dia., mm		135	200
Disc dia., mm		115	180
Depth of disc below flange, mm		65	85
DES-220-030M	Desiccator, 135mm		**£5·70**
DES-220-050G	Desiccator, 200mm		**£10·94**

SPARE PARTS

DES-230-030F	Cover, for 135mm desiccator	**£3·04**
DES-230-050W	Cover, for 200mm desiccator	**£6·10**
	Discs	*See DES-640*

DESICCATORS, borosilicate glass, as DES-220 but vacuum pattern with ground-in interchangeable stopcock in cover.

Top internal dia., mm		135	200
Disc dia., mm		115	180
Depth of disc below flange, mm		65	85
Joint size		24/29	29/32
DES-260-030H	Desiccator, 135mm		**£11·17**
DES-260-050B	Desiccator, 200mm		**£19·42**

SPARE PARTS

	Cover, for 135mm desiccator, without stopcock.	
DES-270-030A	Cover, 24/29	**£4·05**
	Cover, for 200mm desiccator, without stopcock.	
DES-270-050R	Cover, 29/32	**£9·00**
DES-270-130T	Stopcock, 24/29	**£4·19**
DES-270-150N	Stopcock, 29/32	**£5·70**
	Discs	*See DES-640*



DES-260

DESICCATOR, borosilicate glass, with knob cover and perforated metal disc. Top internal diameter 250mm, disc diameter 240mm, depth of disc below flange 130mm. (F)

DES-310-U	Desiccator, 250mm	**£15·53**

SPARE PARTS

DES-320-010K	Cover (F)	**£5·40**
	Disc	*See DES-640-110X*

DESICCATOR, borosilicate glass, as DES-310-U but vacuum pattern with ground-in interchangeable stopcock joint size 29/32 in cover. (F)

DES-350-P	Desiccator	**£26·16**

SPARE PARTS

DES-360-010F	Cover, without stopcock (F)	**£7·88**
	Disc	*See DES-640-110X*
	Stopcock	*See DES-270-150N*



DES-310

DESICCATORS, *PYREX* **glass,** with knob cover and perforated metal disc.

Top internal dia., mm		165	220
Disc dia., mm		150	200
Depth of disc below flange, mm		86	114
DES-410-030D	Desiccator, 165mm		**£8·34**
DES-410-050U	Desiccator, 220mm		**£12·77**

DESICCATORS, *PYREX* **glass,** as DES-410 but vacuum pattern with ground-in interchangeable stopcock in cover.

Top internal dia., mm	165	220
Disc dia., mm	150	200
Depth of disc below flange, mm	86	114
Joint size	24/29	34/35

DES-430-030M Desiccator, 165mm **£13·72**
DES-430-050G Desiccator, 220mm **£18·40**


DES-430

SPARE PARTS

Cover, for 165mm desiccator, without stopcock.
DES-450-030V Cover, 24/29 **£8·57**
Cover, for 220mm desiccator, without stopcock.
DES-450-050P Cover, 34/35 **£11·02**
DES-450-130R Stopcock, 24/29 **£3·43**
DES-450-150L Stopcock, 34/35 **£3·71**
Discs *See DES-640*

DESICCATOR, *PYREX* **glass, BLWA pattern,** vacuum type, with interchangeable collar stopcock, joint size 29/32, fitted to cover and with acid tray. Top internal diameter 290mm, depth of tray below flange 70mm. **Without** disc or plate.
DES-480-J Desiccator **£23·55**


DES-480

SPARE PARTS

DES-490-030Q Cover, without collar stopcock **£14·18**
DES-490-050K Collar stopcock **£1·23**
DES-490-070E Acid tray **£3·02**

ACCESSORIES

DES-490-510C Porcelain plate, 255mm diameter **£11·32**

DESICCATORS, plastics, vacuum pattern, suitable for pressures down to 5 torr. With transparent polycarbonate cover, and polypropylene base and desiccant tray. An elastomer ring located in an annular groove in the flange is compressed by the cover and forms a seal without the use of grease. The dimension given is the top internal diameter. (F)
DES-560-030G Desiccator, 150mm **£12·65**
DES-560-050A Desiccator, 200mm **£18·43**
DES-560-070R Desiccator, 250mm **£24·75**


DES-560

DESICCATOR ACCESSORIES

DESICCATOR DISCS, perforated metal.
DES-640-030M Desiccator discs, 115mm dia. Pack of 3 **£1·96**
DES-640-050G Desiccator discs, 150mm dia. Pack of 3 **£2·54**
DES-640-070A Desiccator discs, 180mm dia. Pack of 3 **£3·22**
DES-640-090R Desiccator discs, 200mm dia. Pack of 3 **£3·26**
DES-640-110X Desiccator discs, 240mm dia. Pack of 3 **£3·99**


DES-640

DESICCATOR GUARD, polythene coated steel with slightly tapered sides. Internal dimensions 350mm top diameter × 450mm base diameter × 260mm high.
DES-690-J Desiccator guard **£12·29**

DESICCANT, silica gel, self indicating.
DES-710-L Desiccant Bottle of 500g **£1·41**


DES-690

Gallenkamp DESICCATOR CABINET

For desiccating, storing, UV and ethylene oxide sterilising, plant growth, conditioning at controlled relative humidity in the presence of saturated salt solutions and many other applications



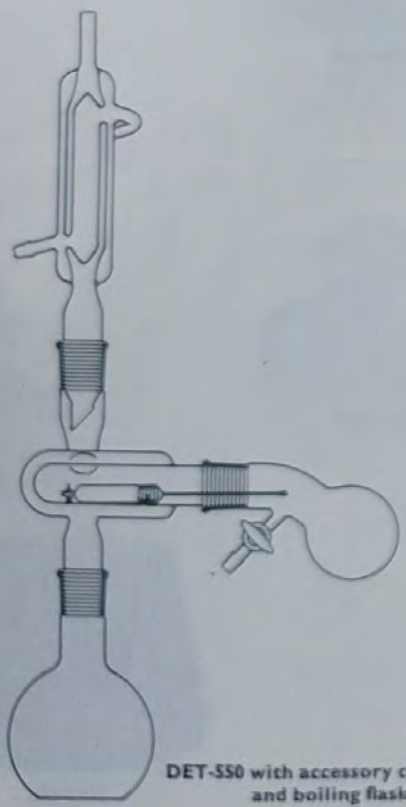
DES-770

- **Material easily cut, drilled or replugged for special modifications and requirements**
- **Excellent all-round visibility, combined with robustness and high quality finish**
- **Perspex permits both external UV and visible light irradiation and external magnetic stirring if required**
- **Good air tightness ensured by Neoprene door gasket compressed by snap-fastening door catches**

DESICCATOR CABINET, *GALLENKAMP*, clear Perspex, with hinged door fitted with Neoprene gasket and with external lugs for stacking of one cabinet on another. One plated 12·5mm wire grid shelf is supplied together with two desiccant trays, 300 × 150 × 50mm deep, which may both be placed on the base of the cabinet below the shelf or one may be placed on supports 125mm from the top and used as a shelf. Overall dimensions 350 × 345 × 380mm high. Complete with instructions.

DES-770-P Desiccator cabinet **£55·13**

SEMI-MICRO DESICCATOR



DET-550 with accessory condenser and boiling flask

DESICCATOR, semi-micro, constant temperature vacuum pistol pattern, for drying temperature sensitive substances in the presence of a drying agent.

The drying chamber is surrounded by a vapour jacket and contains a weighing tube able to accommodate boats up to 33mm long. The tube, 8 to 9mm i.d., has a loop at the closed end, two feet and a long handled ground-in stopper to enable it to be hooked on to an ear in the drying chamber and opened and closed while in position. Connections to the drying agent flask, boiling flask and condenser are by 29/32 joints. With drying agent flask having vacuum control stopcock but **without** boiling flask and condenser.

DET-550-M Desiccator, semi-micro **£18·00**

SPARE PARTS

DET-560-030T	Drying chamber with vapour jacket	£5·63
DET-560-050N	Drying agent flask	£6·05
DET-560-070H	Weighing tube	£6·30

ACCESSORIES

Condenser, Davies double surface	*See CRN-470-E*
Flask, boiling, flat bottom	*See QFT-240-X*
Stopper, for closure of drying agent flask	*See QTE-130-C*

Gallenkamp HEATED VACUUM DESICCA

For heating materials, under vacuum and in the presence of a drying agent, in the range 50 to 15

- **Borosilicate glass heater tube**
- **Energy regulator temperature control**
- **Temperature indication by placing accessory thermometer in drying tube**



DET-670

DESICCATOR, *GALLENKAMP*, **vacuum type,** electrically heated, with borosilicate glass drying tube 600 × 40mm, end caps with 40/38 socket, double bore stopcock, desiccant boat, heater tube, control box and instructions. For 220–240V a.c. single phase supplies.

DET-670-N	Desiccator	**£91-13**

SPARE PARTS

DET-680-030U	Drying tube, with stopcock	**£13-05**
DET-680-050X	End cap	**£2-03**
DET-680-070Y	Desiccant boat	**£2-39**
DET-680-090C	Heater tube, wound	**£10-80**
DET-680-110W	Heater jacket	**£4-94**

ACCESSORIES

Apiezon grease	*See LUB-540-T*
Desiccant, silica gel	*See DES-710-L*
Thermometer, 0 to 200°C	*See THL-210-070N*

DIALYSIS TUBING

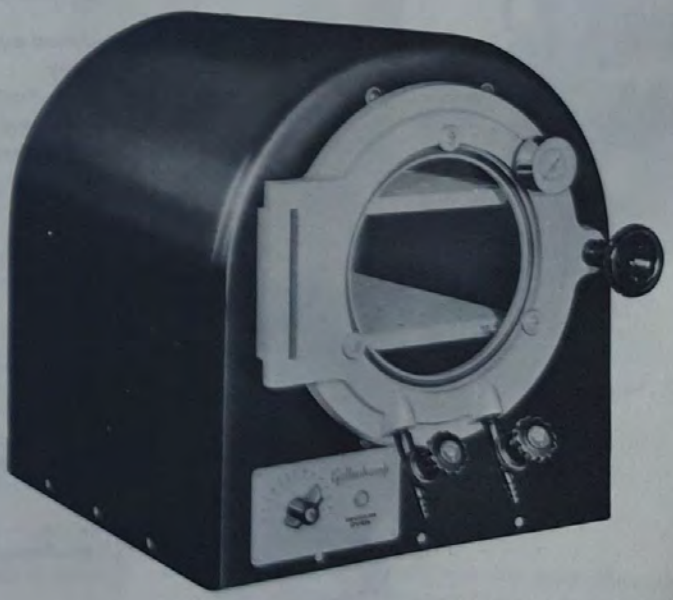
Inflated diameters 6 to 82mm

See PJC-400

Gallenkamp VACUUM OVENS, 150°C

For accelerated batch drying or for preventing decomposition of heat sensitive materials without loss of drying speed
With uses in chemical, biological, pharmaceutical and other fields

- **Two sizes available**
- **All controls built-in**
- **Diaphragm vacuum valves**
- **Vacuum gauge range 0 to 760 torr**
- **Fitted thermometer**



See OVL-600

Gallenkamp

DEWAR VACUUM VESSELS

All capacities and dimensions quoted are approximate



DFH-300

DEWAR VACUUM VESSELS, cylindrical, silvered borosilicate glass.

Capacity, ml	250	370	600	1150
Int. depth × dia., mm	200 × 40	200 × 50	150 × 75	300 × 71

DFH-300-010Y	Dewar vessel, 250 ml	**£3·93**
DFH-300-030C	Dewar vessel, 370 ml	**£6·05**
DFH-300-050T	Dewar vessel, 600 ml	**£7·16**
DFH-300-070N	Dewar vessel, 1150 ml	**£8·36**

DEWAR VACUUM FLASK, cylindrical, silvered glass in plastics container with screw stopper and moulded cap.

Capacity, ml	450	1000
Int. depth × neck dia., mm	170 × 28	200 × 39

DFH-340-010D	Vacuum flask, 450 ml	**£1·06**
DFH-340-030U	Vacuum flask, 1000 ml	**£1·73**

SPARE PARTS

DFH-350-010T	Inner vessel, 450 ml	**£0·75**
DFH-350-030N	Inner vessel, 1000 ml	**£1·20**



DFH-340

DEWAR VACUUM JAR, robust and designed for laboratory use. Comprises a cylindrical, wide mouth, silvered borosilicate glass vessel in polypropylene container giving a high degree of protection against breakage. Container fitted with carrying handle and push-on vented cap.

Capacity, litres	1	4·5
Int. depth × dia., mm	185 × 85	280 × 150

DFH-390-010X	Vacuum jar, 1 litre	**£8·35**
DFH-390-030Y	Vacuum jar, 4·5 litres	**£16·76**

SPARE PARTS

DFH-400-010A	Inner vessel, 1 litre	**£3·61**
DFH-400-030R	Inner vessel, 4·5 litres	**£9·46**



DFH-390

DEWAR VACUUM VESSEL, for the storage of liquid nitrogen. Comprises stainless steel inner and mild steel outer vessels with the interspace evacuated and insulated. With aluminium cap and plastics neck plug.

Technical data

Capacity	25 litres
Loss rate, liquid nitrogen	1 litre/24 hours
Neck diameter	50 mm
Overall dimensions	510 mm diameter × 600 mm high
Mass, empty	13·5 kg
Mass, full	35 kg approximately

DFH-500-S	Vacuum vessel, 25 litres	**£208·58**



DFH-500

LOW TEMPERATURE CABINETS

- **For operation at temperatures down to −40°C and −70°C**
- **Capacities 260 and 370 litres**

See RFP-650-D et seq.

DIGESTION BOMB

For dissolving silicates, rocks and refractory materials in hydrofluoric and other strong mineral acids at temperatures up to 150°C without volatilisation losses and at internal pressures up to 7800kN/m² (80kgf/cm²).

DIGESTION BOMB, comprising removable 25ml PTFE cup, 30mm internal diameter × 36mm deep, fitted with a cover in a metal bomb. The bomb is sealed by hand tightening a metal cap and the closure is spring loaded to remain gas tight during the heating and cooling periods. Overall dimensions 67mm diameter × 97mm high, net mass 970g. (F)

DGW-300-L Digestion bomb **£151·22**



DGW-300

SPARE PART

DGW-320-010R Cup, with cover (F) **£32·63**
Ovens, to heat DGW-300-L *See OVH-200*

DILUTER

For the automatic dilution of liquid samples. With motor driven glass/PTFE diluent syringe and fluorocarbon valve and sample syringe. Sample and diluent are discharged in turn through the delivery tube. With pushbutton control for single cycle operation and adapter for foot switch accessory. Inlet nozzle requires 3mm bore thin wall flexible tubing.

Technical data

Sample syringe capacity	0·02 to 0·5ml
Diluent syringe capacity	10ml maximum
Delivery rate	Up to 10/minute
Reproducibility	±1%
Overall dimensions	160 × 120 × 170mm high
Mass	4·5kg

For 220–240V 50Hz single phase supplies.

DHL-300-S Diluter **£143·00**



DHL-300

ACCESSORY

PVC tubing, 3mm bore *See TWR-670*

DISHES

DISHES, PETRI, expendable, clear polystyrene, biologically inert and having an excellent uniform finish. May be used for standard culturing techniques and then discarded, so dispensing with the usual washing, autoclaving and storage procedures and eliminating the high running costs of replacing broken glass Petri dishes. The lids are slightly recessed for stacking.

Diameter, mm	50	90	
Depth including lid, mm	13	15	
DHP-220-030J	Dishes, Petri, 50mm		Pack of 10 **£0·30**
DHP-220-032F	Dishes, Petri, 50mm		Pack of 700 **£14·52**
DHP-220-050D	Dishes, Petri, 90mm		Pack of 10 **£0·34**
DHP-220-052W	Dishes, Petri, 90mm		Pack of 500 **£11·61**



DHP-220
DHP-250

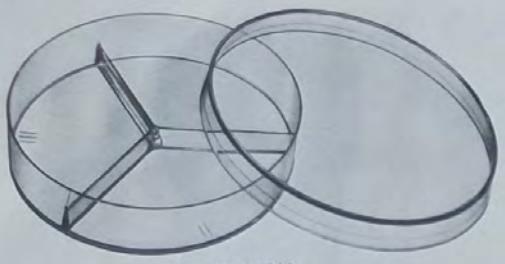
DISHES, PETRI, expendable, water wettable, non-toxic clear polystyrene, 50mm diameter. Both components are precision moulded and the lid rests closely on the dish giving an almost airtight closure. (F)

DHP-250-030L Dishes, Petri, 50mm Pack of 10 **£0·70**
DHP-250-032H Dishes, Petri, 50mm Pack of 700 **£29·15**

DISHES, PETRI, as DHP-250 but with spacers moulded on underside of lid, for use where tight closure is not required. (F)

DHP-280-030N Dishes, Petri, 50mm Pack of 10 **£0·70**
DHP-280-032J Dishes, Petri, 50mm Pack of 700 **£29·15**

Continued overleaf



DHP-310

DISHES, PETRI, expendable, clear polystyrene, 90mm diameter with base subdivided into three equal compartments.

DHP-310-050C	Dishes, Petri, 90mm	Pack of 10 **£0·61**
DHP-310-052V	Dishes, Petri, 90mm	Pack of 500 **£18·04**

DISHES, PETRI, resistance glass, lower dish 95 × 15mm, lid 100 × 12mm. (F)

DHP-430-030J	Dish, Petri	**£0·42**
DHP-430-032F	Dishes, Petri	Pack of 72 **£22·50**



DHP-430
DHP-460

DISHES, PETRI, *PYREX* **glass,** dish height 18mm.

Dish dia., mm	52	63	70
Cover dia., mm	57	70	76
Dish dia., mm	95	115	141
Cover dia., mm	101	122	149

DHP-460-030L	Dish, Petri, 52mm	**£0·77**
DHP-460-032H	Dishes, Petri, 52mm	Pack of 72 **£46·00**
DHP-460-040Y	Dish, Petri, 63mm	**£0·77**
DHP-460-042E	Dishes, Petri, 63mm	Pack of 72 **£46·00**
DHP-460-050F	Dish, Petri, 70mm	**£0·83**
DHP-460-052B	Dishes, Petri, 70mm	Pack of 72 **£49·68**
DHP-460-060C	Dish, Petri, 95mm	**£1·00**
DHP-460-062V	Dishes, Petri, 95mm	Pack of 72 **£60·26**
DHP-460-070W	Dish, Petri, 115mm	**£1·40**
DHP-460-072S	Dishes, Petri, 115mm	Pack of 24 **£24·85**
DHP-460-080T	Dish, Petri, 141mm	**£1·50**
DHP-460-082P	Dishes, Petri, 141mm	Pack of 24 **£32·72**

Petri dish illuminator — See *CNW-610-H*
Labelling tape, self adhesive, legend 'STERILE' — See *LAB-780-L*
Sterilising box, for resistance glass Petri dishes — See *SNV-730-N*



DHP-540

DISHES, REPLI, disposable plastics, supplied sterile packed in polythene bags of four dishes. Each dish is 100mm square, is divided into 25 separate compartments and has a drop-on cover. Easily filled with solid or liquid media. Twenty-five individual tests can be carried out in one dish. The lid fits in two positions, raised for more aeration and less condensation, lowered to reduce gaseous diffusions to neighbouring compartments and to reduce evaporation, thus allowing greater incubation time. One corner has a matt finish for identification. The dish is also applicable to the preparation of small quantities of serial dilutions under sterile conditions.

DHP-540-D	Dishes, Repli	Pack of 120 **£17·56**

OTHER DISHES

Basins — *See BHT-340 et seq.*
Dissecting — *See DKB-360 et seq.*
Photographic — *See PIH-620 et seq.*

DISPENSERS



DHT-300

DISPENSERS, *E-MIL* **PRESSMATIC,** for the rapid dispensing of preset volumes of liquid. The liquid contacts only glass and chemically inert plastics.

Comprises a syringe pump mounted on a 1 litre glass reservoir bottle. The syringe delivers when the plunger is depressed and refills automatically when the plunger is released. The volume dispensed is set by a simple screw clamp and suck-back is prevented by a glass non-return valve.

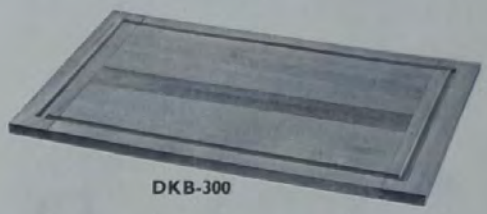
DHT-300-010E	Dispenser, 5ml	**£30·60**
DHT-300-030V	Dispenser, 10ml	**£30·60**

DISSECTING EQUIPMENT

BOARDS, DISHES AND SPECIMEN HOLDING ACCESSORIES

BOARDS, dissecting, selected timber. Dissecting awls can be pressed in without hammering. With channel round the edge of board to collect liquids. Dimensions given are length × width.

DKB-300-030H	Board, 450 × 300 mm	**£6·19**
DKB-300-050B	Board, 560 × 380 mm	**£6·58**


DKB-300

DISHES, dissecting, aluminium, with smooth flange. Dimensions given are length × width × depth.

DKB-360-030L	Dish, 286 × 229 × 44 mm	**£1·20**
DKB-360-050F	Dish, 362 × 289 × 57 mm	**£2·18**
DKB-360-070W	Dish, 413 × 327 × 57 mm	**£3·00**


DKB-360

DISHES, dissecting, stainless steel, with rim. Dimensions given are length × width × depth.

DKB-390-030N	Dish, 286 × 229 × 44 mm	**£4·25**
DKB-390-050H	Dish, 311 × 248 × 51 mm	**£4·77**
DKB-390-070B	Dish, 362 × 289 × 57 mm	**£5·70**
DKB-390-090S	Dish, 467 × 359 × 67 mm	**£8·64**


DKB-390

DISHES, dissecting, *PYREX* **glass,** with rim. Dimensions given are length × width × depth.

DKB-430-030B	Dish, 265 × 165 × 50 mm	**£1·60**
DKB-430-050S	Dish, 265 × 265 × 50 mm	**£2·21**


DKB-430

Instrument tray *See BHT-930-Y*

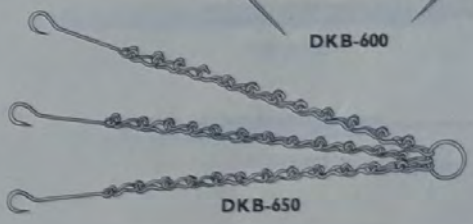
DISSECTING AWLS, in metal handle, for pegging out specimens. Overall length 70 mm.

DKB-600-P	Dissecting awls	Pack of 5 **£1·08**


DKB-600

CHAIN HOOKS, nickel plated steel, for stretching tissue during dissection. Length 150 mm from end of hook to centre of ring. Set of three hooks on one ring.

DKB-650-D	Chain hooks	Set **£0·80**


DKB-650

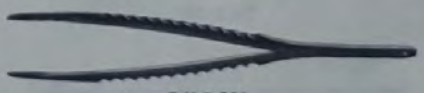
DISSECTING WAX, black. Adheres well to sides of dishes.

DKB-700-H	Dissecting wax	Pack of 3 kg **£4·12**

FORCEPS

FORCEPS, nylon, reinforced, with blunt tips. Length 125 mm. Sterilisable up to 121 °C. (F)

DKC-300-G	Forceps, 125 mm	Pack of 10 **£0·73**


DKC-300

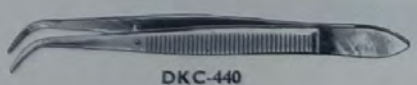
FORCEPS, stainless steel, straight, with fine points and guide pin.

DKC-370-030R	Forceps, 115 mm	**£1·58**
DKC-370-050L	Forceps, 125 mm	**£1·58**
DKC-370-070F	Forceps, 150 mm	**£1·77**


DKC-370

FORCEPS, stainless steel, curved, with fine points and guide pin. Length 125 mm.

DKC-440-Q	Forceps, 125 mm	**£1·86**


DKC-440

FORCEPS, stainless steel, straight, with blunt tips. Length 125 mm.

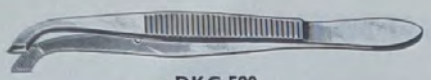
DKC-510-G	Forceps, 125 mm	**£1·58**


DKC-510

FORCEPS, stainless steel, Boley pattern, with fine points. Length 125 mm.

DKC-550-B	Forceps, 125 mm	**£1·46**


DKC-550



DKC-590



DKC-620



DKC-660



DKC-700



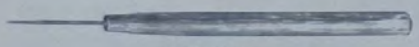
DKC-740



DKC-770



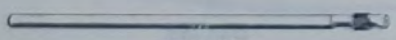
DKC-850



DKD-330



DKD-370



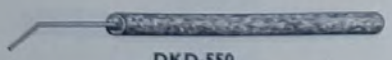
DKD-430



DKD-440



DKD-500



DKD-550

FORCEPS, entomological, stainless steel, with curved ends and broad, side meeting jaws and guide pin. Length 115mm.
DKC-590-T Forceps, 115mm **£2·57**

FORCEPS, feather light, stainless steel, for handling delicate specimens such as mosquito larvae, insect genitalia, etc. Length 110mm. (F)
DKC-620-X Forceps, 110mm **£1·88**

FORCEPS, specimen, stainless steel, with flattened serrated jaws, for removing items from sterilisers or jars. Length 290mm. (F)
DKC-660-J Forceps, 290mm **£3·54**

FORCEPS, storkbill, stainless steel, with long slender points for handling microscopic specimens. Length 110mm. (F)
DKC-700-U Forceps, 110mm **£1·72**

FORCEPS, Treve's rat tooth, stainless steel. Length 125mm.
DKC-740-P Forceps, 125mm **£2·42**

FORCEPS, watchmakers', stainless steel, with very fine points. Length 110mm. (F)
DKC-770-R Forceps, 110mm **£4·20**

MIRROR, inspection. Flat circular mirror 25mm diameter in metal housing with 140mm length handle.
DKC-850-A Mirror, 25mm **£1·09**

NEEDLES, SECTION LIFTERS AND SEEKERS

NEEDLES, stainless steel, length 35mm, in stainless steel handle.
DKD-330-V Needles, 35mm Pack of 5 **£1·74**

NEEDLES, Borradaile, with lancet point, in hardwood handle. Overall length 125mm.
DKD-370-Q Needles, 125mm Pack of 20 **£1·58**

NEEDLE HOLDER, with brass slotted chuck and light alloy handle. Approximate length 200mm. Suitable for dissecting needles and also for culture inoculation wire or flame test platinum wire. Will accept needle or wire up to 0·635mm diameter.
DKD-430-N Needle holder Pack of 5 **£1·89**

NEEDLES, steel, straight, to fit needle holder DKD-430-N.
DKD-440-G Needles Pack of 12 **£0·93**

SECTION LIFTER, stainless steel, blade length approximately 55mm.
DKD-500-D Section lifter **£0·53**

SEEKERS, with bent stainless steel probe, length 35mm, in metal handle.
DKD-550-X Seekers, 35mm Pack of 5 **£1·70**

SEEKERS, similar to DKD-550-X but all stainless steel.
DKD-570-A Seekers, 35mm Pack of 5 **£1·58**

SCALPELS, DISPOSABLE

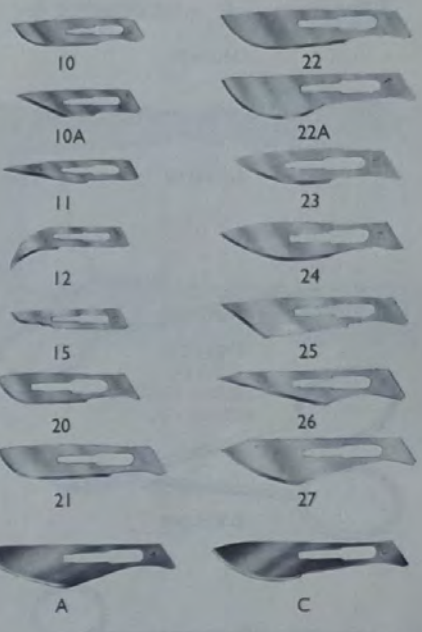
SCALPELS, disposable, with stainless steel blade fixed in moulded polystyrene handle with integral, hinged blade guard. Packed individually in sterile, peel open foil sachets.

Blade No.	10	E/11	15	20	21
Length cutting edge, mm	25	15	10	25	30
Blade No.	22	B/23	24	A	C
Length cutting edge, mm	40	25	30	30	30

DKF-300-030N	Scalpels, No. 10	Pack of 10 **£1·69**
DKF-300-050H	Scalpels, No. E/11	Pack of 10 **£1·69**
DKF-300-070B	Scalpels, No. 15	Pack of 10 **£1·69**
DKF-300-090S	Scalpels, No. 20	Pack of 10 **£1·69**
DKF-300-110P	Scalpels, No. 21	Pack of 10 **£1·69**
DKF-300-130J	Scalpels, No. 22	Pack of 10 **£1·69**
DKF-300-150D	Scalpels, No. B/23	Pack of 10 **£1·69**
DKF-300-170U	Scalpels, No. 24	Pack of 10 **£1·69**
DKF-300-190X	Scalpels, No. A	Pack of 10 **£1·69**
DKF-300-210L	Scalpels, No. C	Pack of 10 **£1·69**



DKF-300



Blade Nos. and shapes for DKF-300, DKF-350 and DKF-420

SCALPELS, DISPOSABLE BLADE

SCALPEL BLADES, disposable, BS 2982, carbon steel.

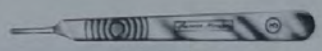
Blade No.	10	10A	11	12	15
Length cutting edge, mm	25	15	20	15	15

DKF-350-030B	Scalpel blades, No. 10	Pack of 5 **£0·16**
DKF-350-050S	Scalpel blades, No. 10A	Pack of 5 **£0·16**
DKF-350-070M	Scalpel blades, No. 11	Pack of 5 **£0·16**
DKF-350-090G	Scalpel blades, No. 12	Pack of 5 **£0·16**
DKF-350-110D	Scalpel blades, No. 15	Pack of 5 **£0·16**

ACCESSORIES

Scalpel blade holders, nickel plated.

DKF-380-030D	Holder, No. 3	**£0·68**
DKF-380-050U	Holder, No. 5	**£0·68**

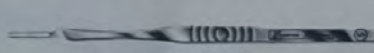


DKF-380-030

SCALPEL BLADES, disposable, BS 2982, carbon steel.

Blade No.	20	21	22	22A	23
Length cutting edge, mm	30	35	40	35	30
Blade No.	24	25	26	27	
Length cutting edge, mm	35	15	35	25	

DKF-420-030X	Scalpel blades, No. 20	Pack of 5 **£0·16**
DKF-420-050Y	Scalpel blades, No. 21	Pack of 5 **£0·16**
DKF-420-070C	Scalpel blades, No. 22	Pack of 5 **£0·16**
DKF-420-090T	Scalpel blades, No. 22A	Pack of 5 **£0·16**
DKF-420-110Q	Scalpel blades, No. 23	Pack of 5 **£0·16**
DKF-420-130K	Scalpel blades, No. 24	Pack of 5 **£0·16**
DKF-420-150E	Scalpel blades, No. 25	Pack of 5 **£0·16**
DKF-420-170V	Scalpel blades, No. 26	Pack of 5 **£0·16**
DKF-420-190P	Scalpel blades, No. 27	Pack of 5 **£0·16**

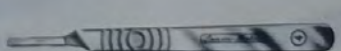


DKF-380-050

ACCESSORY

Scalpel blade holder, nickel plated, No. 4.

DKF-450-C	Holder, No. 4	**£0·68**



DKF-450

SCALPEL SET, *SWANN-MORTON.* Slotted plastics handle with clamping screw to grip blade. Complete in box with blades Nos. 1 and 2.

DKF-500-G	Scalpel set	**£0·19**



DKF-500

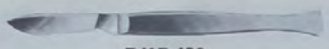
SPARE PARTS AND ACCESSORIES

DKF-520-030G	Blades, No. 1, straight	Pack of 50 **£1·50**
DKF-520-050A	Blades, No. 2, convex	Pack of 50 **£1·50**
DKF-520-070R	Blades, No. 3, concave	Pack of 50 **£1·50**



DKF-520

Gallenkamp



DKF-630



DKF-660



DKF-680



DKF-710

SCALPELS, FIXED BLADE

SCALPELS, stainless steel blade and stainless steel handle. Dimension given is the blade length.

DKF-630-030X	Scalpel, 38mm	£1·35
DKF-630-050Y	Scalpel, 45mm	£1·35
DKF-630-070C	Scalpel, 54mm	£1·35

STROP, leather, 500mm long, with hanging ring. (F)

DKF-660-C	Strop	£3·58

CARTILAGE KNIFE, high quality stainless steel blade and handle. Blade length 83mm.

DKF-680-L	Cartilage knife	£7·72

SCALPEL SHARPENER. Shaped carborundum stone 75 x 35 x 15mm, with wood handle.

DKF-710-G	Scalpel sharpener	£1·64



DKH-230



DKH-300



DKH-340



DKH-390



DKH-430



DKH-520

SCISSORS

SCISSORS, stainless steel, straight, with fine points and open shanks. Dimension given is the overall length.

DKH-230-030D	Scissors, 115mm	£2·15
DKH-230-050U	Scissors, 125mm	£2·40
DKH-230-070X	Scissors, 150mm	£3·12

SCISSORS, stainless steel, curved, with fine points and open shanks. Length 125mm.

DKH-300-C	Scissors, 125mm	£3·24

SCISSORS, stainless steel, straight, with blunt, rounded blades and closed shanks. Length 125mm.

DKH-340-U	Scissors, 125mm	£2·67

SCISSORS, probing, stainless steel, with straight blades, one finely pointed, the other enlarged to form a rounded probe at the end. Closed straight shanks. Length 125mm.

DKH-390-Y	Scissors, 125mm	£4·50

BONE CUTTERS, nickel plated carbon steel with sprung handles and closing clip. Blade length 20mm. (F)

DKH-430-T	Bone cutters	£5·40

SECTION CUTTING EQUIPMENT

SECTION CUTTING RAZORS, carbon steel, with blade hollow ground on one surface and flat ground on the other. Blade length 75mm.

DKH-520-010P	Section razor, right hand	£2·90
DKH-520-030J	Section razor, left hand	£3·26



DKH-550

OILSTONE, carborundum, fine grade, 200 x 50 x 25mm high, for honeing razors or scalpels.

DKH-550-U	Oilstone	£4·25



DKH-600

HAND MICROTOME. Sample to be sectioned is supported in styropith or other material and placed in a central well. Turning a milled knob at the base of the microtome raises the sample and sections can be cut from the top using a razor. Screw has 19mm overall movement with click stops at 20 μm intervals. Top diameter 63mm, well diameter 22mm.

DKH-600-B	Hand microtome	£9·84

STYROPITH, support material for section cutting by hand. Sticks approximately 110 x 20 x 13mm.

DKH-630-D	Styropith	Pack of 25 £0·47

DISSECTING SETS

Unless otherwise specified, instruments are of stainless steel

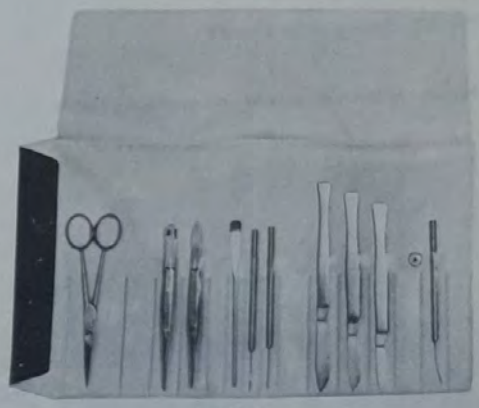
WALLET, tough welded plastics, for the storage of dissecting instruments. With pockets, flap and tie fastening.

DKJ-300-F Wallet **£0·80**

DISSECTING SET in plastics wallet, comprising:

1 Forceps, 125mm, straight, fine points
1 Forceps, 125mm, straight, blunt tips
2 Needles, stainless steel in metal handle
1 Section lifter
1 Seeker, stainless steel in metal handle
1 Scalpel, blade length 38mm
1 Scalpel, blade length 45mm
1 Scalpel, blade length 54mm
1 Scissors, 125mm, straight, fine points.

DKJ-330-H Dissecting set Set **£4·78**

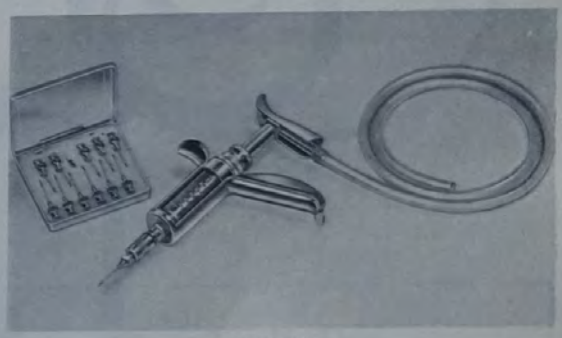


DKJ-330
DKJ-370 and DKJ-410 are similar

DISSECTING SET, in plastics wallet, comprising:

6 Dissecting awls, stainless steel in metal handle
1 Forceps, 125mm, straight, fine points
1 Forceps, 125mm, straight, blunt tips
2 Needles, stainless steel in metal handle
2 Seekers, stainless steel in metal handle
5 Scalpel blades No. 10
5 Scalpel blades No. 10A
2 Scalpel blade holders, nickel plated
1 Scissors, 125mm, curved, fine points.

DKJ-370-C Dissecting set Set **£4·87**



DKL-290

DISSECTING SET, in plastics wallet, comprising:

1 Forceps, 125mm, straight, fine points
1 Forceps, 125mm, curved, fine points
1 Forceps, 125mm, straight, blunt tips
2 Needles, stainless steel
1 Section lifter
1 Seeker
1 Scalpel, blade length 38mm
1 Scalpel, blade length 45mm
1 Scalpel, blade length 54mm
1 Scissors, 115mm, straight, fine points
1 Scissors, 125mm, straight, fine points
1 Scissors, 125mm, curved, fine points
1 Section cutting razor, carbon steel.

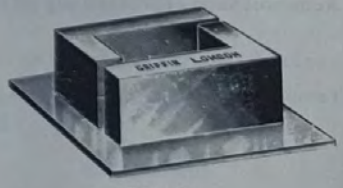
DKJ-410-N Dissecting set Set **£8·47**

AUTOMATIC SYRINGE, 5ml, for large volume injections, rapid repeat injections and automatic dispensing. Cast alloy body with trigger grip and plastics barrel, working parts stainless steel. Piston stem graduated 0 to 5ml. As trigger is squeezed, syringe contents are ejected and a fresh supply is drawn in. An adjustable stop facilitates rapid and accurate repeat doses. With 12 Luer No. 18 needles and needle locking collar. (F)

DKL-290-W Automatic syringe **£19·13**

SPARE PARTS

DKL-310-010V Needles Pack of 12 **£2·81**



DKL-450

EMBEDDING MOULD, Leukarts, for casting blocks up to 44 × 37 × 20mm. Comprises a pair of L-shaped mould walls with a metal baseplate, to retain wax when embedding specimens.

DKL-450-L Embedding mould Pair **£1·92**

Gallenkamp

Griffin OXYGEN METER

- For laboratory or field work
- Measures both dissolved and gaseous oxygen
- Direct reading



DOS-210

Can be used for experiments on human respiratory exchanges, animal respiration and plant photosynthesis in the laboratory and for determination of oxygen in fresh waters, brackish waters, sea waters and soil atmospheres in the field.

The instrument is battery operated and housed in a robust metal case 150 × 100 × 80mm high. It has a meter, switch with OFF, BATTERY TEST and ON positions, CALIBRATE control, 4mm sockets for connection to an external recorder and a coaxial socket for connection of the probe. The meter is scaled 0 to 100 × 2% for measuring the percentage oxygen in water and 0 to 30 × 1% for measurements in air.

The probe is connected to the instrument by 1 m of coaxial cable and will operate within a temperature range of 5 to 35°C. It consists of a central platinum cathode with a silver-silver chloride reference anode immersed in a saturated potassium chloride solution. The electrolyte is contained by a thin polythene membrane which is permeable to oxygen.

Supplied with comprehensive handbook by George Wigglesworth, Matlock College of Education, Nuffield Secondary Science Development team member. The handbook includes suggested investigations and specimen results together with operating instructions.

OXYGEN METER, *GRIFFIN*, as specified, with probe, polythene for spare membranes and comprehensive handbook but **without** case and battery.

DOS-210-K	Oxygen meter	**£71·10**

SPARE PARTS

DOS-230-030K	Probe Membrane set, comprising 50 membranes and five O-rings.	**£22·40**
DOS-230-050E	Membrane set	**£1·34**

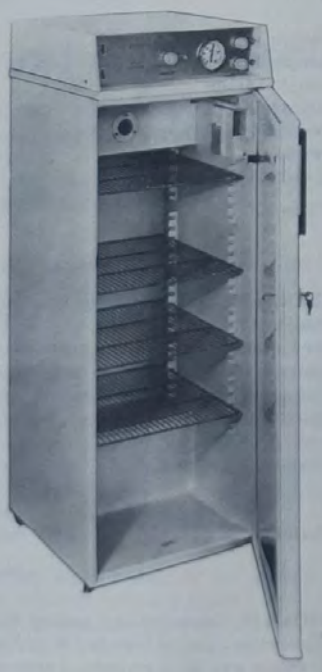
ACCESSORIES

DOS-230-502S	Case	**£7·88**
	Battery, 9V, PP3	*See BMT-540-050J*

Gallenkamp

COOLED INCUBATOR

- Suitable for Biochemical Oxygen Demand (B.O.D.) testing
- Accommodates approximately 150 B.O.D. bottles
- Temperature range approximately 0 to 45°C



See INF-600

DISSOLVED OXYGEN METERS

Developed in co-operation with the Freshwater Biological Research Association, for the determination of dissolved oxygen in river water, reservoirs, effluents, etc. By means of a Mackereth lead-silver oxygen electrode within a polythene membrane, the instrument gives direct readings in percentage oxygen, relative to the value of a saturated solution of air in the water. The readings are temperature compensated by a resistance thermometer which is also used for the measurement of temperature.

The instrument is powered by five MALLORY batteries and a battery check facility is built in. Sockets are fitted for monitoring oxygen concentration and temperature on an external 1mA recorder of up to 400Ω resistance.

Technical data

	Oxygen concentration	Temperature
Ranges	0 to 100 and 0 to 200%*	−5 to 30°c
Accuracy	5% at f.s.d.	±1·5°C
Discrimination	0·5%	0·2°C
Dimensions	310 × 190 × 220mm high	
Mass	5·4kg	

*0 to 100% corresponds to water saturated with air at 760 torr.



DOS-450

DISSOLVED OXYGEN METER, *EIL* **Model 15A,** as specified, with five batteries and probe containing electrode and resistance thermometer.

DOS-450-M Dissolved oxygen meter **£368·50**

SPARE PARTS

Batteries (5 required) *See BMT-620-070J*



DOS-520

The instrument comprises electronic circuits and a meter for the display of oxygen saturation values measured by means of an electrode. The meter has a 100mm length scale calibrated 0–100 and 0–30 divisions. A range selector switch enables the full scale deflection of the meter to be set to 0–100, 0–30 or 0–10% oxygen saturation. Multi-turn potentiometers are fitted for sensitive setting up of zero and span. Outer case of stove enamelled steel 136 × 208 × 294mm (height × width × depth) is fitted with carrying handle and rubber feet. For 200–250V 50Hz or 100–120V 60Hz supplies. Requires but not supplied with one of the following alternative electrodes.

General purpose temperature compensated oxygen electrode with polypropylene body, interchangeable membranes and screwed nylon filler plug. Connected to meter by 1m long lead with plug. Supplied in kit with electrolyte, spare membranes and other expendable components. This electrode is not autoclaveable.

Autoclaveable electrode suitable for applications such as fermentation where the test temperature is constant. Comprises a glass stem 115mm × 10mm diameter with interchangeable membranes, polypropylene top cap, filler tube and 1m connecting lead with plug. Supplied in kit with electrolyte, spare membranes and other expendable components. Maintenance kits are available for both electrodes and contain the expendable components such as electrolyte and spare membranes.

DISSOLVED OXYGEN METER, as specified, **without** electrode.

DOS-520-010W	Oxygen meter, 200–250V 50Hz	**£181·50**
DOS-520-030Q	Oxygen meter, 100–120V 60Hz	**£181·50**

ACCESSORIES

DOS-540-502K	Temperature compensated electrode	**£49·50**
DOS-540-508V	Maintenance kit for DOS-540-502K	**£2·20**
DOS-540-516W	Autoclaveable electrode	**£36·30**
DOS-540-524A	Maintenance kit for DOS-540-516W	**£2·20**

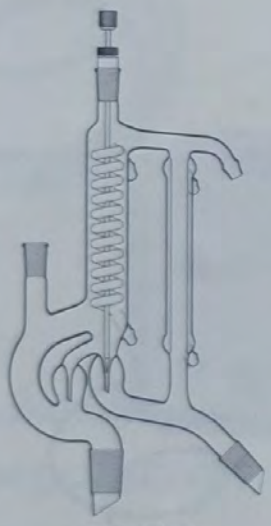
Gallenkamp FRACTIONAL DISTILLATION ASSEMBLY

For fractional distillation of liquids at atmospheric or reduced pressures

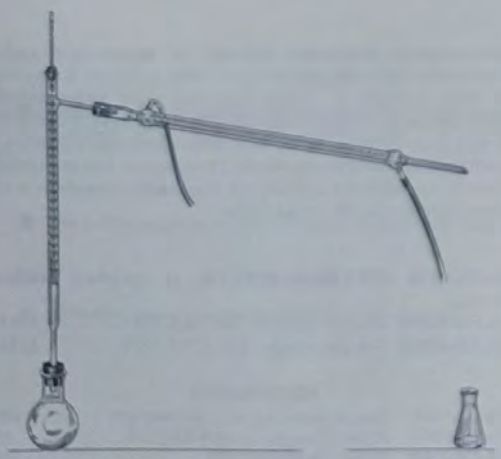
- **Borosilicate glass components fitted with interchangeable joints where applicable**
- **Theoretical plate value 12 to 15 plates**
- **Double walled heated jacket gives reasonably adiabatic conditions**
- **Column can be viewed during distillation**
- **Variable take-off stillhead. Accessory with controlled reflux ratio available**



DPR-200 with scaffolding and mantle



DPR-220-550



DPR-290

FRACTIONAL DISTILLATION APPARATUS, *GALLENKAMP*, comprising glassware listed below, rheostat for adjusting heating jacket temperature, thermometers, grease and wax for joints and instructions manual. For 200–250V a.c. single phase supplies.

DPR-200-Q	Fractional distillation apparatus	**£149·63**

SPARE PARTS

DPR-220-030Q	Air leak tube, borosilicate glass	**£2·48**
DPR-220-050K	Column, borosilicate glass, 600mm long	**£3·71**
DPR-220-070E	Funnel for supporting packing	**£1·63**
	Heater jacket, borosilicate glass, double walled. Overall length 530mm.	
DPR-220-090V	Heater jacket	**£37·13**
	Stillhead, borosilicate glass, total condensation, variable take-off pattern.	
DPR-220-110S	Stillhead	**£13·28**
DPR-220-130M	Calcium chloride tube, borosilicate glass	**£1·74**
	Connecting piece, borosilicate glass, for vacuum distillation, with cone and socket, one 3-way and one 1-way tap, rubber junction and vacuum take-off nozzle with socket.	
DPR-220-150G	Connecting piece	**£12·38**
	Helices, Fenske, single turn (1 pack)	*See DPR-490-010D*
	Helices, Fenske, multi-turn (1 pack)	*See DPR-490-030U*
	Distillation flask, 500ml	*See QFM-060-R*
	Distillation flask, 1000ml	*See QFM-080-D*
	Stopper	*See QTE-090-X*
	Condenser, helical pattern	*See QCJ-100-W*
	Thermometer, range −5 to 360°C	*See THM-280-150C*
	Thermometer, range −5 to 360°C	*See THM-300-150E*
	Thermometer adapter for THM-300-150E	*See THM-820*
	Receiver flask, 250ml	*See QFH-250-M*
	Receiver flask, 500ml	*See QFH-290-H*
	Calcium chloride tube	*See QTY-620-W*

ACCESSORIES

	Scaffolding set, GALLENKAMP, comprising LABLOX rods, connectors, feet and clamps with bossheads, rings and fixing screws to form a three-sided rigid support framework 1·2m high.	
DPR-220-510C	Scaffolding set	**£16·43**
	Stillhead, borosilicate glass, total condensation; variable take-off with reflux ratio control by rotation of metal rod operating through a stuffing box. For use at atmospheric or reduced pressures. With standard cone joints for column, receiver and thermometer.	
DPR-220-550N	Stillhead	**£42·95**
	Heating mantles	*See HEA-400*

FRACTIONAL DISTILLATION APPARATUS, comprising 250ml round bottom flask, fractionating column with side arm, overall height 620mm, Liebig condenser with inner tube integral with body, effective length 500mm, wide mouth 100ml conical flask, three rubber stoppers, 0·9m of Neoprene tubing 5mm bore and thermometer −10 to 110×1°C.

DPR-290-W	Fractional distillation apparatus	**£13·50**

SPARE PART

Thermometer	*See THL-340-050N*

COLUMNS

FRACTIONATING COLUMN, STPTC Schedule A1, pear bulb type, borosilicate glass, suitable for use with high boiling point liquids. With side arm 160mm long, 24/29 cone and eight bulbs. Overall height 380mm.

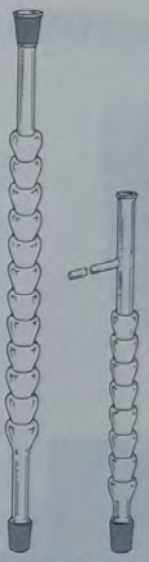
DPR-360-M Fractionating column **£5·74**

FRACTIONATING COLUMN, rod and disc type, borosilicate glass. Removable centre rod with 20 discs in smooth bore tube with side arm. Overall length 620mm.

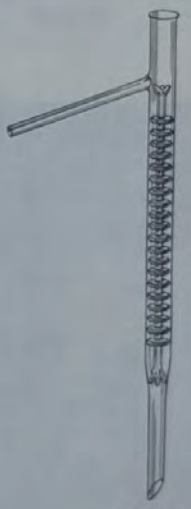
DPR-380-V Fractionating column **£5·18**

FRACTIONATING COLUMN, borosilicate glass, with 14/15 joints. Effective length 110mm, internal diameter 14mm with indents at the lower end to support packing. Approximate capacity 20ml.

DPR-400-A Fractionating column **£2·03**



DPR-360



DPR-380



DPR-400

COLUMN FILLINGS

RINGS, Raschig, glass, approximately 5mm diameter × 5mm long. Filling capacity of pack approximately 300ml.

DPR-470-U Rings Pack of 250g **£1·58**

HELICES, Fenske, borosilicate glass, 4mm diameter, filling capacity approximately 150ml.

DPR-490-010D Helices, single turn Pack of 50g **£1·85**
DPR-490-030U Helices, multi-turn Pack of 50g **£2·03**

GLASS SPHERES, solid, for packing columns and also for gas absorption and washing tubes. The diameters and pack sizes are approximate. (F)

DPR-530-030Y Glass spheres, 3mm Pack of 250ml **£1·41**
DPR-530-050C Glass spheres, 4mm Pack of 250ml **£1·41**
DPR-530-070T Glass spheres, 6mm Pack of 250ml **£1·41**

Gallenkamp DISTILLATION AND SUBLIMATION BLOCK

For purification by distillation and sublimation at temperatures up to 350°C

- **For 2 to 20mg samples – solid or liquid**
- **Accommodates three sample tubes**
- **Block can be clamped at any angle up to 45°**

The temperature of the aluminium block is controlled by an integral energy regulator; temperature range 50 to 350°C, fluctuation approximately ±2°C.

In operation, samples contained in capsules DPR-620-050B, are placed in thin walled glass tubes DPR-620-030H, which are then constricted and, after a cotton wool plug has been inserted, are evacuated to at least 0·01 torr. The evacuated tubes are heated in the block at an appropriate temperature until distillation or sublimation is complete.

With liquid samples some fractionation is possible if a thin copper tube is placed around the glass tube where it projects from the block.

DISTILLATION AND SUBLIMATION HEATING BLOCK, *GALLENKAMP*, as specified, with 10 sample tubes, 20 capsules, 'cold-finger' and a thermometer. For 220–240V a.c. single phase supplies.

DPR-610-A Distillation and sublimation heating block **£98·44**



DPR-610

SPARE PARTS

DPR-620-030H Sample tubes Pack of 10 **£0·52**
DPR-620-050B Capsules Pack of 10 **£0·52**
Thermometer, −10 to 360°C See *THL-210-110E*

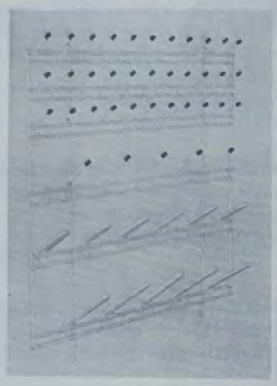
ACCESSORY

Vacuum pump See *PYB-740-D*

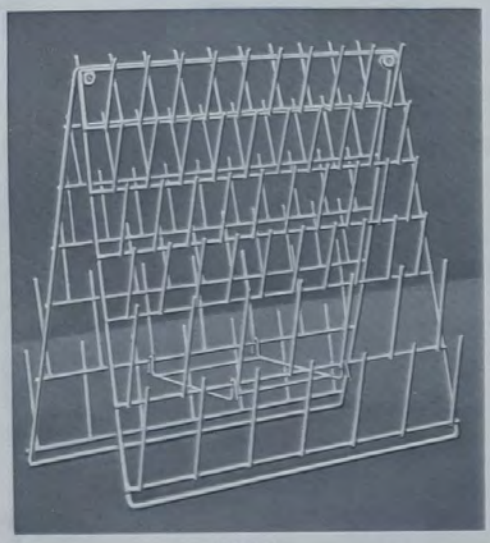
DRAINING



DRF-300



DRF-340



DRF-380

DRAINING MAT, polythene, 475 × 360mm, with grooved surface and lip to overhang draining board or bench top to drain liquid into a sink. Provides a clean surface on which to stand glassware and help to reduce breakage.

DRF-300-X Draining mat **£1·50**

DRAINING RACK, wall mounting, polythene coated metal frame, 560 × 560mm, with pegs. Angled brackets support the rack about 25mm away from the wall surface.

DRF-340-J Draining rack, wall **£5·63**

DRAINING RACK, used as a free-standing bench unit or as two wall-mounted racks. Comprises two polythene coated metal frames, 500 × 480mm, with pegs. For bench use, the two frames are bolted together at the top and held apart at the lower end by a removable frame. For wall use, each support frame can be mounted separately using the fixing holes provided. Overall dimensions when assembled for bench use 500 × 260 × 480mm high.

DRF-380-E Draining rack, bench **£6·86**

DRYING

Gallenkamp GLASSWARE DRYERS

For the rapid drying of laboratory glassware such as cylinders, flasks, etc. with narrow necks which would otherwise be difficult to dry.

An electrically driven blower is housed in the base and room air is drawn through a filter, passed through a heater and forced through a perforated apparatus support tube. Fitted with safety thermostat to protect from overheating should the air circulation be accidentally interrupted and the heater can be switched off if required to enable cold air to be circulated. DTF-300-010M is supplied with three interchangeable support tubes of 9·5, 16 and 25mm external diameter respectively. DTF-300-030G has twelve support tubes 230mm long × 18mm external diameter. For 200–250V 50Hz single phase supplies.

Type	Single point	12-point
Overall height, mm (excluding tubes)	280	280
Diameter, mm	240	350
Power rating, W	200	1000

DTF-300-010M Dryer, single point **£85·50**

DTF-300-030G Dryer, 12-point **£140·63**



DTF-300-010



DTF-300-030

SPARE PARTS

Heaters, for 200–250V a.c. single phase supplies.

DTF-320-010V Heater for single point, 200–250V **£4·39**

DTF-320-030P Heater for 12-point, 200–250V **£6·53**

ACCESSORY

Apparatus support tube, 75mm long × 11mm diameter, with air outlets at the top and sides.

DTF-320-502A Support tube **£2·59**

ELECTRICAL ACCESSORIES



ECA-350



ECA-450



ECA-390



ECA-590

CONNECTORS, PLUGS AND SOCKETS
for 250 V maximum working

PLUG, 13A, 3-pin, BS 1363, with moulded plastics body and fuse.
ECA-350-V Plug **£1·09**

PLUG, 13A, 3-pin, BS 1363, with moulded plastics body, fuse and mains indicator lamp.
ECA-390-Q Plug, indicating **£1·87**

ADAPTER, with 13A, 3-pin plug to BS 1363, three 13A shuttered outlet sockets, moulded plastics body and fuse.
ECA-450-N Adapter **£1·72**

SOCKET, 13A, 3-pin, rubber clad, for surface mounting.
ECA-590-A Socket **£1·18**

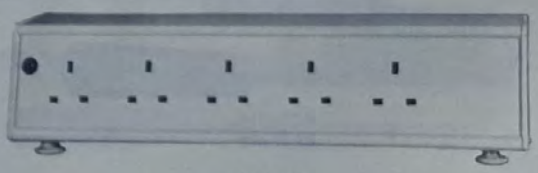
CONNECTOR, SAFEBLOC, for making temporary connections of electrical apparatus to the mains supply. A plastics case with a hinged lid houses three colour-coded spring-loaded terminals, having a large contact area and providing a firm grip for bare ended flexible leads. A double pole ON-OFF switch and fuse form part of the lid and so reduce the risk of accidental contact with the live terminals when the lid is open. Overall dimensions 130×70×50mm high. With fixing holes for wall or block mounting. Maximum rating 13A. Supplied with 5A fuse.
ECA-640-E Connector **£6·08**

MULTIPLE SOCKET OUTLET, with five 13A sockets to BS 1363 housed in a rigid PVC and earthed aluminium case for standing on bench. A micro circuit breaker will withstand a momentary surge in excess of 60A but trips on extended overload before the 13A fuse blows. With mains cable and an indicator lamp which shows when the circuit is live. The unit complies with IEE regulations.
ECA-700-B Multiple socket outlet **£13·50**

TERMINAL BLOCKS, flexible plastics, 12-way. Can be cut into smaller units as required.
ECA-770-030M Terminal block, maximum current 5A **£1·74**
ECA-770-070A Terminal block, maximum current 15A **£3·15**



ECA-640



ECA-700



ECA-770



ECA-810

TERMINATIONS SET comprising 25 each of eight types of insulated connectors and terminations which may be quickly fitted to wire using the crimping tool provided. Suitable for wires up to 10 to 15A capacity according to type. The connectors enable butt joints to be made between wires of 16 to 18 swg and between wires of 17 to 23 swg. The terminations include rings of 0 and 4BA sizes for 16 to 18 swg wires, spades of 2 and 4BA sizes for 17 to 23 swg wires, pins for 17 to 23 swg wires and push-on receptacles to fit $\frac{1}{4}$in. wide blades for 17 to 23 swg wires. The tool is used for cutting, stripping and crimping. Packed in metal box with storage compartments.

ECA-810-J Terminations set **£19·13**

TEST PROBE, to indicate polarity, leakage and short circuits in 200–250V a.c. and d.c. circuits. Comprises safety resistor and indicator lamp in plastics case fitted with pair of test leads.

ECA-880-G Test probe **£1·43**

METRIC DIMENSIONS of BA and SWG

Size	Dia. (mm)	size	Dia. (mm)
0 BA	6·0	23 SWG	0·61
2 BA	4·7	18 SWG	1·22
4 BA	3·6	17 SWG	1·42
		16 SWG	1·63

CONNECTORS, PLUGS AND SOCKETS for low voltages

PLUGS, 4mm, with plastics shank having entry for lead at one end with grub screw retention and 4mm transverse hole for additional plug connection. (F)

ECD-370-A Plugs, white Pack of 5 **£2·01**

PLUGS, 4mm, with plastics shank having side entry and grub screw retention for lead, and 4mm socket at one end to enable plugs to be stacked. With 4mm transverse hole for additional plug connection. (F)

ECD-400-030J Plugs, red Pack of 5 **£2·42**

ECD-400-070U Plugs, black Pack of 5 **£2·42**



ECA-880

FLEXIBLE LEADS FITTED WITH CONNECTORS, LOW VOLTAGE

LEADS, flexible, crocodile clip. Length 900mm, PVC insulated with crocodile clip at each end which will accommodate a 4mm plug.

ECF-240-J Leads Pack of 10 **£7·82**



ECD-370
ECD-400

FUSES

CARTRIDGE FUSE LINKS

Wire link in glass tube with contact through metal end caps

FUSES, BS 1362, 1in. long × $\frac{1}{4}$in. diameter.

ECF-540-250Y Fuses, 2A Pack of 10 **£1·24**

ECF-540-330K Fuses, 5A Pack of 10 **£1·24**

ECF-540-350E Fuses, 10A Pack of 10 **£1·24**

ECF-540-370V Fuses, 13A Pack of 10 **£1·24**



ECF-240

FUSE WIRE, for firing calorimeter bombs:

nickel chromium *See CBA-505-W*

platinum *See CBA-500-G*

WIRE

COPPER WIRE, bare.

Gauge, swg	Diameter mm	Resistance Ω/1,000m	Length m/kg	Resistance Ω/kg
20	0·914	25·5	170	4·35
26	0·457	102	680	69·6

ECW-200-132L Copper wire, bare, 20 swg Reel of 250g **£2·95**
ECW-200-192Q Copper wire, bare, 26 swg Reel of 250g **£3·06**

NICKEL-CHROMIUM WIRE, bare, an 80% nickel, 20% chromium alloy, 24 swg, 0·559mm diameter. Resistance 4·4Ω/m and current capacity 4·8A, both at 800°C.
ECW-440-170F Nickel-chromium wire, bare, 24 swg Reel of 125g **£3·49**

WIRE AND CABLE, PVC INSULATED

Available in minimum lengths of 10m. Multiples of this unit are supplied in one continuous length

Current carrying capacity of cables

The dimensions of wires previously expressed in inches are now given in mm and mm². The main dimension is the cross-sectional area of the wire (e.g. 2·5mm²).

The Imperial classification by number of strands and diameter of strands has been superseded, but for information purposes this is included in the table.

Nominal cross-sectional area mm²	Number and nominal diameter of wires No./mm	Current rating A
0·5	16/0·20	3
0·55	1/0·85	3
0·75	24/0·20	6
1	32/0·20	10
1·5	30/0·25	15
2·5	50/0·25	20
4	56/0·30	25

WIRE, single, copper, stranded core, cross-sectional area 0·5mm², maximum current 3A, PVC sheathed. Maximum operating voltage 250V.
ECW-680-J Wire, single, 0·5mm² Unit of 10m **£0·84**

WIRE, single, copper, stranded core, cross-sectional area 0·75mm², maximum current 6A, PVC sheathed. Maximum operating voltage 250V.
ECW-710-030S Wire, single, 0·75mm², blue Unit of 10m **£1·06**
ECW-710-070G Wire, single, 0·75mm², brown Unit of 10m **£1·06**

Wire ECW-680-J and ECW-710 is recommended for use with 4mm plugs ECD-400.

WIRE, twin, twisted, copper, stranded core, cross-sectional area each core 0·5mm², maximum current 3A, PVC sheathed. Maximum operating voltage 250V.
ECW-740-G Wire, twin, 0·5mm² Unit of 10m **£2·00**

CABLE, 3-core, for heavy duty power transmission. Copper, stranded core PVC covered and PVC sheathed.

Cross-sectional area, each core, mm²	0·5	0·75	1	1·5
Maximum current, each core, A	3	6	10	15

ECW-800-030R Cable, 3-core, 0·5mm² Unit of 10m **£3·30**
ECW-800-070F Cable, 3-core, 0·75mm² Unit of 10m **£3·94**
ECW-800-110T Cable, 3-core, 1mm² Unit of 10m **£4·53**
ECW-800-150H Cable, 3-core, 1·5mm² Unit of 10m **£6·02**

OTHER ELECTRICAL ACCESSORIES







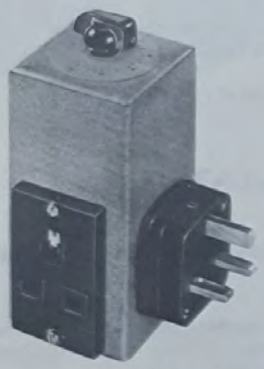
Electrical drill	See *TOH-400-L*
Electricians screwdriver	See *TOJ-850-030H*
Electrical lubricants	See *LUB-800-A*
Pliers with insulated handles	See *TOJ-530-Y*
Safety label	See *LAB-660-K*
Screwdriver/mains tester	See *TOJ-880-S*
Soldering irons	See *TOK-390-S*
Tool kit	See *TOL-240-F*
Wire stripper	See *TOK-650-W*

Gallenkamp

ELECTRICAL CONTROLS

POWER CONTROLLERS

For controlling small furnaces, hotplates, water baths, etc



EFP-200



EFP-250



EFP-400

For controlling power input by periodically and automatically switching the electrical supply on and off. The ratio of 'on' time to total cycle time determines the average input and is variable. Being small, continuously variable and with low power loss, these energy regulators can, to advantage, replace three-heat switches and resistance controls on most forms of heating equipment.

OPERATION

Each regulator is essentially a single pole switch having one contact mounted on a bimetal strip wound with a heater. When the switch is closed, current flows through the heater. The bimetal increases in temperature and opens the switch, thus breaking the supply to the heater. When the bimetal cools the cycle is repeated. The ratio of the 'on' to the total time and thus the average input is controlled by a cam, operated by the control knob.

CHARACTERISTICS

Continuous and maximum current ratings are given for each regulator. The continuous rating applies when the apparatus is normally required to run for long periods. The maximum rating should be used only when the apparatus is to be used for periods of 1 or 2 hours per day. For d.c. supplies the regulator contacts will only switch 0·1 A and, therefore, must be used with a relay such as EFP-700-C or EFS-220-V.

Energy regulators provide automatic compensation for changes in the supply line voltage but do not compensate for variation in ambient temperature.

The controllers listed are fitted with non-linear regulators which are suitable for controlling heating apparatus, e.g. furnaces, which, in order to have a high heating rate, have higher power heaters than are required to maintain the maximum temperature. 50% power setting is at a scale reading of about 9 (about 90 on EFP-200-T).

POWER CONTROLLER, *GALLENKAMP*, with integral 13A 3-pin input plug and shuttered output socket to BS 1363. In enamelled metal case with arbitrary scale and 13A fuse. Current rating 4A continuous, 12A intermittent. For 200–250V a.c. single phase supplies.

EFP-200-T Power controller **£16·09**

SPARE PART

Fuse *See ECF-540-370V*

POWER CONTROLLER, *GALLENKAMP*, with input cable and 13A 3-pin shuttered output socket fitted with heavy duty plug, both to BS 1363. In rigid ABS plastics case 175 × 100 × 90mm high with arbitrary scale and input and output indicator lamps. Current rating 4A continuous, 12A intermittent. For 200–250V a.c. single phase supplies.

EFP-250-H Power controller **£14·63**

POWER CONTROLLER, *ELECTROTHERMAL*, with input and output cable for in-line connection. In metal case 140mm diameter with arbitrary scale and indicator lamp. Current rating 4A continuous, 12A intermittent. For 200–250V a.c. single phase supplies.

EFP-400-D Power controller **£10·45**

Gallenkamp TRANSISTORISED RELAY

For use with contact thermometers and other thermostatic devices to switch heavy heater loads and for many other laboratory applications

- **Switches loads up to 20A at 250V (5kVA)**
- **Incorporates double pole changeover switch**
- **For 'normally open' and 'normally closed' switching**
- **Earthed or floating control circuit operation**
- **Built-in mains and load indicator lamps**

The GALLENKAMP transistorised relay is used to convert a low current, low voltage switch into a heavy duty power switch. It incorporates an independent double pole changeover switch and can switch two circuits or two sides of the same circuit in either the 'normally open' or the 'normally closed' modes. By suitable wiring, it can switch the mains by which it is powered on and off in another circuit, or it can be used to switch an independent a.c. or d.c. electricity supply into the circuit.

The control circuit (e.g. to a contact thermometer) operates on very low voltage and current; it is also self-powered. The control circuit can be operated either earthed or floating simply by the inclusion or removal of an internal connecting link.



EFP-700

Technical data

Power contacts	Double pole changeover rated at 20A 250V a.c. non-inductive and 1A 220V d.c.
Control circuit	15V d.c. open circuit applied to the control device with a resulting current of 4mA. Earthed or floating circuit. Self-powered. 250V maximum between control circuit and earth.
Operational mode	Normally open or normally closed.
Ambient temperature	Up to 50°C
Dimensions	190 × 115 × 75mm high

RELAY, transistorised, *GALLENKAMP*, as specified, enclosed in diecast light alloy box for wall or bench mounting. Fitted with indicator lamps and terminal block for load and mains supplies. A 2-pin plug connector is supplied for attachment to the leads of the control device. With illustrated instructions manual giving examples of typical circuit applications. **Without** mains or load circuit cables. For 110–120V and 200–250V a.c. single phase supplies.

EFP-700-C Relay, transistorised **£52·88**

HOT WIRE VACUUM RELAYS

Operated by thermal expansion of a wire through which the control current passes. The period of 2 or 3 seconds which the wire takes to heat or cool causes a delay in the operation of the contacts thus preventing 'chattering'. Surge suppressors are fitted.

EFS-220-V is suitable both for thermostats with 'normally closed' contacts such as the bimetallic type and those with 'normally open' contacts such as expansion thermoregulators and contact thermometers.

EFS-250-A is suitable for normally closed contacts only.

See also EFP-700-C for use particularly with contact thermometers.

RELAY, hot wire vacuum, normally closed or open, as specified, for controlling loads up to 2kVA. For 220–240V a.c. single phase supplies.

EFS-220-V Relay **£20·19**

SPARE PART

EFS-230-010L Relay tube type 602 **£12·40**

RELAY, hot wire vacuum, normally closed, as specified, for controlling loads up to 3·5kVA. For 220–240V a.c. single phase supplies.

EFS-250-A Relay **£26·89**

SPARE PART

EFS-260-030H Relay tube type 603 **£17·16**

VARIABLE OUTPUT AUTOTRANSFORMERS

Provide smooth, stepless control over the output range, with indication of setting on calibrated scales



EFT-700



EFT-740

Technical data

Input voltages

The standard input is 240V 50–60Hz single phase but all models have centre-tapped primaries for use on 120V 50–60Hz supplies.
NOTE: When wired for use on 120V supplies, the current drawn must not exceed half the rated current.

Output voltages

Line-voltage connection. When the mains supply is connected across the whole primary winding, the output is variable from zero to mains voltage, i.e. 0 to 240V.
Over-voltage connection. When the mains supply is connected across only part of the primary winding by means of the tapping provided, the output is variable from zero to higher than mains voltage, i.e. 0 to 270V on 240V supplies.

Output currents

The rated currents shown are values calculated to protect the transformers by ensuring that winding temperatures do not exceed 55°C under continuous operation in ambient temperatures not exceeding 45°C.

For EFT-700-070K only, currents up to 3·75A can be safely drawn at near-zero and near-maximum output voltage settings. Special care must therefore be taken with variable impedance loads (e.g. electric motors) and the ouput current checked when the voltage setting is increased or decreased. Less care is needed with constant impedance loads.
NOTE: When the over-voltage connection is used on the primary winding, the load must never draw more than the rated current.

AUTOTRANSFORMERS, bench mounting, as specified, in ventilated case fitted with shrouded terminals.

EFT-700-030W	Autotransformer, 1·5A	£25·54
EFT-700-050Q	Autotransformer, 2·5A	£28·69
EFT-700-070K	Autotransformer, 3A	£34·21
EFT-700-090E	Autotransformer, 8A	£65·25
EFT-700-110B	Autotransformer, 15A	£114·56
EFT-700-130S	Autotransformer, 25A	£173·14

AUTOTRANSFORMER, portable, as specified, rated current 3A. In rectangular metal case with output meter, carrying handle, mains switch, fuse, mains cable and 3-pin 13A socket outlet to BS 1363. Supplied in over-voltage connection.

EFT-740-D	Autotransformer, 3A	£72·28

AMMETERS

AMMETERS, moving coil type for d.c. measurements only, accuracy ±2% at f.s.d. Scale, 50mm long with anti-parallax mirror, is set at a convenient reading angle in plastics case 100×90×100mm high. With pair of colour-coded 4mm socket terminals and zero adjustment. (F)

EHA-370-030M	Ammeter, 0 to 1A d.c.	£10-69
EHA-370-050G	Ammeter, 0 to 2·5A d.c.	£10-69
EHA-370-070A	Ammeter, 0 to 5A d.c.	£10-69
EHA-370-090R	Ammeter, 0 to 10A d.c.	£10-69



EHA-370

AMMETERS, as EHA-370 but moving iron type for a.c. or d.c. measurements, accuracy ±2·5% at f.s.d. (F)

EHA-400-030H	Ammeter, 0 to 1A a.c./d.c.	£10-69
EHA-400-050B	Ammeter, 0 to 2·5A a.c./d.c.	£10-69
EHA-400-070S	Ammeter, 0 to 5A a.c./d.c.	£10-69
EHA-400-090M	Ammeter, 0 to 10A a.c./d.c.	£10-69

AMMETER, dual scale 0 to 1×0·02A and 0 to 5×0·1A, moving coil type for d.c. measurements only. Scale, 50mm long with anti-parallax mirror, is set at a convenient reading angle in plastics case 100×90×100mm high. With three colour-coded 4mm socket terminals and zero adjustment. Nominal internal resistance 0·05 and 0·1Ω. (F)

EHA-450-E	Ammeter, 0 to 1A and 0 to 5A d.c.	£11-81



EHA-450

MILLIAMMETERS, moving coil type for d.c. measurements only, accuracy ±2% at f.s.d. Scale, 50mm long with anti-parallax mirror, is set at a convenient reading angle in plastics case 100×90×100mm high. With pair of colour-coded 4mm socket terminals and zero adjuster. (F)

EHA-610-030H	Milliammeter, 0 to 1mA	£10-69
EHA-610-070S	Milliammeter, 0 to 10mA	£10-69
EHA-610-110J	Milliammeter, 0 to 100mA	£10-69
EHA-610-150U	Milliammeter, 0 to 500mA	£10-69

MICROAMMETER, 0 to 500μA, moving coil type for d.c. measurements only, accuracy ±2% at f.s.d. Scale, 50mm long with anti-parallax mirror, is set at a convenient reading angle in plastics case 100×90×100mm high. With pair of colour-coded 4mm socket terminals and zero adjustment. (F)

EHA-800-H	Microammeter, 0 to 500μA	£10-71

MICROAMMETER, as EHA-800-H but range 0 to 50μA and with additional logarithmic scale. (F)

EHA-830-J	Microammeter, 0 to 50μA	£11-06

VOLTMETERS

VOLTMETER, dual scale 0 to 5×0·2V and 0 to 15×0·5V, moving coil type for d.c. measurements only. Scale, 50mm long with anti-parallax mirror, is set at a convenient reading angle in plastics case 100×90×100mm high. With three colour-coded 4mm socket terminals and zero adjuster. Nominal internal resistance 5 and 15kΩ. (F)

EHB-360-S	Voltmeter, 0 to 5V and 0 to 15V	£11-93

VOLTMETERS, moving coil type for d.c. measurements only, accuracy ±2% at f.s.d. Scale, 50mm long with anti-parallax mirror, is set at a convenient reading angle in plastics case 100×90×100mm high. With pair of colour-coded 4mm socket terminals and zero adjuster. Resistance 1000Ω/V. (F)

EHB-420-030G	Voltmeter, 0 to 3V	£10-69
EHB-420-050A	Voltmeter, 0 to 5V	£10-69
EHB-420-070R	Voltmeter, 0 to 10V	£10-69
EHB-420-110Y	Voltmeter, 0 to 100V	£10-69
EHB-420-150T	Voltmeter, 0 to 300V	£10-69



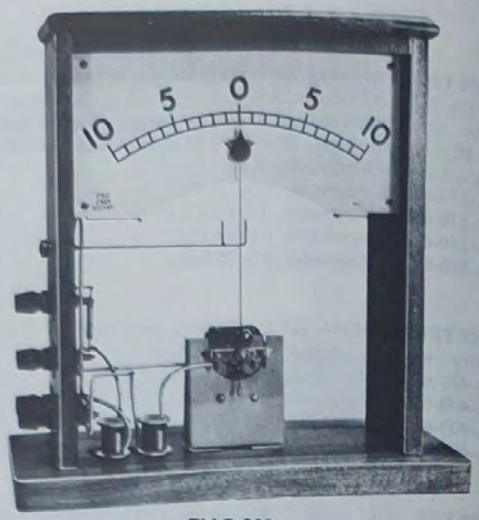
EHB-420



EHG-250

GALVANOMETER, 35–0–35mV, moving coil type for d.c. use only. Sensitivity approximately 200μA/division, coil resistance 10Ω. Scale, 50mm long with anti-parallax mirror, is set at a convenient reading angle in plastics case 100 x 90 x 100mm high. With pair of colour-coded 4mm socket terminals and zero adjustment. (F)

EHG-250-G Galvanometer **£10-69**



EHG-300

GALVANOMETER, demonstration pattern, moving coil type for d.c. use only. With 4mm socket terminals to give ranges of 2–0–2mA, 10–0–10A, 100–0–100mV and 10–0–10V. A large spade-ended pointer moves over a 200mm scale boldly marked 10–0–10. Housed in a wood case 330 x 190 x 330mm high with glass front and rear panels to enable all working parts to be clearly seen.

EHG-300-K Galvanometer, demonstration **£63·34**

ELECTRONIC GALVANOMETER

- **Voltage, current and charge ranges**
- **Battery operated**
- **Built-in overload protection**



EHG-400

A battery operated instrument, more robust than conventional galvanometers with calibrated voltage, current and charge ranges. The charge range allows charge and flux measurements to be made more conveniently than by ballistic methods. Readout is given by a pointer moving over a 120mm scale, marked 0–10 and 5–0–5 for left hand or centre-zero operation. Input is via a pair of 4mm socket terminals and the instrument is simple to operate using only three controls which are mounted, with the meter, on an inclined fascia panel and comprise a range switch with an OFF position, a SET ZERO adjustment and a DISCHARGE button. The SET ZERO allows the zero to be set at any point on the scale for voltage and current measurements. On the charge range, it nullifies the drift and the DISCHARGE button can then be used to return the scale pointer to centre-zero. With built-in overload protection device and housed in robust metal case fitted with rubber feet.

Technical data

Ranges	1mV, 10mV, 1μA, 10μA, 1μC f.s.d.
Readout	Meter with 120mm scale marked 0–10 and 5–0–5
Input resistance	1kΩ
Battery	9V PP6 (not supplied)
Overall dimensions	240 x 170 x 120mm high
Mass	1kg

GALVANOMETER, electronic, *GRIFFIN*, as specified, with instructions but **without** battery.

EHG-400-C Galvanometer, electronic **£62·44**

ACCESSORY

Battery, 9V, PP6 See BMT-540-090U

WPA EDSPOT GALVANOMETER

- **Sensitivity control in × 10 steps**
- **Operating instructions printed on case**
- **Built-in overload protection**

The movement which has a pre-twisted suspension and anti-vibration stops, is oil damped and enclosed in a metal case. The coil is epoxy resin bonded and a reduced and aged Alcomax magnet ensures high stability. The movement is protected against overload by a semiconductor device with a fuse and compensating capacitor. Calibration accuracy is ±1%. Readout is given by a krypton filled lamp which produces a bright circle of light on a 180mm scale divided in mm and marked 0–18 and 9–0–9 for left hand or centre-zero operation. In metal case 290×210×120mm high, mass 4kg, with operating instructions printed on the top and with range and zero adjustment controls, pair of 4mm socket terminals for the input, fuse and indicator lamp, to show operation of the krypton filled lamp, mounted on the front panel. The range control has positions for DIRECT (maximum sensitivity), ×1 (internal shunt giving highest sensitivity at near critical damping), ×0·1 ×0·01, ×0·001 and SHORT (for transit).

Technical data

Sensitivity, typical	25mm/μA 1·8mm/μV 75mm/μC
Resistance, direct	14Ω
×1	13Ω
Critical damping resistance	120Ω
Period	2s



EHG-520

GALVANOMETER, *WPA EDSPOT*, as specified, with mains cable. For 200–240V 50Hz supplies.

EHG-520-D Galvanometer, 25mm/μA **£64·90**

SPARE PARTS

Lamp, krypton filled	*See XJF-770-010Y*
Fuse, 1A	*See ECF-630-170F*

ACCESSORY

Adapter, to give deflections of 1mm/μA, 1mm/10μA and 1mm/100μA on ×1, ×0·1 and ×0·01 ranges respectively. Comprises a plastics block, containing a network of resistors, which plugs into the input terminals and provides an equivalent pair of 4mm terminals at 33mm spacing. Gives an input impedance of 1kΩ to match the GRIFFIN d.c. amplifier and electrometer XKS-840-V while preserving the appropriate resistance for convenient damping of the meter.

EHG-540-M Adapter **£3·63**

WPA GALVANOMETERS

- **Linearity better than 1% f.s.d.**
- **Magnetic and oil bead damping**
- **Built-in overload protection**

Similar to EHG-520-D but with different sensitivities and having a range control with positions for DIRECT (maximum sensitivity), ×1 (internal shunt giving highest sensitivity at near critical damping), ×0·03, ×0·001, SERIES (with series resistor, for low resistance circuits) and SHORT (for transit).

Technical data

Sensitivity, typical	15mm/μA 1·4mm/μV 40mm/μC	70mm/μA 1mm/μV 200mm/μC	500mm/μA 0·2mm/μV 1500mm/μC
Resistance, direct	11·4Ω	73Ω	2485Ω
×1	10Ω	70Ω	2400Ω
Critical damping resistance	30Ω	1kΩ	50kΩ
Period	2s	2s	2s

GALVANOMETER, *WPA*, highest voltage sensitivity, for thermocouple work, etc. in low resistance circuits. For 200–240V 50Hz supplies.

EHG-630-L Galvanometer, 15mm/μA **£70·40**



EHG-690

GALVANOMETER, *WPA*, general purpose, with applications as a null point detector in bridge circuits. For 200–240V 50Hz supplies.

EHG-660-N Galvanometer, 70mm/μA **£74·80**

GALVANOMETER, *WPA*, highest current sensitivity, for current and ballistic charge measurements. For 200–240V 50Hz supplies.

EHG-690-P Galvanometer, 500mm/μA **£79·20**

SPARE PARTS for EHG-630-L to EHG-690-P

Lamp, krypton filled	*See XJF-770-010Y*
Fuse, 1A, for EHG-630-L	*See ECF-630-170F*
Fuse, 500mA for EHG-660-N	*See ECF-630-130R*
Fuse, 100mA for EHG-690-P	*See ECF-630-050P*

Gallenkamp

MULTIRANGE TEST METERS

Portable, battery operated, multirange a.c./d.c. measuring instruments incorporating a moving coil movement having a knife edge pointer moving over a two-colour scale with an anti-parallax mirror. Fitted with overload circuit protection.

Model	66	50	1400
Internal resistance	20kΩ/V	50kΩ/V*	20kΩ/V†
No. of ranges	28	23	27
D.C. current	50μA to 500mA	30μA to 12A	50μA to 10A
D.C. voltage	1V to 1kV	0·3V to 1·2kV	0·25V to 5kV
A.C. current	–	–	10mA to 10A
A.C. voltage	1V to 1kV	6V to 1·2kV	2·5V to 5kV
Resistance	5kΩ to 5MΩ	10kΩ to 100MΩ	2kΩ to 20MΩ
Decibels	−20 to +22	−20 to +17	−20 to +50

* On d.c. ranges. Internal resistance 10kΩ/V on a.c. ranges.
† On d.c. ranges. Internal resistance 5kΩ/V on a.c. ranges.



EHL-220

TEST METER, Model 66, multirange, as specified, with range selection by single control knob and with fluorescent red pointer. Overall dimensions approximately 190 × 100 × 40mm, mass 400g. With carrying case, test leads, probes and batteries. (F)

EHL-220-A Test meter, Model 66 **£25·88**

SPARE PARTS

Batteries, 1·5V (2 required) *See BMT-460-050D*



EHL-260

TEST METER, Model 50, multirange, as specified, with range selection by single control knob, polarity reversing switch for d.c. ranges and damped meter movement for transit when in the OFF position. Meter 30μA f.s.d., resistance 2kΩ. Overall dimensions 160 × 105 × 60mm, mass 660g. With carrying case, test leads, probes and batteries. (F)

EHL-260-S Test meter, Model 50 **£41·06**

SPARE PARTS

Batteries, 1·5V (2 required) *See BMT-460-050D*
Battery, 22·5V (1 required) *See BMT-510-030N*

TEST METER, Model 1400, multirange, as specified, with full width meter scale, resistance zero adjustment, function and range control knobs and damped meter movement for transit when in the OFF position. Meter 50μA f.s.d., accuracy better than ±3% for current and voltage ranges. Overall dimensions 200 × 170 × 100mm, mass 1·7kg. Fitted with feet and carrying handle. With test leads, one probe and one shrouded crocodile clip, and batteries. (F)

EHL-310-W Test meter, Model 1400 **£46·13**

SPARE PARTS

Batteries, 1·5V (4 required) *See BMT-460-050D*
Battery, 1·5V (1 required) *See BMT-460-070U*



EHL-310

AVO MULTIRANGE TEST METERS

Portable, battery operated, multirange a.c./d.c. measuring instruments.

Model	Multiminor	8	7φ
Internal resistance	10kΩ/V*	200kΩ/V†	500Ω/V
No. of ranges	19	32	47
D.C. current	100μA to 1A	50μA to 10A	1mA to 10A
D.C. voltage	100mV to 1kV	100mV to 3kV	50mV to 1kV
A.C. current	–	10mA to 10A	5mA to 10A
A.C. voltage	10V to 1kV	3V to 3kV	5V to 1kV
Resistance (battery)	20kΩ, 2MΩ	2kΩ to 20MΩ	10kΩ to 1MΩ
Resistance (mains)	–	–	10MΩ to 40MΩ
Capacitance	–	–	20μF
Decibels	–	−10 to +55	−25 to +16

* On d.c. ranges. Internal resistance 1kΩ/V on a.c. ranges.
† On d.c. ranges. Internal resistance on a.c. 100Ω/V on 3V range; 1000Ω/V on 10V range; 2000Ω/V above 30V.
φ Incorporates facility for halving all current and voltage ranges.



EHL-600

TEST METER, *AVO* **MULTIMINOR, multirange,** as specified, having 70mm scale with test leads, clips and instructions, in plastics case 200 × 100 × 40mm, mass 0·7kg.

EHL-600-F Test meter, Multiminor **£32·42**

TEST METER, *AVO* **Model 8, multirange,** as specified. Tropicalised, with test leads, clips and instructions.

EHL-640-A Test meter, Model 8 **£103·50**



EHL-640

TEST METER, *AVO* **Model 7, multirange,** as specified. With test leads, clips and instructions.

EHL-680-S Test meter, Model 7 **£91·41**

ACCESSORY for EHL-640-A to EHL-680-S

EHL-710-502M Carrying case **£22·50**

INSULATION AND CONTINUITY TESTER, *MEGGER*, with 60mm scale, individually calibrated to read 0 to 100MΩ and 0 to 500Ω. With brushless a.c. generator, changeover switch and 100mA fuse to protect continuity range circuit, in robust plastics case 130 × 100 × 60mm with fold-away generator handle. Mass 962g. With test leads and instructions.

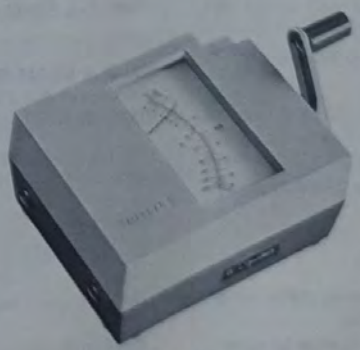
EHL-850-A Insulation and continuity tester **£72·90**

SPARE PART

Fuse, 100mA — See *ECF-630-050P*

ACCESSORY

EHL-860-504L Carrying case **£10·24**



EHL-850

Gallenkamp

Griffin OSCILLOSCOPES

The oscilloscope, already well established as an essential tool for modern industry and research.

GRIFFIN cathode ray oscilloscopes are general purpose calibrated instruments, available in both single and double beam versions, having wide range and high sensitivity.



EHM-700

SINGLE BEAM OSCILLOSCOPE

VERTICAL (Y) AMPLIFIER

Bandwidth	d.c. to 3MHz (down to 3Hz if a.c. coupled)
Input impedance	Nominally 1MΩ/30pF

The input attenuator has nine switched frequency compensated ranges providing input sensitivities from 100mV/cm to 50V/cm in 1, 2, 5 sequence, accuracy ±5%.

Maximum input	400V (d.c. + peak a.c.)
Rise time (calculated)	Approximately 100ns

TIMEBASE

Calibrated speeds	1, 10, 100μs/cm and 1, 10, 100ms/cm accuracy ±5%
Adjustment of speed	Continuous, down to 1s/cm by VELOCITY control

X GAIN can increase the maximum speed to 500ns/cm

TRIGGERING

The timebase may be triggered automatically (AUTO) or by trigger level selection, internally or externally.

Bandwidth	Up to 1MHz
Sensitivity	
Internal	Typically 5mm of vertical deflection of the trace up to 1MHz.
External	Typically 0·5V peak to peak (of external trigger signal) up to 1MHz.

HORIZONTAL (X) AMPLIFIER

Bandwidth	d.c. to 100kHz
Input impedance	Nominally 1MΩ/30pF
Sensitivity	Typically 250mV/cm at maximum X gain
Maximum input	400V (d.c. + peak a.c.)

X GAIN control expands the display by a factor of at least 2

GENERAL

Further controls are fitted for brilliance, power ON-OFF and X and Y shift. With sockets at the rear of the case for Z modulation and sockets on the front panel for timebase output. Fitted with a 1A fuse. A swivel foot raises the front of the instrument for convenient viewing. Ruled display area 100×80mm. Overall dimensions approximately 310×410×190mm high, mass approximately 9kg. Power requirement 80W.

SINGLE BEAM OSCILLOSCOPE, *GRIFFIN*, as specified, with instructions. For 220–240V 50–60Hz supplies.

EHM-700-K Single beam oscilloscope **£103·00**



EHM-800

DOUBLE BEAM OSCILLOSCOPE

More versatile and having a wider range than the single beam instrument. A particular feature is a locate button for finding a lost trace.

VERTICAL AMPLIFIER

Bandwidth	d.c. to at least 10MHz (down to 3Hz if a.c. coupled)
Input impedance	Nominally 1MΩ/33pF
Sensitivity	10mV/cm to 50V/cm switched in 1, 2, 5 sequence, accuracy ±5%
Maximum input	400V (d.c. + peak a.c.)
Rise time (calculated)	Approximately 35ns

Each vertical amplifier has an attenuator, shift control and a.c./d.c. switch, with provision for earthing the amplifier, without shorting the input signal, to give a zero reference line for the trace.

TIMEBASE

Calibrated speeds	1 μs/cm to 100ms/cm in 1, 2, 5 sequence, accuracy ±5%

Speeds increased ×5 using expansion control, accuracy ±5%, so that the instrument is always calibrated.

TRIGGERING

May be triggered from the vertical 'A' channel, externally or from the mains frequency. Beam switching is alternate, chop or single channel as selected.

Sensitivity	
Internal	5mm minimum from 10Hz to 1MHz rising to 3cm at 5MHz
External	300mV peak to peak from 30Hz to 5MHz 600mV peak to peak from 10 to 30Hz and from 5 to 10MHz

HORIZONTAL AMPLIFIER

Bandwidth	d.c. to 500kHz
Sensitivity	Approximately 1V/cm (approximately 200mV/cm when expanded)
Input impedance	Nominally 1MΩ/20pF
Maximum input	250V (d.c. + peak a.c.)

Shift control incorporates ×5 expansion control (±5%)

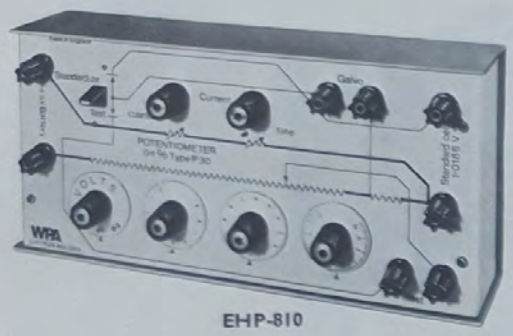
GENERAL

With mains switch, intensity, focus and locate controls, together with a timebase output socket which is at the rear of the case. Fitted with a 250mA, 20×5mm surge resisting fuse. A carrying handle can swivel to serve also as a foot to raise either the front or rear of the instrument for convenient viewing. Ruled display area 80×60mm. Dimensions of case (excluding handle) approximately 310×360×150mm high, mass 8kg. Power requirement approximately 25VA.

DOUBLE BEAM OSCILLOSCOPE, *GRIFFIN*, as specified, with instructions. For 220–240V 50–60Hz supplies.

EHM-800-C Double beam oscilloscope **£159·50**

POTENTIOMETERS



EHP-810

POTENTIOMETER, *WPA*, four-decade dial type, ranges 1 to 2V, 0 to 1V, 0·1 to 0·2V and 0 to 0·1V. With coarse and fine current controls for standardisation and a two-way detector key to enable immediate changeover from measurement to standardisation. Accuracy of potential division 0·1%, impedance 1kΩ/V. In metal case 318×152×102mm with 4mm socket terminals appropriately positioned in circuit diagram on top panel.

EHP-810-L Potentiometer **£63·80**

ACCESSORIES

Weston standard cell	See *BML-750-M*
Dry battery, 4·5V	See *BMT-240-C*
Null detector	See *EHG-400-C*



EHP-870

POTENTIOMETER, portable, self contained, dial type, ranges 0 to 1·8V×1mV, 0 to 180mV×100μV and 0 to 18mV×10μV. Accuracy ±0·1% or ±1 scale division whichever is greater. Range selected by switch and covered in 18 steps with continuous slide wire adjustment over each step. With independent standardising circuit, standard cell and two 1·5V batteries. Integral galvanometer, terminals for potential to be measured and external galvanometer, TEST and STANDARDISE keys and battery switch which shorts galvanometer in the OFF position, are mounted on the control panel. In wood case, 290×220×160mm high, mass 5·1kg, with lid, clasps and handle. Instructions and circuit diagram on inside of lid.

EHP-870-P Potentiometer **£268·31**

RESISTANCE BOXES



EHW-410

RESISTANCE BOXES, *WPA*, four-decade dial type, with tapping points between each dial to allow use as an accurate potential divider, ratio arm, etc. For a.c. or d.c. measurements, accuracy better than 0·1% except 0·1Ω which is ±0·5%, continuous loading 0·5W each step. In metal case 273×108×102mm, with earth connection for high voltage or a.c. use and 4mm socket terminals appropriately positioned in circuit diagram on top panel.

EHW-410-030K Resistance box, 0 to 999·9×0·1Ω **£37·40**
EHW-410-050E Resistance box, 0 to 9999×1Ω **£37·40**
EHW-410-070V Resistance box, 0 to 99990×10Ω **£37·40**

Griffin REGULATED POWER SUPPLY

- **Specially designed for electronic work**
- **Low ripple–better than 0·1% peak to peak**
- **Electronic safety cutout**
- **Positive or negative voltages available**

Specially designed for use with electronic modules, transistors, amplifiers, etc. where the current required is not more than 800mA. Output 0 to 30V or 15–0–15V d.c., controlled by a five-position switch marked 5, 6, 9, 12 and 15V, these voltages being those most usually required for electronic applications. The output is taken from 4mm sockets, with both the positive and negative sockets at 19mm spacing from the zero potential socket. Also mounted on the front panel are a mains switch, indicator lamp and fuse. In robust metal case with mains cable fitted by moulded connector. Cable and connector removable for storage.

Technical data

Voltage output	15–0–15V d.c. in five switched ranges (up to 30V by connecting between positive and negative sockets)
Current	800mA maximum
Ripple (at maximum output)	Better than 0·1% peak to peak (0·04% r.m.s.)
Output connections	4mm sockets, positive, negative, earth
Mains fuse	300mA, 20 × 5mm surge resisting
Dimensions	250 × 160 × 110mm high
Mass	3·8kg



EKR-250

REGULATED POWER SUPPLY, *GRIFFIN*, as specified, with mains cable, connector and instructions. For 240–250V 50–60Hz single phase supplies.

EKR-250-B Regulated power supply **£40·78**

Griffin LOCKAVOLT POWER SUPPLY

- **Lockable voltage settings to prevent interference**
- **Voltage output 2, 4, 6, 9, 12 and 14V**
- **Maximum current output 4A a.c. or d.c.**
- **Overload safety cutout**

Supplies 2, 4, 6, 9, 12 or 14V a.c. or d.c. at up to 4A. The a.c. and d.c. outputs can be used simultaneously provided that the total current does not exceed 4A. To prevent interference, the voltage selector may be locked in position by means of a socket wrench. The output is taken from two pairs of colour-coded 4mm sockets at 19mm spacing, for a.c. and d.c. respectively, mounted on the front panel, together with a voltage selector, reset button for a circuit breaker which protects the secondary circuit, mains switch, indicator lamp and fuse. In robust metal case with mains cable fitted by moulded connector. Cable and connector removable for storage.

Technical data

Voltage outputs	2, 4, 6, 9, 12 and 14V
Current outputs	Up to 4A a.c. or d.c.
Mains fuse	1A, 20 × 5mm, surge resisting
Dimensions	250 × 160 × 110mm high
Mass	5kg



EKR-400

POWER SUPPLY, *GRIFFIN* **LOCKAVOLT,** as specified, with socket wrench, mains cable, connector and instructions. For 220–240V a.c. supplies.

EKR-400-010R Power supply, 220–240V **£38·25**

Griffin 5kV EHT SUPPLY



EKR-500

- Outputs up to 5kV
- Fully floating EHT circuits
- Suitable for operation of spark counters, discharge tubes, etc.

The output limitation of 5kV complies with the requirement of the Department of Education and Science.

Continuously variable output up to 5kV given by an autotransformer with specially insulated windings to withstand EHT voltages. With fully floating EHT circuits so that, for certain discharge tube experiments, the positive or negative terminal may be safely connected to earth and/or one side of the filament.

The outputs are taken from 4mm sockets and the continuously variable output is shown on a meter. Also mounted on the front panel are a mains switch, indicator lamp and fuse. In robust metal case fitted with lifting handles.

Technical data

Outputs	0 to 5kV at up to 3mA d.c. 0 to 5kV at up to 60μA d.c. Centre tap to give 0 to $\pm$2·5kV 6·3V at 2A a.c. Separate earthing terminal
Mains fuse	1A (220–240V), 2A (110–120V), 20 × 5mm, surge resisting
Dimensions of case	305 × 130 × 230mm high
Mass	6kg

5kV EHT SUPPLY, *GRIFFIN*, as specified, with mains cable and instructions. For a.c. supplies.

EKR-500-010J	5kV EHT supply, 220–240V	**£87·41**
EKR-500-030D	5kV EHT supply, 110–120V	**£91·13**

STORAGE BATTERIES

2V, multiplate type in plastics container and screw terminals

10h rate capacities from 20 to 80Ah



See BMP-550-030C et seq.

Griffin LOW TENSION VARIABLE VOLTAGE SUPPLIES

- Provide a.c. or d.c. at high currents
- Continuously variable output
- Smoothed d.c.
- Overload safety cutout
- Lockable voltage limit stop



EKR-650

Continuously variable 0 to 22 V a.c. or d.c. output from two pairs of colour-coded 4 mm sockets at 19 mm spacing. A stop is fitted which can be locked in any position, using a socket wrench provided, to limit the maximum voltage. The output is continuously variable up to this maximum. With overload cutout and reset button mounted on the front panel together with a 4 mm earth socket and mains switch, indicator lamp and fuse. In robust metal case with feet and a carrying handle which can also serve as a foot to incline the front panel at a convenient angle. With mains cable fitted by moulded connector. Cable and connector removable for storage.

Technical data

Voltage output	0 to 22 V a.c. or d.c.
Current output	8 A maximum continuous 10 A maximum for up to 1 hour
Mains fuse	1 A (220–240 V), 2 A (110–120 V), 20 × 5 mm surge resisting
Dimensions of case	400 × 160 × 160 mm high
Mass	7 kg

LOW TENSION VARIABLE VOLTAGE SUPPLY, *GRIFFIN,* as specified with socket wrench, mains cable, connector and instructions. For a.c. supplies.

EKR-650-010M Low tension variable voltage supply, 220–240 V **£61·88**

EKR-650-030G Low tension variable voltage supply, 110–120 V **£66·38**

LOW TENSION VARIABLE VOLTAGE SUPPLY, *GRIFFIN,* as EKR-650 but with meters 0 to 25 V and 0 to 10 A giving an indication of output voltage and current. With socket wrench, mains cable, connector and instructions. For a.c. supplies.

EKR-680-010X Low tension variable voltage supply, 220–240 V **£66·38**

EKR-680-030Y Low tension variable voltage supply, 110–120 V **£70·88**

Griffin SMOOTHING UNIT

- Voltage inputs up to 25 V
- Current outputs up to 3 A
- Ripple less than 0·1%

Provides smoothed d.c. from any rectified source such as EKR-400, EKR-650 or EKR-680. Will accept inputs up to 25 V and provide outputs up to 3 A via two pairs of 4 mm colour-coded sockets at 19 mm spacing mounted on the front panel together with a 5 A, 20 × 5 mm fuse. In robust metal case 250 × 160 × 110 mm high.



EKR-720

SMOOTHING UNIT, *GRIFFIN,* as specified, with instructions.

EKR-720-F Smoothing unit **£23·63**

Gallenkamp

Gallenkamp ELECTRODEPOSITION ANALYSERS

With stationary electrodes and magnetic stirring for the estimation of any metal which can be determined gravimetrically after electrodeposition

- Alternative single and 3-test analysers
- Built-in magnetic stirrer and hotplate
- Accessory power supply units
- Platinum electrodes
- Adjustable height electrode holders



ENE-300
with accessories



ENE-320 with
ENE-390 and accessories

ANALYSER UNIT

Both analysers are bench mounting but the 3-test version is designed also to stand on its corresponding power supply unit. The analyser base is of rust resistant steel, finished in grey enamel. Inside this base are fitted the magnetic stirrer, speed control and energy regulator for the 125mm diameter hotplate which is supported on the top of the base. The electrode holders, which are adjustable for height, are fitted on stainless steel rods at the rear of the analyser.

POWER SUPPLY UNIT

Comprises selenium full wave rectifiers and a double wound transformer in a ventilated metal case finished in stoved enamel. An ammeter and voltmeter are fitted in each circuit together with mains fuses and switch, and a variable resistance. Output from each circuit is 7A d.c. at 12V.

ELECTRODEPOSITION ANALYSERS, *GALLENKAMP*, **single test,** as specified, comprising magnetic stirrer hotplate with speed and heat controls, one each 20 and 40mm PTFE coated followers, electrode support rod and holder. Base dimensions 210 × 190mm. **Without** power supply unit, beakers and electrodes. With instructions. For single phase supplies.

ENE-300-010H	Analyser, 220–240V 50Hz	**£70·54**
ENE-300-030B	Analyser, 110–120V 60Hz	**£71·10**

ELECTRODEPOSITION ANALYSERS, *GALLENKAMP*, **3-test,** otherwise similar to ENE-300 but base dimensions 520 × 270mm. **Without** power supply unit, beakers and electrodes. With instructions. For single phase supplies.

ENE-320-010Q	Analyser, 220–240V 50Hz	**£219·04**
ENE-320-030K	Analyser, 110–120V 60Hz	**£220·16**

SPARE PARTS

	Electrode holder with cable connection.	
ENE-340-010C	Electrode holder	**£18·00**
	Magnetic followers	*See SWX-350*

ACCESSORIES

	Inner electrode, anode, platinum gauze cylinder, 320 × 320 × 140mm overall height.	
ENE-340-502E	Inner electrode, anode	**£162·00**
	Outer electrode, cathode, platinum gauze cylinder, 450 × 450 × 125mm overall height.	
ENE-340-512B	Outer electrode, cathode	**£252·00**
	Beaker cover, polythene, with slot to allow for entry of electrodes. Recommended to minimise the loss of solution as spray.	
ENE-340-522V	Beaker cover	**£0·90**
	Beakers	*See BNB-300*

POWER SUPPLY UNIT, *GALLENKAMP*, **single test,** as specified, output 7A d.c. at 12V. With ammeter, voltmeter and rheostat. Overall dimensions 450 × 300 × 230mm. For single phase supplies.

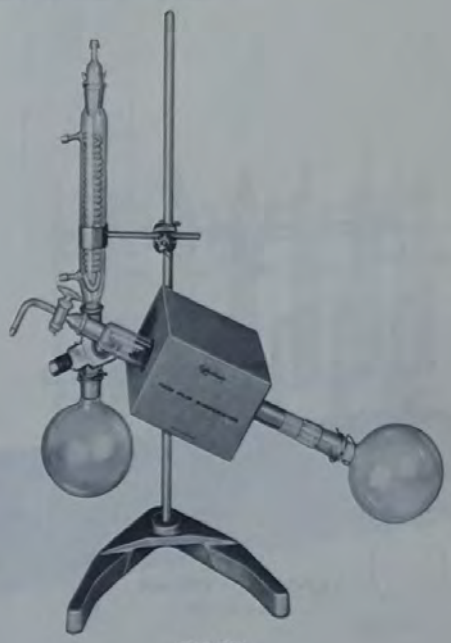
ENE-370-010E	Power supply, 220–240V 50Hz	**£123·75**
ENE-370-030V	Power supply, 110–120V 60Hz	**£135·00**

POWER SUPPLY UNIT, *GALLENKAMP*, **3-test,** otherwise similar to ENE-370 but output 7A d.c. at 12V on each circuit. Overall dimensions 830 × 600 × 350mm. For single phase supplies.

ENE-390-010N	Power supply, 220–240V 50Hz	**£334·13**
ENE-390-030H	Power supply, 110–120V 60Hz	**£356·63**

Gallenkamp ROTARY THIN FILM EVAPORATOR

- **For evaporation under vacuum with gentle heating applied where necessary**
- **Especially useful with heat-sensitive materials**
- **Rapid distillation occurs at temperatures well below normal boiling points**
- **Suitable for batch and semi-continuous operation**
- **Alternative assemblies – distillate collected or run to waste**
- **Typical distillation rate – 190 ml/hour of water at 40°C and 25 torr pressure**
- **Applications in pharmacology, biochemistry, preparative chemistry, explosives chemistry and nutritional studies**



EVF-320

A precision ground glass sleeve, driven by a rim-drive mechanism in the motor housing, rotates over a stationary precision ground tube, the two glass members forming a rotating glass seal assembly when lubricated with silicone oil.

Either the purpose made evaporator flask EVF-370, which has a cone neck to prevent lubricating oil entering the flask, or an ordinary 24/29 socket necked flask used with the cone-to-cone adapter can be attached and clipped to the rotating member. A lipped, moulded washer between the drive mechanism and the rotating member prevents the evaporator flask from slipping when the vacuum is released.

The stationary member is fitted with a sample feed tube with stopcock and a spherical joint side tube. This side tube optionally accepts a tubing adapter for 6·5 mm bore vacuum tubing (when distillate runs to waste) or condenser adapter for fitting the collection flask/condenser assembly (when distillate is to be collected). A vaccum adapter for the top of the condenser is supplied also with model EVF-320.

The whole assembly is mounted on a stand and the height and angle of the glassware can be adjusted.

Accessory condenser QCJ-730-W is required when very volatile solvents are being removed.

Overall length 600 mm, height of stand 700 mm, net mass including stand 6 kg.

THIN FILM EVAPORATOR, *GALLENKAMP*, as specified, for evaporations in which distillate is run to waste. Comprises stand, motor housing, 500 ml cone-necked evaporator flask, rotating glass seal assembly, sample feed tube with stopcock, spherical joint adapter for vacuum tubing, joint clips and bottle of silicone oil. With instructions. For single phase a.c. supplies.

EVF-300-010B	Evaporator, 220–240 V 50 Hz	**£87·19**
EVF-300-030S	Evaporator, 110–120 V 60 Hz	**£87·75**

THIN FILM EVAPORATOR, *GALLENKAMP*, for evaporations in which distillate is either run to waste or is collected. As EVF-300 but with 500 ml collection flask, double surface condenser, condenser adapter for fitting collection flask/condenser assembly, 24/29 vacuum tubing adapter for the top of condenser and stand fittings. For single phase supplies.

EVF-320-010K	Evaporator, 220–240 V 50 Hz	**£100·13**
EVF-320-030E	Evaporator, 110–120 V 60 Hz	**£100·69**

CONVERSION SET, comprising adapter, collector flask, condenser and stand fittings to convert EVF-300 to EVF-320.

EVF-350-P	Conversion set	**£12·94**

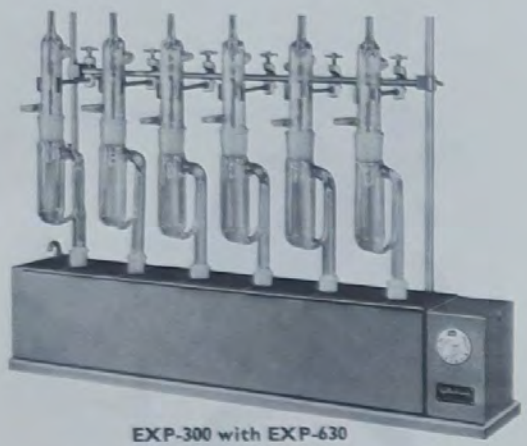
SPARE PARTS for EVF-300 and EVF-320

EVF-370-010V	Rotating glass seal assembly.	**£10·58**
	Evaporator flasks, cone necked.	
EVF-370-050J	Flask, 250 ml	**£1·24**
EVF-370-070D	Flask, 500 ml	**£2·14**
EVF-370-090U	Flask, 1000 ml	**£2·36**
EVF-370-150F	Tubing adapter, spherical joint.	**£2·51**
EVF-370-170W	Sample feed tube with stopcock	**£4·17**
EVF-370-190Q	Silicone oil, 25 ml	**£0·62**
EVF-370-210N	Clip for conical ground joints. (F)	**£0·56**
EVF-370-230H	Condenser adapter	**£5·12**
EVF-370-250B	Idler wheel assembly	**£2·25**
	Condenser, double surface	*See QCJ-110-P*
	Vacuum tubing adapter for QCJ-110-P	*See QAL-120-K*
	Collector flask, 500 ml	*See QFH-290-H*
	Clip for spherical joints S29	*See QJL-820-Q*
	Clamp, 35 mm, for condenser	*See STE-820-050G*
	Bosshead for STE-820-050G	*See STE-480-L*
	Socket wrench for STE-480-L	*See STH-270-518L*

ACCESSORIES

	Cone-to-cone adapter. **Without** joint clip EVF-370-210N.	
EVF-370-502A	Adapter	**£2·57**
	Flasks, socket neck	*See QFH-250-M to QFH-340-L*
	Condenser, effective area approximately 400 cm²	*See QCJ-730-W*
	Vacuum pumps	*See PXY-400-U and PYB-500*
	Water baths	*See BJP-600*
	Receiver support	*See STK-220-J*

Gallenkamp WATER BATH FOR SOXHLET EXTRACTIONS



EXP-300 with EXP-630 and clamps

WATER BATH, Soxhlet, *GALLENKAMP*, stainless steel, to take six flasks of up to 500ml capacity. Overall dimensions 180 × 850 × 165mm high, with sectional top cover for easy access to individual flasks. The base supports two aluminium alloy rods, extending 600mm above the bath top, carrying a horizontal rod, the height of which can be adjusted. The flasks are supported on a shelf above the 1kW tubular immersion heater which extends practically the length of the bath, giving uniform heating. Temperature is controlled by an energy regulator housed in a compartment at one end of the bath. With integral constant level device and mains cable but **without** glassware, condenser clamps and bossheads. For a.c. single phase supplies.

EXP-300-010R	Water bath, 220–240V	**£150·75**
EXP-300-030L	Water bath, 110–120V	**£151·31**

SPARE PARTS

EXP-320-010D	Heater, 220–240V	**£9·90**
EXP-320-030U	Heater, 110–120V	**£9·90**

ACCESSORIES

Extraction apparatus See *EXP-630*

Spring clamp, 35mm diameter, for 40/38 joint condensers CRN-470-E and CRN-490-010K See *STE-820-050G*

Spring clamp, 40mm diameter, for 50/42 joint condenser CRN-490-030E See *STE-820-070A*

Bosshead, to support spring clamps on horizontal support rod See *STE-480-L*

AIR BATHS FOR SOXHLET EXTRACTIONS



EXP-390-050

For flasks of 100 to 150ml and 200 to 350ml capacities. Heated by coiled-coil nickel-chromium elements supported by knitted glass fabric situated close to the flasks. Heat losses are minimised by glass wool insulation. Temperature is accurately controlled by built-in energy regulators, one for each flask position.

Overall width 250mm, length of three-position baths 660mm, length of six-position baths 1170mm.

AIR BATHS, *ELECTROTHERMAL*, as specified, with support rods but **without** glassware, condenser clamps and bossheads. For a.c. single phase supplies.

No. of places	3	6	6	
Flask capacity, ml	200/350	100/150	200/350	
Rating at 250V, W	450	600	900	
EXP-390-010A	Bath, 3 × 200/350ml, 200–250V			**£93·50**
EXP-390-030R	Bath, 3 × 200/350ml, 110–130V			**£93·50**
EXP-390-050L	Bath, 6 × 100/150ml, 200–250V			**£137·50**
EXP-390-070F	Bath, 6 × 100/150ml, 110–130V			**£137·50**
EXP-390-090W	Bath, 6 × 200/350ml, 200–250V			**£148·50**
EXP-390-110T	Bath, 6 × 200/350ml, 110–130V			**£148·50**

QUICKFIT SOXHLET ASSEMBLIES

Complete with extractor body, flask and condenser.

Extractor body capacities from 40 to 2000ml.

See *QEK-100-N et seq.*

Gallenkamp SOXHLET EXTRACTORS

EXTRACTORS, Soxhlet type, *GALLENKAMP*. A compact extractor in which the siphon tube is protected by being enclosed within the vapour tube. Reduces breakage and permits high boiling rates due to the large diameter of the vapour tube. The siphon operates reliably with water or organic solvents at normal rates of extraction.

Capacity, ml	40	100	200
Socket size	29/32	40/38	50/42
Cone size	24/29	24/29	29/32
For thimble, mm	22 × 80	30 × 100	41 × 123

EXP-600-030K	Extractor, 40 ml	**£7·13**
EXP-600-050E	Extractor, 100 ml	**£7·82**
EXP-600-070V	Extractor, 200 ml	**£8·97**



EXP-600

EXTRACTION APPARATUS, Soxhlet. Each assembly comprises extractor EXP-600 with flat bottomed flask and Davies double surface condenser. On the two larger sizes the cone joint of the condenser forms the lower end of the water jacket, making a compact and convenient extraction combination.

Extractor capacity, ml	40	100	200
Flask capacity, ml	150	250	500
Flask socket	24/29	24/29	29/32
Condenser cone	29/32	40/38	50/42

EXP-630-030M	Extraction apparatus, 40 ml	**£15·07**
EXP-630-050G	Extraction apparatus, 100 ml	**£17·37**
EXP-630-070A	Extraction apparatus, 200 ml	**£19·38**



EXP-630

SintAGlass EXTRACTION THIMBLES

EXTRACTION THIMBLES, *SINTAGLASS*, borosilicate glass. Made entirely from sintered glass. Mechanically strong, having a wall thickness of 2 to 3 mm, can be handled when wet. For most purposes can be used instead of paper thimbles, the initial cost being offset by repeated use. The porosity figures given are approximate.

Nominal size, mm	22 × 80	30 × 100	41 × 123
Suitable for extractors EXP-600 and EXP-630, ml	40	100	200

EXP-700-030C	Thimble, 22 × 80 mm, porosity 1	**£3·68**
EXP-700-050T	Thimble, 30 × 100 mm, porosity 1	**£3·68**
EXP-700-070N	Thimble, 41 × 123 mm, porosity 1	**£3·80**
EXP-700-230R	Thimble, 22 × 80 mm, porosity 3	**£3·68**
EXP-700-250L	Thimble, 30 × 100 mm, porosity 3	**£3·68**
EXP-700-270F	Thimble, 41 × 123 mm, porosity 3	**£3·80**

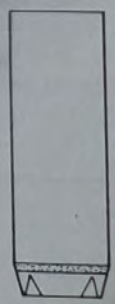


EXP-700

EXTRACTION THIMBLES, *SINTAGLASS*, borosilicate glass, with sintered plate fused into a glass tube. Can be heated in a furnace up to about 500°C and dried to constant mass in an oven.

Nominal size, mm	22 × 80	30 × 100	41 × 123
Plate dia., mm	20	30	40
Height above plate, mm	75	95	110
Suitable for extractors EXP-600 and EXP-630, ml	40	100	200

EXP-750-030N	Thimble, 22 × 80 mm, porosity 1	**£1·50**
EXP-750-050H	Thimble, 30 × 100 mm, porosity 1	**£1·67**
EXP-750-070B	Thimble, 41 × 123 mm, porosity 1	**£2·13**
EXP-750-130J	Thimble, 22 × 80 mm, porosity 2	**£1·50**
EXP-750-150D	Thimble, 30 × 100 mm, porosity 2	**£1·67**
EXP-750-250W	Thimble, 30 × 100 mm, porosity 3	**£1·67**



EXP-750

Gallenkamp



EXP-880 with condenser and siphon cap

EXTRACTION THIMBLES, *WHATMAN*, fat-free paper, seamless. Single thickness.

EXP-800-030R	Thimbles, 10 × 50 mm	Box of 25 **£3·72**
EXP-800-070F	Thimbles, 19 × 90 mm	Box of 25 **£3·72**
EXP-800-110T	Thimbles, 22 × 80 mm	Box of 25 **£3·72**
EXP-800-150H	Thimbles, 25 × 80 mm	Box of 25 **£3·72**
EXP-800-190S	Thimbles, 25 × 100 mm	Box of 25 **£3·72**
EXP-800-230J	Thimbles, 30 × 100 mm	Box of 25 **£4·15**
EXP-800-270U	Thimbles, 33 × 100 mm	Box of 25 **£4·15**
EXP-800-310L	Thimbles, 41 × 123 mm	Box of 25 **£5·94**

EXTRACTION THIMBLES, *WHATMAN*, as EXP-800 but double thickness.

EXP-830-110V	Thimbles, 22 × 80 mm	Box of 25 **£7·43**
EXP-830-230L	Thimbles, 30 × 100 mm	Box of 25 **£8·31**
EXP-830-270W	Thimbles, 33 × 80 mm	Box of 25 **£7·43**

EXTRACTION FLASK, conical, borosilicate glass, capacity 400 ml. Suitable for rubber analysis to ASTM D297 when used with accessories listed below.

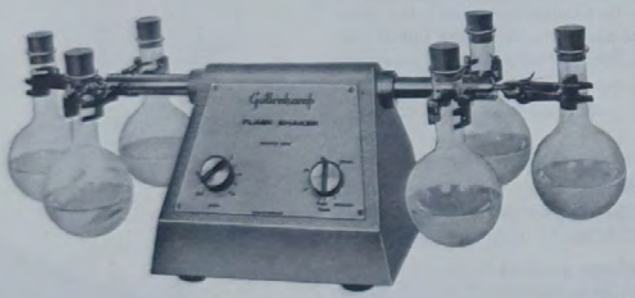
EXP-880-Q	Extraction flask, 400 ml	**£0·87**

ACCESSORIES

	Condenser, tin spiral, to fit neck of flask EXP-880-Q. (F)	
EXP-890-502Y	Condenser	**£9·39**
	Siphon cup, borosilicate glass, with suspension holes. Approximately 28 mm internal diameter × 65 mm long.	
EXP-890-512F	Siphon cup	**£1·28**

Gallenkamp FLASK SHAKER

For dissolving, dispensing, extracting and other applications

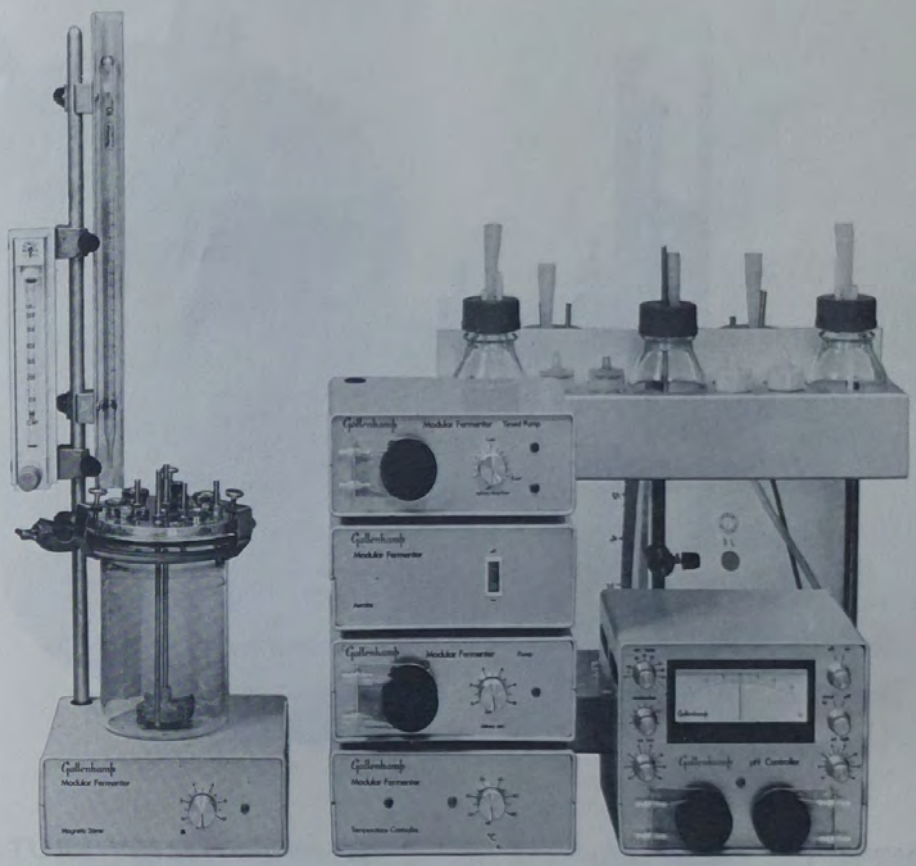


- **Accepts up to six 500 ml flasks**
- **Positive grip clamps**
- **Speeds up to 800 oscillations/min**
- **Integral 0 to 20 minute timer**

See SGL-700

Gallenkamp MODULAR FERMENTER

For the growth and study of micro organisms under batch or continuous culture conditions



A series of modules designed to enable user to build-up a fermenter system as required. The modules stack one upon another to form compact assemblies using a minimum of bench space.

CULTURE VESSEL MODULE
A 1 litre gross capacity borosilicate glass vessel with cover plate and ports.

MAGNETIC STIRRER MODULE
Variable speed from about 200 to 2000rev/min with true speed control.

TEMPERATURE CONTROL MODULE
Maximum temperature 60°C with thermistor and heater which can be autoclaved.

AERATION MODULE
Complete with flowmeter measurement and air filters.

NUTRIENT/HARVEST PUMP MODULE
Twin channel variable speed pump with flow measuring system.

RACK MODULE
Provides a tidy and convenient means of housing storage and sampling bottles.

TIMED PUMP MODULE
Enables small amounts of antifoam to be added at regular intervals.

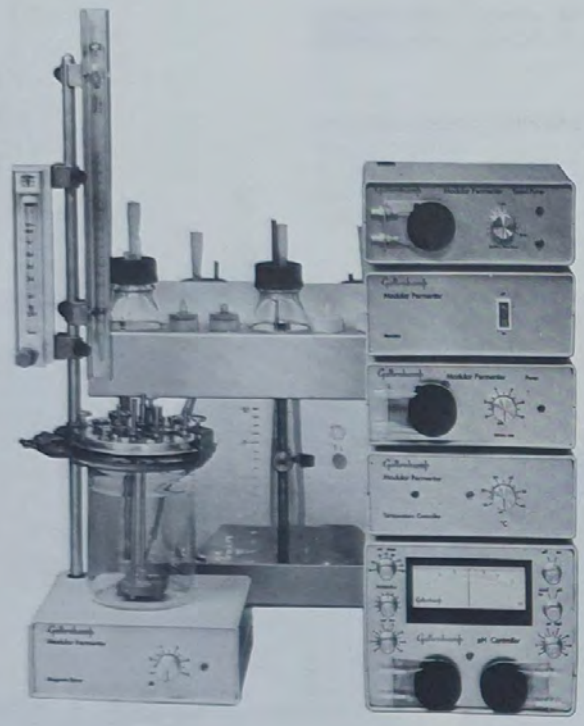
pH CONTROL MODULE
With two adjustable set points, pumps to deliver acid or base and electrode which can be autoclaved.

OXYGEN MEASUREMENT
Meter indication with output for a recorder. Electrode can be autoclaved.

Continued overleaf

Gallenkamp

Gallenkamp MODULAR FERMENTER



The system is presented as a series of modules each of which can be added to the basic fermenter vessel module independently of all others. Most of the modules can also be used as components of other fermentation systems, either proprietary or custom built. Each module is supplied with associated hardware and instructions to enable the user to commence work with the minimum of delay.

Stacking facility

The modules can be stacked one upon another to form compact, convenient assemblies and each module is supplied with a boss to plug into the module below to stabilise the stack.

The system is designed for use in industrial or university research but has applications in general education and can be operated by individual students. Although designed for operation as a chemostat it can be adapted to turbidistat or other control means.

Separate modules for stirring, temperature control, aeration, pH and other parameters allow systems ranging from simple batch culture to an instrumented continuous culture to be built up and modified as required.

Power Supply Arrangements

Every module is fitted with power supply inlet and outlet sockets in the rear panel of its case. By the use of connecting leads between modules, a complete system can be built up free from unnecessary trailing leads and requiring only one connection to the mains electricity supply. Every module is supplied with a mains lead 1·5m long having a connector fitted at one end and an inter-module connecting lead, 300mm or 900mm long as specified, fitted with connectors at both ends.

Technical data

Vessel	
Body diameter	110mm
Maximum diameter	160mm
Height, depending on accessories,	from 200mm to 400mm
Module cases	
Height, general	85mm
pH module	170mm
Width	200mm
Depth	190mm
Power requirement	
Maximum for a complete set	200 W

Sterilisation

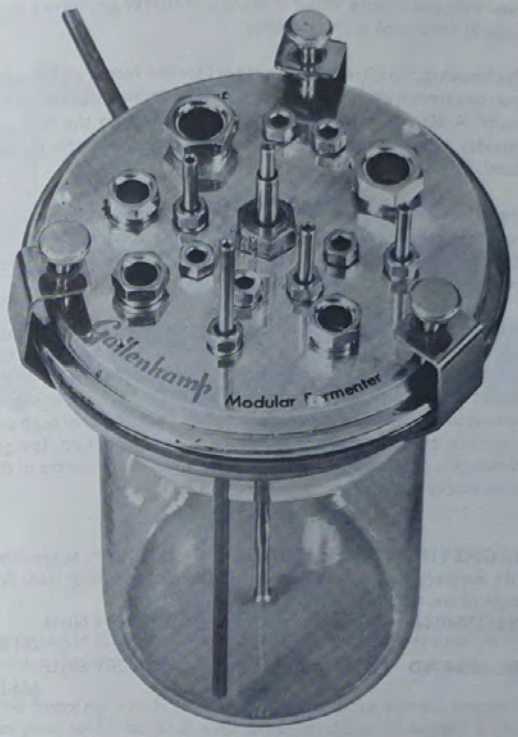
The vessel and accessories are intended for sterilisation by autoclaving at 121°C.

The rack module complete with vessel and two 5 litre storage bottles will fit into an autoclave with a working space of 450mm diameter by 420mm deep.

AUX-700 is a suitable autoclave.

The 20 litre storage vessel with cap assembly is approximately 350mm diameter by 600mm high.

Gallenkamp MODULAR FERMENTER



FBL-200



FBL-200 with FBL-280

CULTURE VESSEL MODULE

This module comprises a 1 litre gross capacity culture vessel with cover plate and associated seals, connecting tubes and sampling bottles. On its own it is suitable for simple batch culture work. In conjunction with other modules it forms the basis for systems of increasing complexity for continuous culture applications.

The materials which come into contact with the culture are stainless steel, glass, inert plastics and elastomers.

The Culture Vessel is borosilicate glass. It has a gross capacity of 1 litre and a working capacity in the range of 200 to 800ml depending on conditions required. Culture level may be controlled by the use of one of the tubes supplied as a downwards pointing weir pumped by nutrient/harvest module. For applications requiring a gravity or wide bore weir an accessory vessel with side arm is available. Aeration can be by the vortex action of the stirrer module or by sparger action. Gas inlet tubes for both methods are included.

The Cover Plate is stainless steel with an aluminium backing plate. It is fitted with fifteen ports of various diameters to provide access for instruments and for tubes for the addition and removal of gases and liquids. Items fitted through the plate are sealed to it by toroidal rings compressed by easily tightened gland nuts. The module is supplied with a set of five stainless steel tubes, a thermometer pocket and sets of gland nuts, sealing rings and blanking discs for ports not in use.

The Main Seal between the vessel and the cover plate is a toroidal ring compressed between the vessel flange and the cover plate by three hand-tightened screw clamps.

Technical data

Gross capacity	1 litre
Working capacity	200ml to 800ml
Cover ports	2 of 12·5mm bore 3 of 9·5mm bore 9 of 5mm bore 1 of 5mm bore (central tube)
Tubes supplied	3 of 5mm o.d., 50mm long 1 of 5mm o.d., 200mm long 1 sparger of 5mm o.d. × 225mm long

CULTURE VESSEL MODULE, *GALLENKAMP*, as specified, with vessel, cover plate and associated hardware.

FBL-200-W	Culture vessel module	**£74·81**

SPARE PARTS

FBL-220-030W	Main sealing ring	**£1·54**
FBL-220-070K	Port sealing rings	Set of 15 **£1·20**
FBL-220-090E	Port blanking discs	Set of 14 **£0·79**
	Culture vessel, glass part only	*See QRE-110-P*

ACCESSORY

Vessel, glass, with 16mm bore side arm 30mm above base. Facilitates fitting gravity or wide bore harvest system, level tube or external circulation loop for optical density monitoring and turbidistat control.

FBL-220-506W	Vessel with side arm	**£17·44**

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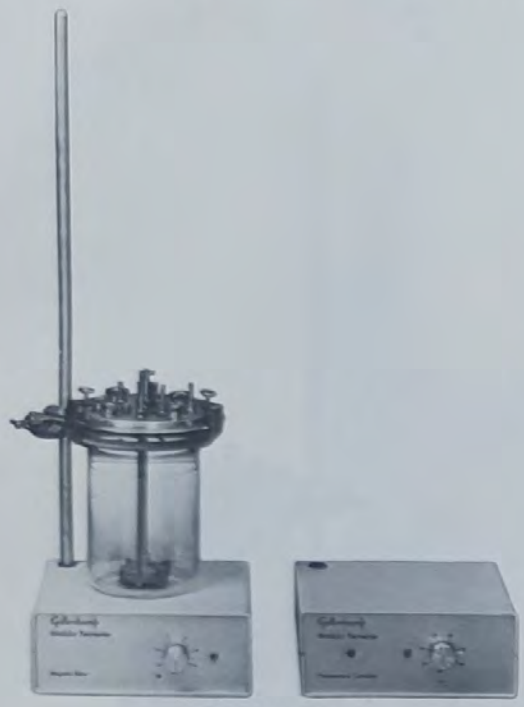
Gallenkamp MODULAR FERMENTER



FBL-280 with
FBL-200 and FBL-330

MAGNETIC STIRRER MODULE

Used with the culture vessel module this stirrer provides a wide range of controlled stirring speeds.

The housing, which serves as a support for the vessel, is finished in two-tone stoved enamel and incorporates a cooling system for the motor. A 600mm retort rod supplied screws into the case and provides a secure support and location facility for the culture vessel.

The stirrer drive magnet is mounted on a powerful, brushless motor. The speed range of the motor is approximately 200 to 2000 rev/min. and is controlled by a true control system which for any given culture conditions maintains virtually constant speed.

The stirrer magnet used in the culture vessel is incorporated into a plastics disc turbine with four blades on both surfaces of the disc. When correctly located on the sparger tube supplied with the culture vessel it will not damage electrodes, etc., if it should become uncoupled from the drive magnet. Mixing is thorough and aeration is efficient whether by vortex or sparger action. Sparger efficiency is enhanced by having the air outlet in the centre of the underside of the stirrer.

MAGNETIC STIRRER MODULE, *GALLENKAMP*, as specified with support rod, mains lead and 900mm connecting lead. For single phase supplies.

FBL-280-010J Magnetic stirrer module, 220–240V 50Hz **£61·88**

FBL-280-030D Magnetic stirrer module, 110–120V 60Hz **£64·13**



FBL-330 as part of a
typical assembly

TEMPERATURE CONTROL MODULE

Used with the culture vessel module this module will provide accurate temperature control from a few degrees below ambient temperature (with a suitable supply of cold water) to 60°C.

The housing, which is finished in two-tone stoved enamel is designed to be stacked with other modules and contains the temperature control systems.

Temperature control is provided by a COMPENSTAT thermostat which has a scale calibrated 10 to 60°C. The thermistor and heater used are designed to be fitted in ports in the vessel cover plate. They can be autoclaved at 121°C.
Temperature fluctuation is ±0·15°C.

Cooling is required when cultures are to be grown near to or below ambient temperature. The module incorporates a needle valve and a solenoid valve with automatic control to admit cooling water to a cooling coil in the culture vessel when necessary. A cooling coil with connecting tubing is supplied but a supply of cold water from the mains or chiller circulator is required.

TEMPERATURE CONTROL MODULE, *GALLENKAMP*, as specified, with COMPENSTAT, autoclaveable thermistor and heater, cooling coil, mains lead and 300mm connecting lead. For single phase supplies.

FBL-330-010N Temperature control module, 220–240V 50Hz **£124·88**

FBL-330-030H Temperature control module, 110–120V 60Hz **£126·13**

SPARE PARTS

FBL-350-010W	Heater, 220–240V	£17·44
FBL-350-030Q	Heater, 110–120V	£18·00
FBL-350-090V	Thermistor	£12·94

Gallenkamp MODULAR FERMENTER



FBL-420



FBL-500

AERATION MODULE

This module forms an air supply and measurement system for the culture vessel module.

The housing which is finished in two-tone stoved enamel is designed to be stacked with other modules. It houses a twin compressor capable of providing a free air-flow rate in excess of 2 litres/min. The compressor has an ON-OFF switch.

Air-flow measurement and control is provided by a rotating float flowmeter range 0·2 to 2 litres/min which incorporates a manual flow control valve. The flowmeter is fitted with inlet and outlet nozzles and it has clamps for attaching to a 13mm diameter retort rod. Connecting tubing is supplied.

Air filters are supplied to sterilise air entering and leaving the vessel. They are autoclaveable and have an NaCl penetration of less than 0·001% at an air-flow rate of 10 litres/min.

A water cooled outlet tube provided condenses water vapour out of the air leaving the vessel and so prevents excessive loss of culture volume by evaporation and the wetting of the outlet filter.

AERATION MODULE, *GALLENKAMP*, as specified, with pump, flowmeter, filters, outlet tube, mains lead and 300mm connecting lead. For single phase supplies.

FBL-420-010M	Aeration module, 220–240V 50Hz	**£94·50**
FBL-420-030G	Aeration module, 110–120V 60Hz	**£96·75**

SPARE PARTS

FBL-440-030P	Bacteriological filter	**£5·52**
FBL-440-090U	Outlet condenser	**£5·63**
FBL-440-110R	Outlet condenser seals	**£0·45**

NUTRIENT/HARVEST PUMP MODULE

A system for simultaneous nutrient addition and harvest removal. An adjustable true speed controller ensures constant pump speed. A flow measuring system is included.

An alternative use is for the addition of two part nutrient solutions but additional provision for harvest removal then becomes necessary.

The housing, which is finished in two-tone stoved enamel, is designed to be stacked with other modules. It contains the twin rotor peristaltic pump and its speed control system.

The twin rotor pump provides the means of simultaneously adding nutrient to the vessel and removing harvest from it. By using tubes of different bores, build up of culture volume is prevented. The pump motor has a true speed control system to ensure that once set its speed remains virtually constant. The motor speed is continuously adjustable over a ratio of about 10 to 1 and this, together with the 1 to 5mm bore range of pump tubes supplied, gives a pump delivery rate range of approximately 0·05 to 15ml/min.

A flow measuring assembly including a mounting frame for attachment to a retort rod and a 10ml flow measuring pipette is included. By the use of this assembly the rate of supply of nutrient to the vessel can be measured by a direct timing operation without interrupting the nutrient flow.

Drip feed flow breakers with and without an air supply tube are included to give added protection against the grow back of organisms along the nutrient supply tube.

Supplied complete with connecting tubing, vessel inlet and outlet tubes and sample bottle.

NUTRIENT/HARVEST PUMP MODULE, *GALLENKAMP*, as specified, with twin rotor pump, pump speed control, flow measuring assembly, mains lead and 300mm connecting lead. **Without** storage bottles or stopper assemblies. For single phase supplies.

FBL-500-010S	Nutrient pump module, 220–240V 50Hz	**£105·75**
FBL-500-030M	Nutrient pump module, 110–120V 60Hz	**£108·00**

SPARE PARTS

FBL-520-050P	Tubes, 1, 2, 3, 4 and 5mm bore assorted. Pack of 50	**£2·57**
FBL-520-070J	Tube connectors, 1, 2·5, 4 and 5mm bore assorted. Pack of 8	**£3·49**
FBL-520-110A	Flow pipette, 10ml	**£18·56**
FBL-520-130R	Drip feed	**£1·69**
FBL-520-150L	Drip feed with side arm	**£1·80**

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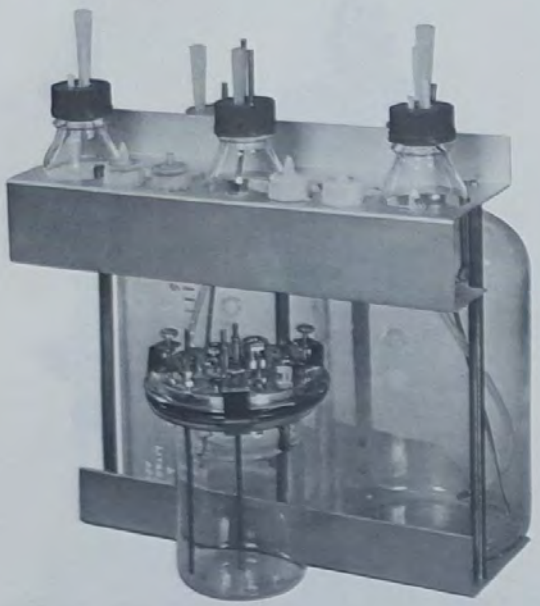
Gallenkamp MODULAR FERMENTER



FBL-620 with bottles and culture vessel



FBL-650

STORAGE AND HANDLING SYSTEMS

The following items are available to facilitate the preparation, autoclaving, storage and transfer of nutrient solutions and harvest products.

STOPPER ASSEMBLIES, for 5 and 20 litre bottles BTF-300, comprising a drilled Neoprene stopper, stopper retaining clamp, filter tube, tubes for transfer, sampling bottle, connector and silicone tubing. The 20 litre assembly also includes a stainless steel tube coupler to facilitate connection of the bottle after separate autoclaving.

FBL-580-070N	Stopper assembly, 5 litre	**£18·00**
FBL-580-110E	Stopper assembly, 20 litre	**£45·56**

Bottles — *See BTF-300*

RACK MODULE

An aluminium rack designed to support the storage and sampling bottles needed for a wide range of culture systems. It includes places for two 5 litre bottles BTF-300-170X and it has a fixing point where the culture vessel module can be secured during autoclaving.

Loaded with all bottles and the culture vessel the rack will fit into an autoclave with an internal diameter of 450mm and a working depth of 420mm. During the subsequent use of the system, the rack is very convenient for keeping the various bottles tidy and yet readily accessible.

RACK MODULE, *GALLENKAMP*, as specified. **Without** bottles.

FBL-620-W	Rack module	**£28·13**

Bottle cradle — *See BTS-870-E*

TIMED PUMP MODULE

This module is intended primarily for the addition of small amounts of antifoam agent to a culture at regular intervals.

The housing, which is finished in two-tone stoved enamel, is designed to be stacked with other modules. It houses a peristaltic pump and its control unit together with a mains lamp and a manual override switch.

The pump control circuit causes the pump motor to switch on for an adjustable period of 0 to 2 minutes duration and off for a fixed period of 60 minutes. With the pump tube supplied this results in the addition of up to 2ml/hour.

A storage bottle of 250ml capacity complete with cap, stopper, delivery tube, filter and connectors is supplied for autoclaving and storing the antifoam supply. Supplied complete with connecting tubing and vessel inlet tube.

TIMED PUMP MODULE, *GALLENKAMP*, as specified, with pump, pump control, storage bottle, mains lead and 300mm connecting lead. **Without** antifoam. For single phase supplies.

FBL-650-010V	Timed pump module, 220–240V 50Hz	**£75·38**
FBL-650-030P	Timed pump module, 110–120V 60Hz	**£77·63**

SPARE PART

FBL-670-010H	Pump tube, 2mm bore	Metre **0·62**

ACCESSORY

FBL-670-502J	Antifoam, polypropylene glycol 2000	250ml **£1·13**

Gallenkamp MODULAR FERMENTER



FBL-720



FBL-720 as part of a typical assembly

pH CONTROL MODULE

A pH measuring and control unit incorporating two independently adjustable control set points with built-in acid and base supply peristaltic pumps. The electrode is of the combination type and is autoclaveable.

The housing, which is finished in two-tone stoved enamel is twice the height of the other modules. It contains the measuring and control circuits, including the peristaltic pumps.

The electrode is supplied with a special support/gland nut to fit it to the cover plate of the vessel. It is of the combination type with the glass and calomel half cells in a single probe. It can be autoclaved at temperatures up to 121°C.

The indicating controller has a 95mm long scale graduated 0 to 14pH. It incorporates two set points which are independently adjustable over the full range. Each set point operates its own peristaltic pump so that the controller can maintain the required control in cultures normally encountered. Setting accuracy is 0·1 pH with a fluctuation of 0·1 pH. There is an outlet socket for the connection of a 10mV high input impedance recorder.

The peristaltic pumps draw acid or base solutions from 250ml capacity storage bottles which are supplied with cap, stopper, PTFE delivery tube, filter and connectors. Delivery to the vessel is by silicone tubing and PTFE inlet tubes.

pH CONTROL MODULE, *GALLENKAMP*, as specified, with electrode, two set point control, pumps, mains lead and 900mm connecting lead. **Without** buffer powders. For single phase supplies.

FBL-720-010L	pH control module, 220–240V 50Hz	**£206·44**
FBL-720-030F	pH control module, 110–120V 60Hz	**£208·69**

SPARE PARTS

FBL-730-010E	pH electrode, combined	**£58·50**
	Pump tubes	*See FBL-670-010H*

ACCESSORIES

	Buffer powders	*See PHM-870*

SPARE PARTS

The following list contains spare parts of a general nature, many of which are common to more than one module.

Tube coupler, comprising two stainless steel tubes of 5mm o.d. with hand-tightening coupling and silicone rubber seal, to facilitate the aseptic connection of supply tubes.

FBL-760-070L	Tube coupler	**£2·81**
FBL-760-150N	Sample bottle assembly	**£1·69**
FBL-760-180E	Storage bottle assembly, 250ml	**£7·31**

Shrouded connectors, glass, for use with filling tube. For 8mm bore flexible tubing. Not threaded.

FBL-760-230P	Shrouded connector	**£2·25**

Sampling and filling port connector, male, glass, with R3/28 male thread for use with FBL-760-270D female connectors. For 8mm flexible tubing. Required when transferring large volumes of liquids.

FBL-760-250J	Male connector	**£1·24**

Sampling and filling port connector, female, stainless steel. For 8mm bore flexible tubing and with R3/28 female thread for universal containers and FBL-760-250J male connectors.

FBL-760-270D	Female connector	**£6·19**

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Gallenkamp MODULAR FERMENTER



FBL-820

OXYGEN MEASUREMENT

A system for the measurement of the oxygen content of cultures in the culture vessel module.

The case, of stove enamelled steel, is 105mm wide, 145mm high and 295mm deep.

The meter has a 60mm long scale calibrated 0 to 100% saturation of oxygen. Zero and span adjustment controls, a mains switch and mains indicator lamp are fitted. There is an output socket for connection to a 10mV recorder.

The electrode is 165mm long overall and is supplied with a support/gland nut to fit the cover plate of the culture vessel. It is fitted with a 1m cable terminating in a plug for connection to the measuring circuit. The electrode and its cable can be autoclaved.

Supplied complete with a maintenance kit including electrolyte filling syringe and five spare membranes with retaining sleeves.

OXYGEN MEASURING SYSTEM, as specified, with electrode. For single phase supplies.

FBL-820-010D Oxygen measuring system, 220–240V 50Hz **£248·63**

FBL-820-030U Oxygen measuring system, 110–120V 60Hz **£248·63**

SPARE PARTS

Oxygen electrode	*See DOS-540-516W*
Maintenance kit	*See DOS-540-524A*

Gallenkamp ORBITAL INCUBATORS

For growing cultures of micro-organisms and tissue cells under controlled conditions of temperature and agitation. The orbiting motion of the sample platform minimises accretion of material on the sides of flasks, provides good transfer of gas to the culture and avoids undue buffeting of the organisms and cells

Applications in:

Bacteriology, Biochemistry,

Botany, Immunology,

Metallurgy, Microbiology,

Virology and Zoology.



Basic heated

See INR-200

Heated and refrigerated model

See INR-250

Heated and refrigerated model with illumination and programmed cycling

See INR-400

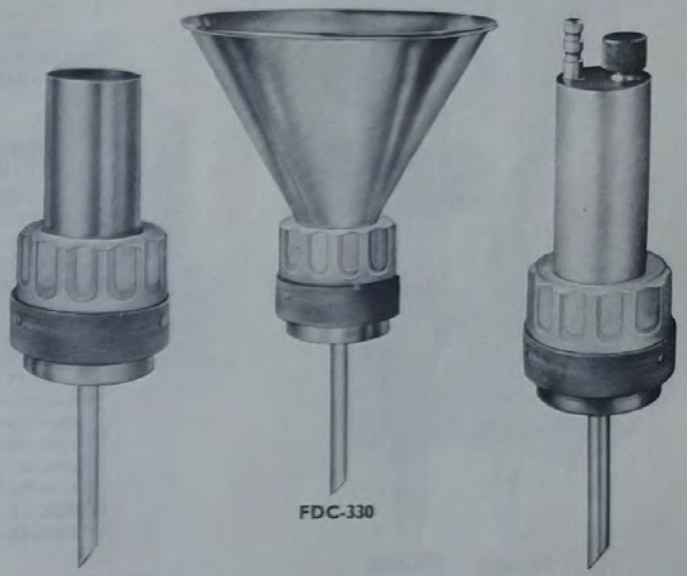
Gallenkamp MEMBRANE FILTER HOLDERS

FOR BACTERIOLOGICAL FILTRATION

Widely used to filter liquids for the separation or examination and analysis of particulate and biological matter

Typical fields of application include:

- **Water, sewage and marine biology**
- **Dairy products**
- **Sugar and allied foodstuffs**
- **Bacteriology, virology and mycology**
- **Antibiotics and disinfectants**
- **Beers, wines and soft drinks**
- **Clinical fluids including blood, urine, spinal fluids, gastric and pleural washings**



FDC-300 FDC-330 FDC-360

A range of membrane holders which are easily assembled and efficient in use.

The membrane which rests on a sintered glass support bed is clamped between silicone rubber gaskets by hand tightening a lock collar on the filter body. A sintered bronze support bed is available as an accessory.

All metal parts are of stainless steel and the locking collar, which does not come into contact with the filtering liquid, is of polypropylene. The components may be sterilised by autoclaving at 121°C (1·05kgf/cm²) and the holder may be loosely assembled with the membrane in position during this process.

FILTER HOLDER, *GALLENKAMP*, as specified, for gravity or vacuum filtration. Accepts 47 or 50mm diameter membranes. With cylindrical funnel top having graduation marks at 50 and 100ml. **Without** membranes.

FDC-300-N Filter holder, 100ml **£11·48**

FILTER HOLDER, *GALLENKAMP*, as specified, for gravity or vacuum filtration. Accepts 47 or 50mm diameter membranes. With conical funnel top, capacity approximately 500ml. **Without** membranes.

FDC-330-P Filter holder, 500ml **£20·48**

FILTER HOLDER, *GALLENKAMP*, as specified, for pressure filtration. Accepts 47 or 50mm diameter membranes. With cylindrical top, capacity 100ml, fitted with an 8mm o.d. nozzle for pressure connection and a screw-on cap for filling and pressure release. **Without** membranes.

FDC-360-R Filter holder, 100ml **£32·29**

SPARE PARTS

FDC-380-010A	Support bed, sintered glass.	**£0·56**
	Funnel top, cylindrical, capacity 100ml, with locking collar.	
FDC-380-050L	Funnel top, 100ml	**£4·22**
	Funnel top, conical, capacity 500ml, with locking collar.	
FDC-380-070F	Funnel top, 500ml	**£14·96**
	Funnel top, pressure, capacity 100ml, with locking collar.	
FDC-380-090W	Funnel top, 100ml, pressure	**£25·09**
FDC-380-110T	Gaskets, silicone rubber.	Pair **£0·68**

ACCESSORIES

FDC-380-502C	Support bed, sintered bronze.	**£0·96**
	Filter membranes	*See FDC-800-030K to FDC-800-070V*
	Filter flasks	*See FHD-350-030H to FHD-350-152Q*

CONVERSION OF FILTER HOLDERS

By selecting the appropriate funnel top, a filter holder can be converted into either of the other models.

To convert	into	use
FDC-300-N	FDC-330-P FDC-360-R	FDC-380-070F FDC-380-090W
FDC-330-P	FDC-300-N FDC-360-R	FDC-380-050L FDC-380-090W
FDC-360-R	FDC-300-N FDC-330-P	FDC-380-050L FDC-380-070F

Gallenkamp ALL-GLASS MEMBRANE FILTER HOLDERS

For bacteriological filtration



FDC-500

Borosilicate glass, easily cleaned and sterilised.

The filter body is available with either 24/29 or 29/32 cone joint, with drip end to deliver below the level of the side tube of the Buchner flask with which it is used.

The selected membrane is supported on a flat ground sintered glass disc. The membrane is clamped between glass flanges held together by a three screw ring clamp which allows the two halves of the holder to be easily assembled and separated.

FILTER HOLDERS, *GALLENKAMP*, as specified, all-glass, for gravity or vacuum filtration. Accepts 47 or 50mm diameter membranes. Comprises funnel top 85mm diameter, capacity approximately 300ml, ring clamp and filter body with sintered glass disc and drip ended cone. **Without** membranes.

FDC-500-010R	Filter holder, 24/29 cone	**£26·66**
FDC-500-030L	Filter holder, 29/32 cone	**£26·66**

FILTER HOLDERS, *GALLENKAMP*, as specified, all-glass, for pressure filtration. Accepts 47 or 50mm diameter membranes. Comprises heavy wall pressure top 80mm diameter, capacity approximately 300ml, pressure connection nozzle, filtrant inlet tube, flow control stopcock, ring clamp and filter body with sintered glass disc and drip ended cone. All nozzles accept 8mm bore flexible tubing. **Without** membranes.

FDC-530-010T	Filter holder, 24/29 cone	**£33·47**
FDC-530-030N	Filter holder, 29/32 cone	**£33·47**

SPARE PARTS

FDC-550-010F	Funnel top	**£6·75**
	Pressure top, with thread to fit screw cap QAK-100-L but **without** inlet tube.	
FDC-550-030W	Pressure top	**£8·04**
FDC-550-090E	Inlet tube to fit screw joint of FDC-550-030W	**£3·71**
	Filter body with sintered plate and 24/29 cone joint.	
FDC-550-150M	Filter body, 24/29 cone	**£9·45**
	Filter body with sintered plate and 29/32 cone joint.	
FDC-550-170G	Filter body, 29/32 cone	**£9·45**
	Screw cap	*See QAK-100-L*
	Rubber ring	*See QAK-160-P*
	PTFE washer	*See QAK-220-M*

ACCESSORIES

Filter pump	*See PXY-400-U*
Filter flasks with 29/32 socket and side arm	*See FHD-380-030J and FHD-380-050D*



FDC-530

FILTER MEMBRANES

FILTER MEMBRANES, *GELMAN* **GA,** cellulose ester, 47mm diameter, 150μm thick. Suitable for biological and pharmaceutical filtrations. White membranes which can be autoclaved and contain a non-toxic, non-ionic wetting agent. Maximum operating temperature 134°C. Membranes of pore sizes 0·45μm and 0·8μm are printed with a grid of approximately 3·1 mm squares. (F)

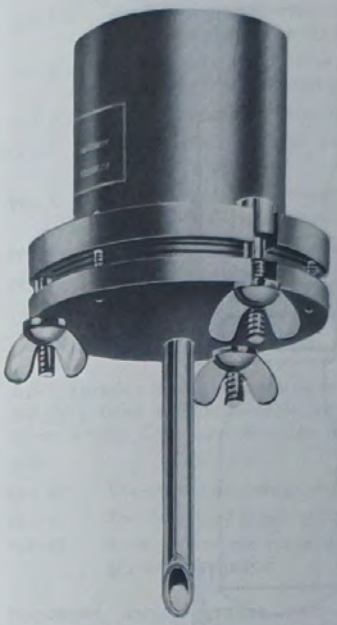
FDC-800-030K	Membranes, 0·2μm pore	Pack of 100 **£11·48**
FDC-800-050E	Membranes, 0·45μm pore	Pack of 100 **£11·48**
FDC-800-070V	Membranes, 0·8μm pore	Pack of 100 **£11·48**

FILTER MEMBRANE, *GELMAN* **GN,** cellulose ester, 47mm diameter, 150μm thick, pore size 0·45μm. A white membrane designed for use in water analysis applications and in particular the detection of coliforms. Maximum operating temperature 110°C. Supplied sterilised for immediate use. Printed with a grid of approximately 3·1 mm squares. (F)

FDC-840-X	Membranes, 0·45μm	Pack of 100 **£11·14**

FILTER HOLDERS

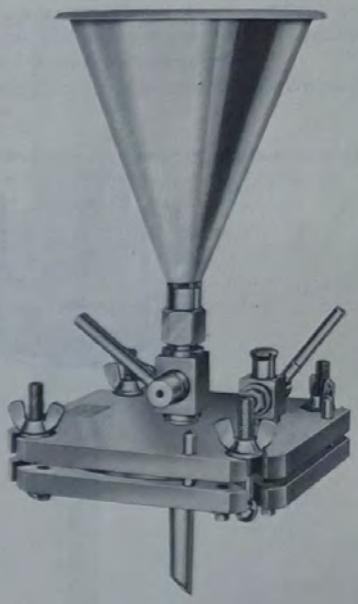
FOR CLARIFICATION AND STERILISATION USING CARLSON-FORD FILTER SHEETS



FDF-200



FDF-230



FDF-270

METAL FILTER HOLDERS

Principally constructed of stainless steel including the gauze to support the filter sheet. The filter sheet forms the joint between the two halves of the filter and is pulled directly into position under an even pressure, thus ensuring a perfect seal.

FILTER HOLDERS, as specified, for vacuum filtration. With cylindrical funnel top.

Capacity, ml	25	80
Dia. filter sheet, mm	36	80

FDF-200-010L Filter holder, 25ml **£48·40**
FDF-200-050W Filter holder, 80ml **£58·75**

FILTER HOLDER, as specified, for vacuum or pressure filtration. Accepts 60mm diameter filter sheets. With cylindrical pressure top, capacity 80ml.
FDF-230-Q Filter holder, 80ml **£68·75**

FILTER HOLDER, as specified, for vacuum or pressure filtration. Accepts 140mm diameter filter sheets. With centre connection to take either an inlet pipe, or funnel of about 650ml capacity. Complete with inlet pipe and 650ml funnel.
FDF-270-L Filter holder, 650ml **£266·70**

ACCESSORIES

Filter sheets, CARLSON-FORD grade HP/EKS.

FDF-300-010D	Filter sheets, 36mm dia.	Box of 25 **£0·41**
FDF-300-050X	Filter sheets, 60mm dia.	Box of 25 **£0·66**
FDF-300-110W	Filter sheets, 140mm dia.	Box of 25 **£1·76**

FILTER SHEETS, CARLSON-FORD Grade HP/EKS

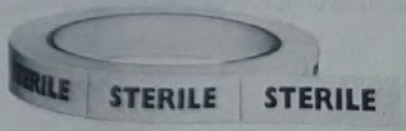
A high purity sterilising grade of asbestos filter sheets which removes deposits by absorption.

To ensure sterility, the filter holder with the sheet loosely in position should be autoclaved at 103kN/m² (1·05kgf/cm²) steam pressure for 30 minutes. If steam is passed through the filter for this purpose, the static pressure must not exceed 34·3kN/m² (0·35kgf/cm²).

The pressure difference between the inlet and the outlet side of the filter must be kept low, and should not exceed 103kN/m² (1·05kgf/cm²) when sterile filtration is required.

STERILE LABELS

- Self-adhesive reels
- Printed blue on white background



See LAB-780-L

Gallenkamp

FILTER HOLDERS

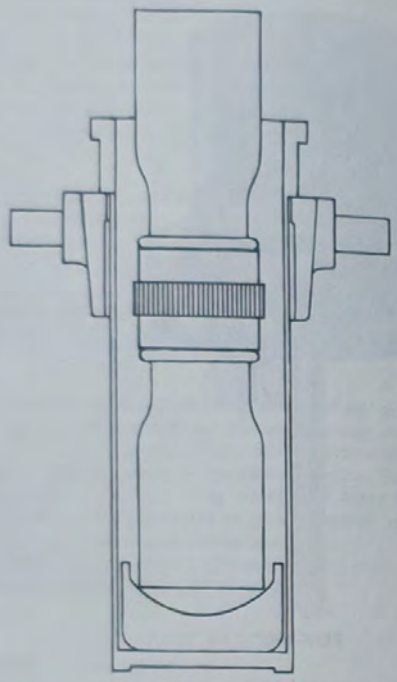
FOR CLARIFICATION AND STERILISATION USING CARLSON-FORD FILTER SHEETS



FDF-500



FDF-600



FDF-600 assembled with bottles in centrifuge bucket

FILTER HOLDERS

Glass, with stainless steel discs. Filtering liquids are in contact with glass and a stainless steel perforated disc which supports the filter sheet. The disc including the filtering holes, is polished to withstand corrosion, and fits in a recess in the lower part of the glass filter. The glass parts are held together by screws with milled heads, which require only finger tightening.

FILTER HOLDERS, as specified, for vacuum filtration. With cylindrical funnel top.

Capacity, ml		20	100	
Filter sheet dia., mm		36	60	
FDF-500-010K	Filter holder, 20ml			**£27·56**
FDF-500-030E	Filter holder, 100ml			**£30·09**

SPARE PARTS

FDF-520-010T	Upper glass part for 20ml holder	**£1·01**
FDF-520-030N	Lower glass part for 20ml holder	**£1·35**
FDF-520-110P	Upper glass part for 100ml holder	**£1·97**
FDF-520-130J	Lower glass part for 100ml holder	**£2·48**
	Filter sheets, CARLSON-FORD grade HP/EKS	
		See FDF-300

HEMMINGS FILTER HOLDERS

Chromium plated brass and used for clarification and sterilisation of small samples of biological fluids, when rapid filtration without heavy loss of material is required. Usually used in pairs in a centrifuge with 50ml buckets. In use each filter holder is fitted with two 7ml screw-cap bottles BTS-300-010V, one to contain the original sample and the other to act as the receiver. The liquid is filtered through 18mm diameter filter sheets and the product can be stored in the receiver bottle, thus minimising the risk of contamination. The filter holders are easily cleaned and assembled. Tests have shown that 4ml of nutrient broth can be sterilised in each filter holder in 5 minutes, using a grade EKS sheet and a centrifuge with appropriate head, rotating at 2300 rev/min.

FILTER HOLDERS, Hemmings, as specified, for use in a 50ml centrifuge bucket. Accepts 18mm diameter filter sheets. **Without** 7ml capacity screw-cap bottles.

FDF-600-F	Filter holders	Pair **£5·61**

ACCESSORIES

	Filter sheets, CARLSON-FORD grade EKS, 18mm diameter.	
FDF-620-010L	Filter sheets, 18mm	Pack of 200 **£2·26**
	Centrifuge	*See CFC-300-0108*
	Screw-cap bottles	*See BTS-300-010V*

WHATMAN FILTER PAPERS

EXPLANATION OF GRADES

Qualitative grades, for filtration purposes where a low ash content is not required.

No. 91 A schools' grade creped paper manufactured to less critical standards than other Whatman papers.

No. 1 Smooth paper, the most widely used for general laboratory filtrations and qualitative analysis.

No. 2 Thicker and more retentive than No. 1

No. 3 Thick, rough surfaced paper, suitable for use in Buchner funnels.

No. 4 An open structure paper. Retains gelatinous precipitates and used in air pollution analysis.

No. 6 A smooth paper capable of retaining fine precipitates.

No. 113V A creped and pleated thick paper suitable for removal of coarse solids or gelatinous precipitates from solution. Used in the preparation of agar-agar solutions.

Ashless grades, for use in accurate gravimetric analysis. All have a slightly grained surface. Suitable for gravity or low suction filtration only. Care must be taken to prevent rupture of the paper.

No. 40 The general purpose gravimetric paper.

No. 41 The most rapid gravimetric paper.

No. 42 A very retentive paper used for the most critical gravimetric analysis.

Hardened, ashless grades, have smooth tough surfaces hardened to give high wet strength and chemical resistance. All can be used in Buchner funnels and are particularly useful for gravimetric analysis in which strongly acidic or alkaline solutions are used.

No. 540 The general purpose hardened ashless paper.

No. 541 The most rapid paper in the hardened ashless range. Used in the immediate stages of gravimetric analysis under strongly acidic or alkaline conditions.

No. 542 The slowest most retentive paper in the range.

Hardened grades, have a tough smooth surface and wet strength/chemical resistance properties similar to the 540 series.

Intermediate in ash content between the equivalent qualitative and ashless grades. All can be used in Buchner funnels.

No. 50 Has a smooth highly glazed surface free from loose surface fibres. Widely used for filtering injection solutions and drying microscope slides.

No. 54 A fast paper for filtering coarse and gelatinous precipitates.

Specialities include ashless tablets, ashless floc, phase separating paper and several grades of glass fibre filter.

MASS OF PAPER AND ASH

Grade No.	Mass, g/m²	Ash (average) %	Ash (average) mg/12·5cm circle	Thickness, mm
91	65 approx.	–	–	0·23 approx.
1	87	0·06	0·6	0·18
2	97	0·06	0·7	0·20
3	185	0·06	1·1	0·38
4	92	0·06	0·6	0·22
6	100	0·06	0·6	0·19
113V	120	–	–	0·45
40	95	0·01	0·11	0·20
41	91	0·01	0·11	0·19
42	100	0·01	0·12	0·20
44	80	0·01	0·09	0·18
50	94	0·025	0·30	0·12
54	90	0·025	0·28	0·18
540	83	0·008	0·08	0·15
541	79	0·008	0·08	0·16
542	95	0·008	0·09	0·16

RELATIVE FILTRATION RATES, RETENTIVITY AND PORE SIZES

Classification	Fast		Fast-Medium	Medium	Slow	
Retaining properties	Coarse particles		Medium particles		Fine particles	
Initial penetration (IPP), size of particles	20 to 30		8 to 11	5 to 7	2·5 to 3	
*Initial filtration speed	3	10 to 12	40 to 55	70 to 90	170 to 180	240 to 250
Qualitative grades	113V	4	91, 1, 2	3	6	
Ashless grades		41		40	44	42
Hardened grades		54				50
Hardened ashless grades		541	540			542

* Time taken for 100ml of clean water to pass through a 15cm quadrant folded circle according to modified ASTM method D981-56.

WHATMAN FILTER PAPERS

No. 91

FDH-200-110K Filter papers, No. 91, 9cm dia. Pack of 200 £0·35
FDH-200-130E Filter papers, No. 91, 11cm dia. Pack of 200 £0·47
FDH-200-150V Filter papers, No. 91, 12·5cm dia. Pack of 200 £0·57
FDH-200-170P Filter papers, No. 91, 15cm dia. Pack of 200 £0·77
FDH-200-190J Filter papers, No. 91, 18·5cm dia. Pack of 200 £1·11
FDH-200-210G Filter papers, No. 91, 24cm dia. Pack of 200 £1·83

No. 1

FDH-240-010J Filter papers, No. 1, 2·1cm dia. Pack of 400 £0·83
FDH-240-030D Filter papers, No. 1, 2·5cm dia. Pack of 400 £0·83
FDH-240-050U Filter papers, No. 1, 4·25cm dia. Box of 100 £0·28
FDH-240-052Q Filter papers, No. 1, 4·25cm dia. Pack of 1000 £2·09
FDH-240-070X Filter papers, No. 1, 5·5cm dia. Box of 100 £0·28
FDH-240-072K Filter papers, No. 1, 5·5cm dia. Pack of 1000 £2·09
FDH-240-090Y Filter papers, No. 1, 7cm dia. Box of 100 £0·28
FDH-240-092E Filter papers, No. 1, 7cm dia. Pack of 1000 £2·20
FDH-240-110F Filter papers, No. 1, 9cm dia. Box of 100 £0·39
FDH-240-112B Filter papers, No. 1, 9cm dia. Pack of 1000 £2·86
FDH-240-130W Filter papers, No. 1, 11cm dia. Box of 100 £0·48
FDH-240-132S Filter papers, No. 1, 11cm dia. Pack of 1000 £3·85
FDH-240-150Q Filter papers, No. 1, 12·5cm dia. Box of 100 £0·59
FDH-240-152M Filter papers, No. 1, 12·5cm dia. Pack of 1000 £4·73
FDH-240-170K Filter papers, No. 1, 15cm dia. Box of 100 £0·77
FDH-240-172G Filter papers, No. 1, 15cm dia. Pack of 1000 £6·38
FDH-240-190E Filter papers, No. 1, 18·5cm dia. Box of 100 £0·94
FDH-240-210B Filter papers, No. 1, 24cm dia. Box of 100 £1·52
FDH-240-230S Filter papers, No. 1, 27cm dia. Box of 100 £1·89
FDH-240-250M Filter papers, No. 1, 32cm dia. Box of 100 £2·66
FDH-240-300A Filter papers, No. 1, 50cm dia. Box of 100 £6·56
FDH-240-330X Filter papers, No. 1, 46 × 57cm sheets Box of 100 £5·97

No. 2

FDH-260-070A Filter papers, No. 2, 5·5cm dia. Box of 100 £0·35
FDH-260-072T Filter papers, No. 2, 5·5cm dia. Pack of 1000 £2·64
FDH-260-090R Filter papers, No. 2, 7cm dia. Box of 100 £0·36
FDH-260-092N Filter papers, No. 2, 7cm dia. Pack of 1000 £2·86
FDH-260-110X Filter papers, No. 2, 9cm dia. Box of 100 £0·51
FDH-260-112K Filter papers, No. 2, 9cm dia. Pack of 1000 £4·07
FDH-260-130Y Filter papers, No. 2, 11cm dia. Box of 100 £0·68
FDH-260-132E Filter papers, No. 2, 11cm dia. Pack of 1000 £5·72
FDH-260-150C Filter papers, No. 2, 12·5cm dia. Box of 100 £0·86
FDH-260-152V Filter papers, No. 2, 12·5cm dia. Pack of 1000 £7·15
FDH-260-170T Filter papers, No. 2, 15cm dia. Box of 100 £0·95
FDH-260-190N Filter papers, No. 2, 18·5cm dia. Box of 100 £1·38
FDH-260-210K Filter papers, No. 2, 24cm dia. Box of 100 £2·27
FDH-260-230E Filter papers, No. 2, 27cm dia. Box of 100 £2·59
FDH-260-250V Filter papers, No. 2, 32cm dia. Box of 100 £3·64
FDH-260-300J Filter papers, No. 2, 50cm dia. Box of 100 £9·79
FDH-260-330A Filter papers, No. 2, 46 × 57cm sheets Box of 100 £9·09

No. 3

FDH-280-070J Filter papers, No. 3, 5·5cm dia. Box of 100 £0·55
FDH-280-072F Filter papers, No. 3, 5·5cm dia. Pack of 1000 £4·40
FDH-280-090D Filter papers, No. 3, 7cm dia. Box of 100 £0·59
FDH-280-092W Filter papers, No. 3, 7cm dia. Pack of 1000 £4·73
FDH-280-110A Filter papers, No. 3, 9cm dia. Box of 100 £0·77
FDH-280-112T Filter papers, No. 3, 9cm dia. Pack of 1000 £6·38
FDH-280-130R Filter papers, No. 3, 11cm dia. Box of 100 £0·98
FDH-280-132N Filter papers, No. 3, 11cm dia. Pack of 1000 £8·47
FDH-280-150L Filter papers, No. 3, 12·5cm dia. Box of 100 £1·09
FDH-280-170F Filter papers, No. 3, 15cm dia. Box of 100 £1·55
FDH-280-190W Filter papers, No. 3, 18·5cm dia. Box of 100 £2·09
FDH-280-210T Filter papers, No. 3, 24cm dia. Box of 100 £3·65
FDH-280-330J Filter papers, No. 3, 46 × 57cm sheets Box of 100 £17·49

No. 4

FDH-300-070L Filter papers, No. 4, 5·5cm dia. Box of 100 £0·35
FDH-300-072H Filter papers, No. 4, 5·5cm dia. Pack of 1000 £2·64
FDH-300-090F Filter papers, No. 4, 7cm dia. Box of 100 £0·36
FDH-300-092B Filter papers, No. 4, 7cm dia. Pack of 1000 £2·86
FDH-300-110C Filter papers, No. 4, 9cm dia. Box of 100 £0·51
FDH-300-112V Filter papers, No. 4, 9cm dia. Pack of 1000 £4·07
FDH-300-130T Filter papers, No. 4, 11cm dia. Box of 100 £0·68
FDH-300-132P Filter papers, No. 4, 11cm dia. Pack of 1000 £5·72
FDH-300-150N Filter papers, No. 4, 12·5cm dia. Box of 100 £0·86
FDH-300-152J Filter papers, No. 4, 12·5cm dia. Pack of 1000 £7·15
FDH-300-170H Filter papers, No. 4, 15cm dia. Box of 100 £0·95
FDH-300-190B Filter papers, No. 4, 18·5cm dia. Box of 100 £1·38
FDH-300-210V Filter papers, No. 4, 24cm dia. Box of 100 £2·27

No. 6

FDH-340-070G Filter papers, No. 6, 5·5cm dia. Box of 100 £0·35
FDH-340-072C Filter papers, No. 6, 5·5cm dia. Pack of 1000 £2·64
FDH-340-090A Filter papers, No. 6, 7cm dia. Box of 100 £0·36
FDH-340-092T Filter papers, No. 6, 7cm dia. Pack of 1000 £2·86
FDH-340-110U Filter papers, No. 6, 9cm dia. Box of 100 £0·51
FDH-340-112Q Filter papers, No. 6, 9cm dia. Pack of 1000 £4·07
FDH-340-130X Filter papers, No. 6, 11cm dia. Box of 100 £0·68
FDH-340-132K Filter papers, No. 6, 11cm dia. Pack of 1000 £5·72
FDH-340-150Y Filter papers, No. 6, 12·5cm dia. Box of 100 £0·86
FDH-340-152E Filter papers, No. 6, 12·5cm dia. Pack of 1000 £7·15
FDH-340-170C Filter papers, No. 6, 15cm dia. Box of 100 £0·95
FDH-340-190T Filter papers, No. 6, 18·5cm dia. Box of 100 £1·38
FDH-340-210Q Filter papers, No. 6, 24cm dia. Box of 100 £2·27

WHATMAN FILTER PAPERS

No. 113V

FDH-380-150D Filter papers, 113V, 12·5cm dia. Box of 100 £1·98
FDH-380-170U Filter papers, 113V, 15cm dia. Box of 100 £2·05
FDH-380-190X Filter papers, 113V, 18·5cm dia. Box of 100 £2·59
FDH-380-210L Filter papers, 113V, 24cm dia. Box of 100 £1·94
FDH-380-230F Filter papers, 113V, 27cm dia. Box of 100 £4·84
FDH-380-250W Filter papers, 113V, 32cm dia. Box of 100 £5·96
FDH-380-300K Filter papers, 113V, 50cm dia. Box of 100 £13·53

No. 40

FDH-420-070M Filter papers, No. 40, 5·5cm dia. Box of 100 £0·55
FDH-420-090G Filter papers, No. 40, 7cm dia. Box of 100 £0·69
FDH-420-110D Filter papers, No. 40, 9cm dia. Box of 100 £1·10
FDH-420-130U Filter papers, No. 40, 11cm dia. Box of 100 £1·56
FDH-420-150X Filter papers, No. 40, 12·5cm dia. Box of 100 £1·84
FDH-420-170Y Filter papers, No. 40, 15cm dia. Box of 100 £2·59
FDH-420-190C Filter papers, No. 40, 18·5cm dia. Box of 100 £3·87
FDH-420-210W Filter papers, No. 40, 24cm dia. Box of 100 £6·20

No. 41

FDH-440-070V Filter papers, No. 41, 5·5cm dia. Box of 100 £0·55
FDH-440-090P Filter papers, No. 41, 7cm dia. Box of 100 £0·69
FDH-440-110M Filter papers, No. 41, 9cm dia. Box of 100 £1·10
FDH-440-130G Filter papers, No. 41, 11cm dia. Box of 100 £1·56
FDH-440-150A Filter papers, No. 41, 12·5cm dia. Box of 100 £1·84
FDH-440-170R Filter papers, No. 41, 15cm dia. Box of 100 £2·59
FDH-440-190L Filter papers, No. 41, 18·5cm dia. Box of 100 £3·87
FDH-440-210Y Filter papers, No. 41, 24cm dia. Box of 100 £6·20

No. 42

FDH-460-070H Filter papers, No. 42, 5·5cm dia. Box of 100 £0·55
FDH-460-090B Filter papers, No. 42, 7cm dia. Box of 100 £0·69
FDH-460-110V Filter papers, No. 42, 9cm dia. Box of 100 £1·10
FDH-460-130P Filter papers, No. 42, 11cm dia. Box of 100 £1·56
FDH-460-150J Filter papers, No. 42, 12·5cm dia. Box of 100 £1·84
FDH-460-170D Filter papers, No. 42, 15cm dia. Box of 100 £2·59
FDH-460-190U Filter papers, No. 42, 18·5cm dia. Box of 100 £3·87
FDH-460-210R Filter papers, No. 42, 24cm dia. Box of 100 £6·20

No. 540

FDH-520-070E Filter papers, No. 540, 5·5cm dia. Box of 100 £0·55
FDH-520-090V Filter papers, No. 540, 7cm dia. Box of 100 £0·77
FDH-520-110S Filter papers, No. 540, 9cm dia. Box of 100 £1·10
FDH-520-130M Filter papers, No. 540, 11cm dia. Box of 100 £1·58
FDH-520-150G Filter papers, No. 540, 12·5cm dia. Box of 100 £1·90
FDH-520-170A Filter papers, No. 540, 15cm dia. Box of 100 £2·88
FDH-520-190R Filter papers, No. 540, 18·5cm dia. Box of 100 £4·27
FDH-520-210X Filter papers, No. 540, 24cm dia. Box of 100 £6·81

No. 541

FDH-550-070G Filter papers, No. 541, 5·5cm dia. Box of 100 £0·55
FDH-550-090A Filter papers, No. 541, 7cm dia. Box of 100 £0·77
FDH-550-110U Filter papers, No. 541, 9cm dia. Box of 100 £1·10
FDH-550-130X Filter papers, No. 541, 11cm dia. Box of 100 £1·58
FDH-550-150Y Filter papers, No. 541, 12·5cm dia. Box of 100 £1·90
FDH-550-170C Filter papers, No. 541, 15cm dia. Box of 100 £2·88
FDH-550-190T Filter papers, No. 541, 18·5cm dia. Box of 100 £4·27
FDH-550-210Q Filter papers, No. 541, 24cm dia. Box of 100 £6·81

No. 542

FDH-570-070P Filter papers, No. 542, 5·5cm dia. Box of 100 £0·55
FDH-570-090J Filter papers, No. 542, 7cm dia. Box of 100 £0·77
FDH-570-110G Filter papers, No. 542, 9cm dia. Box of 100 £1·10
FDH-570-130A Filter papers, No. 542, 11cm dia. Box of 100 £1·58
FDH-570-150R Filter papers, No. 542, 12·5cm dia. Box of 100 £1·90
FDH-570-170L Filter papers, No. 542, 15cm dia. Box of 100 £2·88
FDH-570-190F Filter papers, No. 542, 18·5cm dia. Box of 100 £4·27
FDH-570-210C Filter papers, No. 542, 24cm dia. Box of 100 £6·81

No. 50

FDH-630-070M Filter papers, No. 50, 5·5cm dia. Box of 100 £0·59
FDH-630-072Y Filter papers, No. 50, 5·5cm dia. Pack of 1000 £4·73
FDH-630-090G Filter papers, No. 50, 7cm dia. Box of 100 £0·66
FDH-630-092C Filter papers, No. 50, 7cm dia. Pack of 1000 £5·28
FDH-630-110D Filter papers, No. 50, 9cm dia. Box of 100 £0·86
FDH-630-112W Filter papers, No. 50, 9cm dia. Pack of 1000 £7·15
FDH-630-130U Filter papers, No. 50, 11cm dia. Box of 100 £0·95
FDH-630-150X Filter papers, No. 50, 12·5cm dia. Box of 100 £1·20
FDH-630-170Y Filter papers, No. 50, 15cm dia. Box of 100 £1·66
FDH-630-190C Filter papers, No. 50, 18·5cm dia. Box of 100 £2·53
FDH-630-210W Filter papers, No. 50, 24cm dia. Box of 100 £4·09

No. 54

FDH-650-070V Filter papers, No. 54, 5·5cm dia. Box of 100 £0·59
FDH-650-072R Filter papers, No. 54, 5·5cm dia. Pack of 1000 £4·73
FDH-650-090P Filter papers, No. 54, 7cm dia. Box of 100 £0·66
FDH-650-092L Filter papers, No. 54, 7cm dia. Pack of 1000 £5·28
FDH-650-110M Filter papers, No. 54, 9cm dia. Box of 100 £0·86
FDH-650-112Y Filter papers, No. 54, 9cm dia. Pack of 1000 £7·15
FDH-650-130G Filter papers, No. 54, 11cm dia. Box of 100 £0·95
FDH-650-150A Filter papers, No. 54, 12·5cm dia. Box of 100 £1·20
FDH-650-170R Filter papers, No. 54, 15cm dia. Box of 100 £1·66
FDH-650-190L Filter papers, No. 54, 18·5cm dia. Box of 100 £2·53
FDH-650-210Y Filter papers, No. 54, 24cm dia. Box of 100 £4·09

WHATMAN SPECIALITIES

PHASE SEPARATORS, *WHATMAN* **No. IPS,** for separating aqueous solutions from water immiscible solvents. Used folded in a conical funnel, the paper retains the aqueous phase. Unsuitable for vacuum filtration or where the surface tension of the aqueous phase is reduced by alcohols or wetting agents.

FDJ-200-090Q	Phase separators, No. IPS, 7cm	Box of 100 £0·47
FDJ-200-110N	Phase separators, No. IPS, 9cm	Box of 100 £0·67
FDJ-200-130H	Phase separators, No. IPS, 11cm	Box of 100 £1·00
FDJ-200-150B	Phase separators, No. IPS, 12·5cm	Box of 100 £1·31
FDJ-200-170S	Phase separators, No. IPS, 15cm	Box of 100 £1·84
FDJ-200-190M	Phase separators, No. IPS, 18·5cm	Box of 100 £2·85

ASHLESS TABLETS, *WHATMAN*. 3·85cm diameter, with approximate mass 2·4g and ash content approximately 0·3mg/tablet. Easily dispersed in water. Used for large scale filtration of gelatinous precipitates, or where a bulk supply of filter aids is necessary for a batch of small scale precipitations.

FDJ-240-P	Ashless tablets	Box of 250 £4·25

ASHLESS FLOC, *WHATMAN*, for use as a filter aid or for preparation of filter pulp beds in conical or Buchner funnels. Ash content 0·015% by mass. The floc resembles dry dispersed pulp.

FDJ-270-R	Ashless floc	Box of 100g £0·77

FILTER PAPER CLIPPINGS, *WHATMAN*

FDJ-310-010C	Clippings, ordinary	Box of 500g £0·67
FDJ-310-030T	Clippings, ashless	Box of 500g £1·67

WHATMAN MICROFIBRE FILTERS

Extremely retentive borosilicate glass fibres of great wet strength, much faster than most cellulose papers. The circles contain no binder or cellulose and can be heated to 500°C.

FILTER CIRCLES, GLASS FIBRE, *WHATMAN* **GF/A.** Made from glass fibres of 0·5μm diameter. A very fast, thin filter, about 0·2mm thick, with high retention properties.

FDJ-500-010Q	Filter circles, GF/A, 21mm	Box of 100 £0·92
FDJ-500-030K	Filter circles, GF/A, 25mm	Box of 100 £0·92
FDJ-500-050E	Filter circles, GF/A, 42·5mm	Box of 100 £1·13
FDJ-500-070V	Filter circles, GF/A, 47mm	Box of 100 £1·28
FDJ-500-090P	Filter circles, GF/A, 70mm	Box of 100 £1·60
FDJ-500-110M	Filter circles, GF/A, 90mm	Box of 100 £2·09
FDJ-500-130G	Filter circles, GF/A, 110mm	Box of 100 £2·57
FDJ-500-150A	Filter circles, GF/A, 125mm	Box of 100 £3·27

FILTER CIRCLES, GLASS FIBRE, *WHATMAN* **GF/C.** Made from glass fibres of less than 0·5 μm diameter. An ultra-fine filter of thickness about 0·2mm, with retention properties greater than FDJ-500.

FDJ-530-010S	Filter circles, GF/C, 21mm	Box of 100 £1·03
FDJ-530-030M	Filter circles, GF/C, 25mm	Box of 100 £1·03
FDJ-530-050G	Filter circles, GF/C, 42·5mm	Box of 100 £1·33
FDJ-530-070A	Filter circles, GF/C, 47mm	Box of 100 £1·60
FDJ-530-090R	Filter circles, GF/C, 70mm	Box of 100 £2·09
FDJ-530-110X	Filter circles, GF/C, 90mm	Box of 100 £3·18
FDJ-530-130Y	Filter circles, GF/C, 110mm	Box of 100 £4·42
FDJ-530-150C	Filter circles, GF/C, 125mm	Box of 100 £5·60

FILTER CIRCLES, GLASS FIBRE, *WHATMAN* **GF/D.** Made from less fine fibres than FDJ-500. A very fast thick paper.

FDJ-560-010U	Filter circles, GF/D, 21mm	Box of 100 £0·95
FDJ-560-030X	Filter circles, GF/D, 25mm	Box of 100 £0·95
FDJ-560-050Y	Filter circles, GF/D, 42·5mm	Box of 100 £1·40
FDJ-560-070C	Filter circles, GF/D, 47mm	Box of 100 £1·64
FDJ-560-090T	Filter circles, GF/D, 70mm	Box of 100 £2·61
FDJ-560-110Q	Filter circles, GF/D, 90mm	Box of 25 £0·97
FDJ-560-130K	Filter circles, GF/D, 110mm	Box of 25 £1·21
FDJ-560-150E	Filter circles, GF/D, 125mm	Box of 25 £1·64

WHATMAN GLASS FIBRE FILTER TUBES

For filtration and clarification of bulk quantities of liquids in bottles or carboys. Made of resin reinforced glass fibres resistant to most laboratory reagents up to 100°C. Provide 98% retention of 2μm particles.



FDJ-680

FILTER TUBES, as specified, with two each polypropylene end caps and tubing connectors in each pack.

Size No.	A1	B2
Ext. dia. × length, mm	15·5 × 60	26 × 60
Int. dia., mm	12	19
Flowrate of water at 150 torr suction, litres/min	>0·7	>1·4
Average capacity before clogging, mg	50	150

FDJ-680-010V	Filter tubes, Size A1	Pack of 10 £4·84
FDJ-680-030P	Filter tubes, Size B2	Pack of 10 £7·79

SintAGlass FILTERS

- Close tolerance porosity ranges
- Colour coded for porosity
- Non-friable borosilicate glass sintered plates

For details of porosity ranges and colour coding see page heading Sintered Glassware.

IMMERSION FILTERS, *SINTAGLASS*. For use by immersion in the liquid to be filtered after allowing the precipitate to settle.

Plate dia., mm	30	65	90
Height above plate, mm	110	110	125

FDK-200-030B	Filter, 30mm, porosity 2	£2·19
FDK-200-040V	Filter, 30mm, porosity 3	£2·19
FDK-200-130U	Filter, 65mm, porosity 2	£3·05
FDK-200-140R	Filter, 65mm, porosity 3	£3·05
FDK-200-230Q	Filter, 90mm, porosity 2	£5·18
FDK-200-240N	Filter, 90mm, porosity 3	£5·18



FDK-200-030
FDK-200-040



FDK-200-130
to
FDK-200-240

FILTER TUBES, *SINTAGLASS*, comprising sintered plate sealed into the centre of a tube 150mm long. Designed for assembling into special apparatus without the troublesome job of sealing-in the plate itself. Will seal to borosilicate glass with a linear expansion coefficient of $3{\cdot}2 \times 10^{-6}$. Dimension given is the plate diameter.

FDK-240-010C	Filter tube, 10mm, porosity 0	£1·15
FDK-240-020W	Filter tube, 10mm, porosity 1	£1·15
FDK-240-030T	Filter tube, 10mm, porosity 2	£1·15
FDK-240-040Q	Filter tube, 10mm, porosity 3	£1·15
FDK-240-050N	Filter tube, 10mm, porosity 4	£1·15
FDK-240-110V	Filter tube, 20mm, porosity 0	£1·15
FDK-240-120S	Filter tube, 20mm, porosity 1	£1·15
FDK-240-130P	Filter tube, 20mm, porosity 2	£1·15
FDK-240-140M	Filter tube, 20mm, porosity 3	£1·15
FDK-240-150J	Filter tube, 20mm, porosity 4	£1·15
FDK-240-210R	Filter tube, 30mm, porosity 0	£1·33
FDK-240-220X	Filter tube, 30mm, porosity 1	£1·33
FDK-240-230L	Filter tube, 30mm, porosity 2	£1·33
FDK-240-240Y	Filter tube, 30mm, porosity 3	£1·33
FDK-240-250F	Filter tube, 30mm, porosity 4	£1·33
FDK-240-310N	Filter tube, 40mm, porosity 0	£1·61
FDK-240-320K	Filter tube, 40mm, porosity 1	£1·61
FDK-240-330H	Filter tube, 40mm, porosity 2	£1·61
FDK-240-340E	Filter tube, 40mm, porosity 3	£1·61
FDK-240-360V	Filter tube, 40mm, porosity 4	£1·61



FDK-240

FILTER FUNNELS, *SINTAGLASS*, with sintered plate.

Capacity, ml	30	120
Plate dia., mm	20	30
Height above plate, mm	100	200

FDK-280-040L	Filter funnel, 30ml, porosity 3	£1·67
FDK-280-050Y	Filter funnel, 30ml, porosity 4	£1·67
FDK-280-320F	Filter funnel, 120ml, porosity 1	£2·01
FDK-280-330C	Filter funnel, 120ml, porosity 2	£2·01
FDK-280-340W	Filter funnel, 120ml, porosity 3	£2·01
FDK-280-350T	Filter funnel, 120ml, porosity 4	£2·01

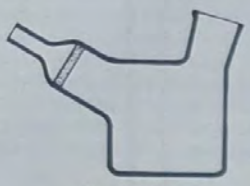


FDK-280

Filters, immersion, thimble form (gas distribution tubes) See *GFD-830-010U* to *GFD-830-150E*

Gallenkamp

SintAGlass FILTERS



FDK-330



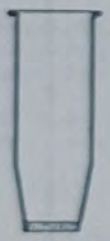
FDK-360



FDK-380



FDK-420



FDK-450



FDK-480

Porosity	Colour code	BS 1752 specified range of maximum pore diameters, μm	Sintaglass range of maximum pore diameters, μm
0	White	150–250	200–250
1	Yellow	90–150	100–120
2	Green	40–90	40–50
3	Black	15–40	20–30
4	Orange	5–15	5–10

FILTER BEAKER, *SINTAGLASS*, 10mm diameter porosity 4 sintered plate sealed into side spout. Capacity approximately 6ml.

FDK-330-E Filter beaker **£3·05**

FILTER FUNNEL, *SINTAGLASS*, micro-Hirsch, with 10mm diameter porosity 3 sintered plate, 35mm diameter funnel top, 14/15 cone and vacuum connection. For use with flask FDK-380.

FDK-360-G Filter funnel **£2·93**

ACCESSORIES

FDK-380-010M Conical flask, 10ml, 14/15 socket **£1·44**
FDK-380-030G Conical flask, 25ml, 14/15 socket **£1·61**

FILTER FUNNELS, *SINTAGLASS*, plate diameter 10mm. FDK-420-040X to FDK-420-150H are to BS 1428 Part F1.

Capacity, ml	1	3	6	
Height above plate, mm	15	40	100	
FDK-420-040X	Filter funnel, 1ml, porosity 3			**£1·44**
FDK-420-050L	Filter funnel, 1ml, porosity 4			**£1·44**
FDK-420-120Q	Filter funnel, 3ml, porosity 1			**£1·44**
FDK-420-140K	Filter funnel, 3ml, porosity 3			**£1·44**
FDK-420-150H	Filter funnel, 3ml, porosity 4			**£1·44**
FDK-420-240G	Filter funnel, 6ml, porosity 3			**£1·78**
FDK-420-250D	Filter funnel, 6ml, porosity 4			**£1·78**

FILTER TUBE, *SINTAGLASS*, for use in 15ml centrifuge tube. With 10mm diameter porosity 3 sintered plate. Height 45mm, capacity approximately 3ml.

FDK-450-F Filter tube **£2·30**

IMMERSION FILTER, (filter stick), *SINTAGLASS*, Pregl pattern, BS 1428 Part F1. With 10mm diameter porosity 4 sintered plate. Overall length 60mm.

FDK-480-H Immersion filter **£1·78**

GAS DISTRIBUTION FILTERS



- **Sintered glass, porosities 0 to 4**
- **Domed, flat plate or thimble form**



See GFD-750-010X to GFD-830-150E

POROUS STAINLESS STEEL FILTERS

Buchner and in-line filters with stainless steel bodies, porous stainless steel discs 3mm thick and silicone rubber washers. The two halves of the bodies are held together by screwed clamping rings.

Porosity	1	2	3	4
Average pore size, μm	70	46	28	6·5

FILTER FUNNELS, Buchner, as specified, with 65mm diameter disc.

FDK-700-020K	Filter funnel, porosity 1	**£28·07**
FDK-700-030H	Filter funnel, porosity 2	**£28·07**
FDK-700-040E	Filter funnel, porosity 3	**£28·07**
FDK-700-050B	Filter funnel, porosity 4	**£28·07**

FILTERS, PIPELINE, as specified, with 65mm diameter disc and 9·5mm inlet and outlet tubes.

FDK-720-020T	Filter, pipeline, porosity 1	**£30·32**
FDK-720-030Q	Filter, pipeline, porosity 2	**£30·32**
FDK-720-040N	Filter, pipeline, porosity 3	**£30·32**
FDK-720-050K	Filter, pipeline, porosity 4	**£30·32**

SPARE PARTS for FDK-700 and FDK-720

FDK-740-010Y	Screwed rings	Pair **£11·08**
FDK-740-030C	Funnel	**£7·88**
FDK-740-050T	Buchner top	**£5·63**
FDK-740-120B	Filter disc, porosity 1	**£2·14**
FDK-740-130V	Filter disc, porosity 2	**£2·14**
FDK-740-140S	Filter disc, porosity 3	**£2·14**
FDK-740-150P	Filter disc, porosity 4	**£2·14**
FDK-740-210A	Washer, silicone rubber	**£1·35**

FILTER FUNNELS, Buchner, as specified, with 103mm diameter disc.

FDK-750-020V	Filter funnel, porosity 1	**£46·01**
FDK-750-030S	Filter funnel, porosity 2	**£46·01**
FDK-750-040P	Filter funnel, porosity 3	**£46·01**
FDK-750-050M	Filter funnel, porosity 4	**£46·01**



FDK-700
FDK-720



FDK-770

FILTERS, PIPELINE, as specified, with 103mm diameter disc and 9·5mm inlet and outlet tubes.

FDK-770-020H	Filter, pipeline, porosity 1	**£44·78**
FDK-770-030E	Filter, pipeline, porosity 2	**£44·78**
FDK-770-040B	Filter, pipeline, porosity 3	**£44·78**
FDK-770-050V	Filter, pipeline, porosity 4	**£44·78**

SPARE PARTS for FDK-750 and FDK-770

FDK-790-010T	Screwed rings	Pair **£22·84**
FDK-790-030N	Funnel	**£8·55**
FDK-790-050H	Buchner top	**£9·79**
FDK-790-120M	Filter disc, porosity 1	**£3·43**
FDK-790-130J	Filter disc, porosity 2	**£3·43**
FDK-790-140G	Filter disc, porosity 3	**£3·43**
FDK-790-150D	Filter disc, porosity 4	**£3·43**
FDK-790-210L	Washer, silicone rubber	**£1·41**

MISCELLANEOUS FILTERS

FILTER UNIT, in-line, *WHATMAN* **Gamma 12,** for use with gases or liquids. Comprises polycarbonate body, glass fibre filter tube support and fluoroelastomer body seal. Can be autoclaved at 135°C and used up to 110°C with compatible fluids.

Tube grade	80	20	10	03
*Liquid filtration, particle size, μm	8	2	1	0·3
†Air filtration, penetration, %	9	0·05	0·0001	0·0001

* 98% removed from water at 20°C. † Sodium flame test.

Flowrates up to 800 litres/hour for water and 600 litres/min air depending on tube grade. End nozzles accept 12·5mm bore flexible tubing. Overall dimensions 60mm diameter × 125mm high. With one each filter tube grades 80, 20, 10 and 03.

FDK-850-T Filter unit **£14·30**

SPARE PARTS

FDK-870-030T	Filter tubes, grade 80	Box of 2 **£1·52**
FDK-870-050N	Filter tubes, grade 20	Box of 2 **£1·89**
FDK-870-070H	Filter tubes, grade 10	Box of 2 **£2·00**
FDK-870-090B	Filter tubes, grade 03	Box of 2 **£2·62**

GLASS WOOL, specially prepared glass fibres for filtration purposes.

FDK-930-C Glass wool Pack of 500g **£2·70**



FDK-850

QUARTZ WOOL, comprises a mass of very fine fibres of average diameter 6μm, resembling cotton wool in appearance. Used in the filtration of acid liquids and hot gases and for making separating plugs for combustion tube fillings.

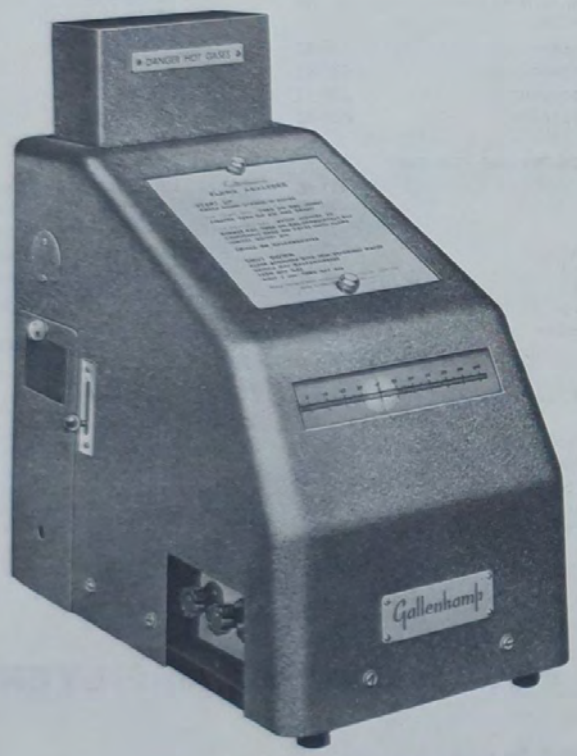
FDK-960-E Quartz wool Pack of 10g **£4·73**

Gallenkamp FLAME ANALYSER

FOR FLAME PHOTOMETRIC DETERMINATIONS OF SODIUM, POTASSIUM AND CALCIUM

Applications include analysis of:

- Biochemical and clinical samples
- Pharmaceuticals and cosmetics
- Plant and animal tissues
- Fertilisers and foods
- Water and oils
- Cement, glass and ceramics



FGA-300

DESIGN FEATURES

- Suitable for coal gas, natural (methane) gas, bottled gas and petrol-air gas
- Controls recessed to prevent inadvertent alteration
- Components easily accessible
- High sensitivity – 5mMol/l potassium and 2mMol/l sodium full scale
- Good linearity characteristics
- Insignificant cross interference
- Negligible drift
- Accurate readings from 0·5ml sample
- Robust galvanometer simply adjusted
- Convenient flick-over filter turret
- All parts corrosion resistant – camera black interior

OPERATION

The flame analyser functions by continuously drawing sample solution at a constant rate into a burner which is supplied with a fuel gas and compressed air. Within the burner the sample solution is atomised and fed into the flame. Excited by the flame temperature, sodium and potassium ions in the solution emit light at characteristic wavelengths. The light intensity is related to the concentrations of the ions.

The light is filtered through interference filters to select the sodium or potassium emission and is detected by means of a photocell and galvanometer. Thus readings may be taken which can be related to the original sodium or potassium solution concentration, after the instrument has been calibrated using prepared standards.

The components of the analyser including burner, air pressure gauge, gas pressure governor, control needle valves and galvanometer system are mounted on a rigid steel baseplate. The instrument is enclosed in a glass fibre reinforced plastics cover which has access hatches for essential adjustments.

The layout is designed to leave only the galvanometer scale facing the operator. The regularly operated controls are recessed into the side of the instrument, conveniently situated for adjustment.

Accuracy of analysis

Quantitative analysis is only as good as the specificity of the method. In flame photometry it is essential that the instrument isolates the element to be determined and that other similar elements should not affect the readings.

In the GALLENKAMP Flame analyser the cross interference from a 100-fold excess of interfering cation is normally less than 5% for sodium and potassium. This means that, in the great majority of cases, interference is negligible.

The flame analyser has excellent linearity characteristics and, for many purposes, it can be assumed that the galvanometer reading is proportional to the concentration of the solution. For highest accuracy work, however, a calibration curve should be prepared.

Also, when highest accuracy is vital, the average of several readings should be taken but, since the flame analyser requires only 0·5ml sample per reading, this does not involve large quantities of sample.

For calcium determinations see Accessories.

Technical data

Ranges at maximum sensitivity	
Sodium	2mMol/l (2ppm) f.s.d.
Potassium	5mMol/l (5ppm) f.s.d.
Calcium	See Accessories
Sample uptake rate	4ml/min
Volume per reading	0·5ml
Repeatability	1%
(For highest accuracy, the average of several readings should be taken)	
Cross interference	Usually <5% for 100-fold excess of cation
Overall dimensions	380 × 200 × 400mm high
Net mass	8kg

Services required

Compressed air (clean, oil free): 100kN/m² (1kgf/cm²).

Gas supply: coal gas (4 to 6 in. w.g.), natural (methane) gas (6 to 8 in. w.g.), or butane, propane, petrol-air gas (4 to 10 in. w.g.).

Electricity: 100–120 or 200–250V a.c. single phase.

FLAME ANALYSER, *GALLENKAMP*, as specified, with sodium and potassium filters, plastics dust cover, 12 polystyrene beakers and instructions. For 100–120 and 200–250V a.c. single phase supplies.

FGA-300-A	Flame analyser	**£477-00**

SPARE PARTS

FGA-320-030A	Atomiser	**£14-01**
FGA-320-110C	Filter, sodium	**£11-48**
FGA-320-130T	Filter, potassium	**£11-48**
FGA-320-170H	Photocell	**£8-44**
FGA-320-210V	Dust cover, plastics	**£2-81**

ACCESSORIES

Filter, calcium. Recommended only where the calcium is isolated from interfering cations, or where compensation for interference may be effected either by arithmetic correction or by doping the standard solution.

FGA-320-512F	Filter, calcium	**£26-89**
	Air compressor	*See FGA-300A*
	Beakers, polystyrene	*See BNH-740C*
	Bottles, polythene	*See BTK-200*
	Gas lighter	*See GHL-400U*
	Tubing, PVC, N6-5	*See TWR-750R*
	Washbottle, polythene, 250ml	*See WBS-450-050E*

OUTFIT

The following list is a guide to the items required for an initial outfit for the determination of sodium and potassium.

1 Flame analyser	FGA-300-A
1 Air compressor	PXW-790-W
10 Bottles, polythene for storage of chemicals (glass bottles must not be used)	BTK-200
10 metres Tubing, PVC, for drain and air and gas	TWR-750-R
1 Gas lighter	GHL-400-U
3 Washbottles, polythene	WBS-450-050E

In addition an analytical balance and volumetric glassware for the preparation of standard solutions are required.

AIR PUMP

For use with flame analysers

- **Air output relatively pulse free**
- **Suitable for long periods of operation**
- **Maximum pressure 137kN/m² (1·4kgf/cm²)**



See PXW-790-W

FLASKS

ROUND BOTTOM FLASKS

FLASKS, round bottom, *PYREX* **glass,** with vial neck finish except 5000 ml capacity which has a tooled ring neck.

FHB-270-030V	Flask, 100 ml	**£0·49**
FHB-270-032R	Flasks, 100 ml	Pack of 72 **£28·29**
FHB-270-050P	Flask, 250 ml	**£0·62**
FHB-270-053J	Flasks, 250 ml	Pack of 6 **£6·00**
FHB-270-055F	Flasks, 250 ml	Pack of 72 **£32·72**
FHB-270-070J	Flask, 500 ml	**£0·86**
FHB-270-073D	Flasks, 500 ml	Pack of 6 **£4·29**
FHB-270-075W	Flasks, 500 ml	Pack of 48 **£31·22**
FHB-270-090D	Flask, 1000 ml	**£1·07**
FHB-270-092W	Flasks, 1000 ml	Pack of 36 **£33·47**
FHB-270-110A	Flask, 2000 ml	**£1·73**
FHB-270-112T	Flasks, 2000 ml	Pack of 18 **£28·29**
FHB-270-130R	Flask, 5000 ml	**£4·23**
FHB-270-132N	Flasks, 5000 ml	Pack of 6 **£23·06**



FHB-270



FHB-300



FHB-330



FHB-370

FLASK SUPPORT, white polypropylene, with concentric shelves to accommodate round bottom flasks from 25 ml to 2 litres. Maximum temperature for safe use is 130°C.

FHB-300-C	Flask support	**£1·71**
	Cork rings	See CSD-340

FLAT BOTTOM FLASKS

FLASKS, flat bottom, *PYREX* **glass,** with vial neck finish except 5000 ml capacity which has a tooled ring neck.

FHB-330-030S	Flask, 100 ml	**£0·61**
FHB-330-032X	Flasks, 100 ml	Pack of 144 **£70·50**
FHB-330-050M	Flask, 250 ml	**£0·66**
FHB-330-053G	Flasks, 250 ml	Pack of 12 **£6·27**
FHB-330-055C	Flasks, 250 ml	Pack of 72 **£34·21**
FHB-330-070G	Flask, 500 ml	**£0·86**
FHB-330-073A	Flasks, 500 ml	Pack of 6 **£4·29**
FHB-330-075T	Flasks, 500 ml	Pack of 60 **£38·99**
FHB-330-090A	Flask, 1000 ml	**£1·15**
FHB-330-092T	Flasks, 1000 ml	Pack of 36 **£34·79**
FHB-330-110U	Flask, 2000 ml	**£1·96**
FHB-330-112Q	Flasks, 2000 ml	Pack of 18 **£29·79**
FHB-330-130X	Flask, 5000 ml	**£3·14**
FHB-330-132K	Flasks, 5000 ml	Pack of 6 **£17·14**

NARROW MOUTH CONICAL FLASKS (Erlenmeyer flasks)

FLASKS, conical, *PYREX* **glass,** narrow mouth, with two or more graduation marks. With vial neck.

FHB-370-010T	Flask, 5 ml	**£0·44**
FHB-370-012P	Flasks, 5 ml	Pack of 60 **£20·07**
FHB-370-030N	Flask, 10 ml	**£0·44**
FHB-370-032J	Flasks, 10 ml	Pack of 60 **£20·07**
FHB-370-050H	Flask, 25 ml	**£0·44**
FHB-370-052D	Flasks, 25 ml	Pack of 120 **£39·45**
FHB-370-070B	Flask, 50 ml	**£0·51**
FHB-370-072U	Flasks, 50 ml	Pack of 144 **£55·95**
FHB-370-090S	Flask, 100 ml	**£0·44**
FHB-370-093M	Flasks, 100 ml	Pack of 12 **£4·22**
FHB-370-095Y	Flasks, 100 ml	Pack of 144 **£46·00**
FHB-370-110P	Flask, 150 ml	**£0·44**
FHB-370-112L	Flasks, 150 ml	Pack of 72 **£23·75**
FHB-370-130J	Flask, 250 ml	**£0·52**
FHB-370-133D	Flasks, 250 ml	Pack of 12 **£4·97**
FHB-370-135W	Flasks, 250 ml	Pack of 72 **£27·08**
FHB-370-150D	Flask, 500 ml	**£0·60**
FHB-370-152W	Flasks, 500 ml	Pack of 72 **£35·42**
FHB-370-170U	Flask, 1000 ml	**£1·10**
FHB-370-172Q	Flasks, 1000 ml	Pack of 36 **£33·70**
FHB-370-190X	Flask, 2000 ml	**£1·78**
FHB-370-192K	Flasks, 2000 ml	Pack of 24 **£36·69**

FLASKS, conical, *PYREX* glass, narrow mouth with screw cap. Can be autoclaved at 121°C. With two or more graduation marks.

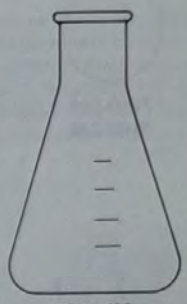
FHB-410-030B	Flask, 100ml	£1·38
FHB-410-032U	Flasks, 100ml	Pack of 12 £14·66
FHB-410-050S	Flask, 250ml	£1·38
FHB-410-052X	Flasks, 250ml	Pack of 12 £14·72
FHB-410-070M	Flask, 500ml	£1·55
FHB-410-072Y	Flasks, 500ml	Pack of 12 £16·68



FHB-410

SPARE PARTS

FHB-430-030K	Caps for 100ml flasks	Pack of 24 £2·01
FHB-430-050E	Caps for 250 and 500ml flasks	Pack of 24 £2·76


FHB-480

WIDE MOUTH CONICAL FLASKS

FLASKS, conical, *PYREX* glass, wide mouth, with two or more graduation marks. With vial neck finish except 2000ml capacity which has a tooled ring neck.

FHB-480-010E	Flask, 50ml	£0·51
FHB-480-012A	Flasks, 50ml	Pack of 144 £55·95
FHB-480-030V	Flask, 100ml	£0·45
FHB-480-033P	Flasks, 100ml	Pack of 12 £4·36
FHB-480-035L	Flasks, 100ml	Pack of 96 £31·68
FHB-480-050P	Flask, 250ml	£0·55
FHB-480-053J	Flasks, 250ml	Pack of 12 £5·24
FHB-480-055F	Flasks, 250ml	Pack of 72 £28·58
FHB-480-070J	Flask, 500ml	£0·63
FHB-480-072F	Flasks, 500ml	Pack of 48 £25·19
FHB-480-090D	Flask, 1000ml	£1·06
FHB-480-092W	Flasks, 1000ml	Pack of 36 £31·97
FHB-480-110A	Flask, 2000ml	£1·96
FHB-480-112T	Flasks, 2000ml	Pack of 24 £39·73


FHC-200-090

CULTURE FLASKS

FLASKS, culture, Roux, *PYREX* glass, capacity 1000ml.

FHC-200-090T	Flask, central neck, 1000ml	£1·69
FHC-200-092P	Flasks, central neck, 1000ml	Pack of 12 £18·46
FHC-200-110Q	Flask, offset neck, 1000ml	£2·59
FHC-200-112M	Flasks, offset neck, 1000ml	Pack of 12 £27·60


FHC-200-110

FLASKS, culture, *PYREX* glass, conical, capacity 1000ml.

FHC-240-090X	Flask, 1000ml	£1·73
FHC-240-092K	Flasks, 1000ml	Pack of 12 £18·23


FHC-240

FLASKS, culture, borosilicate glass, conical, narrow neck, fluted, with four indents down the length of the wall. When used on an orbital shaking incubator the indents break up the regular swirling action of the contents, discourage vortex formation and promote mixing even at relatively low speeds. At higher orbiting speeds aeration is greater than with plain walled conical flasks and this can result in increased yield rates.

FHC-280-030E	Flask, 100ml	£1·82
FHC-280-050V	Flask, 250ml	£2·06
FHC-280-070P	Flask, 500ml	£2·67
FHC-280-090J	Flask, 1000ml	£3·38
FHC-280-110G	Flask, 2000ml	£4·61


FHC-280

Gallenkamp



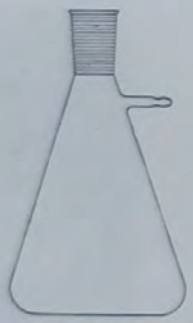
FHD-200
FHD-240



FHD-300



FHD-350



FHD-380



FHD-430
FHD-450

DISTILLATION FLASKS

FLASKS, distillation, *PYREX* **glass,** round bottom.

FHD-200-010K	Flask, 25ml	£0·95
FHD-200-012G	Flasks, 25ml	Pack of 24 £18·98
FHD-200-030E	Flask, 50ml	£0·98
FHD-200-032A	Flasks, 50ml	Pack of 24 £19·49

FLASKS, distillation, *PYREX* **glass,** BS 658, round bottom.

FHD-240-030W	Flask, 100ml	£1·31
FHD-240-032S	Flasks, 100ml	Pack of 36 £39·45
FHD-240-050Q	Flask, 250ml	£1·55
FHD-240-052M	Flasks, 250ml	Pack of 24 £32·14
FHD-240-070K	Flask, 500ml	£2·07
FHD-240-072G	Flasks, 500ml	Pack of 18 £30·82
FHD-240-090E	Flask, 1000ml	£2·01
FHD-240-092A	Flasks, 1000ml	Pack of 12 £20·82

EXTRACTION FLASKS

FLASKS, extraction, *PYREX* **glass,** with flat bottom and wide vial neck. Capacity 250ml.

FHD-300-050N	Flask, 250ml	£0·67
FHD-300-052J	Flasks, 250ml	Pack of 120 £64·40

FILTER FLASKS

FLASKS, filter, *PYREX* **glass,** conical, heavy wall, with side arm. With vial neck finish except 10,000ml capacity which has a tooled ring neck.

FHD-350-030H	Flask, 100ml	£1·44
FHD-350-032D	Flasks, 100ml	Pack of 36 £44·33
FHD-350-050B	Flask, 250ml	£1·78
FHD-350-052U	Flasks, 250ml	Pack of 36 £54·11
FHD-350-070S	Flask, 500ml	£2·13
FHD-350-072X	Flasks, 500ml	Pack of 24 £44·33
FHD-350-090M	Flask, 1000ml	£2·76
FHD-350-092Y	Flasks, 1000ml	Pack of 18 £41·69
FHD-350-110J	Flask, 2000ml	£3·80
FHD-350-112F	Flasks, 2000ml	Pack of 12 £40·19
FHD-350-130D	Flask, 5000ml	£10·72
FHD-350-132W	Flasks, 5000ml	Pack of 4 £38·99
FHD-350-150U	Flask, 10000ml	£12·35
FHD-350-152Q	Flasks, 10000ml	Pack of 4 £44·91

FLASKS, filter, borosilicate glass, conical, heavy wall with side arm and 29/32 socket.

FHD-380-030J	Flask, 500ml	£3·99
FHD-380-050D	Flask, 1000ml	£5·70

KJELDAHL FLASKS

FLASKS, Kjeldahl, *PYREX* **glass** with long neck.

FHD-430-010T	Flask, 50ml	£0·66
FHD-430-012P	Flasks, 50ml	Pack of 144 £75·27
FHD-430-030N	Flask, 100ml	£0·69
FHD-430-032J	Flasks, 100ml	Pack of 36 £20·76
FHD-430-050H	Flask, 300ml	£1·08
FHD-430-052D	Flasks, 300ml	Pack of 60 £53·88
FHD-430-070B	Flask, 500ml	£1·24
FHD-430-072U	Flasks, 500ml	Pack of 36 £37·03
FHD-430-090S	Flask, 800ml	£1·50
FHD-430-092X	Flasks, 800ml	Pack of 36 £44·91

FLASK, Kjeldahl, micro, borosilicate glass, capacity 30ml.

FHD-450-Y	Flask, 30ml	£0·62

Technico VOLUMETRIC FLASKS

One mark flasks to BS 1792

TECHNICO one mark volumetric flasks are manufactured in our own works in accordance with the requirements of BS 1792 (sizes not included in the BS are produced on a similar basis). Stoppered flasks have necks interchangeably ground to BS 572 and sizes 1 to 50 ml Class B and 5 to 50 ml Class A have the same 10/13 stopper size for convenience and interchangeability. The small flasks in Class B have necks which will accept pipettes up to 8·5 mm diameter. Stoppered flasks are supplied with hexagonal head polypropylene stoppers which are inert to most reagents, prevent entrance of dust and give good protection against chipping. For special applications, glass stoppers SYH-200 can be used. All clear glass flasks have permanent graduations and inscriptions in amber stain.

Capacity, ml	Stopper size	Tolerance, ±ml Class B	Class A
1*	10/13	0·04	–
2*	10/13	0·04	–
5	10/13	0·04	0·02
10	10/13	0·04	0·02
20*	10/13	0·06	0·03
25	10/13	0·06	0·03
50	10/13	0·1	0·05
100	12/14	0·15	0·08
200	14/15	0·3	0·15
250	14/15	0·3	0·15
500	16/16	0·5	0·25
1000	19/17	0·8	0·4
2000	24/20	1·2	0·6

* Sizes not included in BS 1792.



CLEAR GLASS FLASKS WITHOUT STOPPER

FLASKS, *TECHNICO*, **Class B,** plain neck, as specified.

FHM-200-070R	Flask, 10 ml	£0·81
FHM-200-110Y	Flask, 25 ml	£0·94
FHM-200-130C	Flask, 50 ml	£1·08
FHM-200-150T	Flask, 100 ml	£1·21
FHM-200-190H	Flask, 250 ml	£1·55
FHM-200-210E	Flask, 500 ml	£2·26



FHM-200

CLEAR GLASS FLASKS WITH STOPPER

FLASKS, *TECHNICO*, **Class B,** as specified, with interchangeable polypropylene stopper.

FHM-240-010H	Flask, 1 ml	£0·67
FHM-240-030B	Flask, 2 ml	£0·69
FHM-240-050S	Flask, 5 ml	£0·97
FHM-240-052X	Flasks, 5 ml	Pack of 10 £7·36
FHM-240-070M	Flask, 10 ml	£1·00
FHM-240-072Y	Flasks, 10 ml	Pack of 10 £7·59
FHM-240-090G	Flask, 20 ml	£1·14
FHM-240-092C	Flasks, 20 ml	Pack of 10 £8·97
FHM-240-110D	Flask, 25 ml	£1·16
FHM-240-112W	Flasks, 25 ml	Pack of 10 £9·20
FHM-240-130U	Flask, 50 ml	£1·25
FHM-240-132Q	Flasks, 50 ml	Pack of 10 £9·89
FHM-240-150X	Flask, 100 ml	£1·47
FHM-240-152K	Flasks, 100 ml	Pack of 10 £12·19
FHM-240-170Y	Flask, 200 ml	£1·84
FHM-240-172E	Flasks, 200 ml	Pack of 10 £15·18
FHM-240-190C	Flask, 250 ml	£1·84
FHM-240-192V	Flasks, 250 ml	Pack of 10 £15·18
FHM-240-210W	Flask, 500 ml	£2·65
FHM-240-212S	Flasks, 500 ml	Pack of 10 £21·85
FHM-240-230Q	Flask, 1000 ml	£3·28
FHM-240-250K	Flask, 2000 ml	£5·52



FHM-240

Gallenkamp

Technico VOLUMETRIC FLASKS

FLASKS, *TECHNICO*, **Class A,** as specified, with interchangeable polypropylene stopper.

FHM-270-050U	Flask, 5ml	£1·31
FHM-270-070X	Flask, 10ml	£1·41
FHM-270-072K	Flasks, 10ml	Pack of 10 £11·73
FHM-270-090Y	Flask, 20ml	£1·36
FHM-270-110F	Flask, 25ml	£1·67
FHM-270-112B	Flasks, 25ml	Pack of 10 £13·80
FHM-270-130W	Flask, 50ml	£1·81
FHM-270-132S	Flasks, 50ml	Pack of 10 £14·95
FHM-270-150Q	Flask, 100ml	£2·09
FHM-270-152M	Flasks, 100ml	Pack of 10 £17·25
FHM-270-170K	Flask, 200ml	£2·24
FHM-270-190E	Flask, 250ml	£2·36
FHM-270-210B	Flask, 500ml	£2·99
FHM-270-230S	Flask, 1000ml	£3·80
FHM-270-250M	Flask, 2000ml	£6·56



FHM-270
FHM-290

FLASKS, *TECHNICO*, **Class A,** with works' certificate of examination stating volume of the flask at 20°C. With interchangeable polypropylene stopper.

FHM-290-050G	Flask, 5ml	£1·96
FHM-290-070A	Flask, 10ml	£2·01
FHM-290-090R	Flask, 20ml	£2·01
FHM-290-110X	Flask, 25ml	£2·24
FHM-290-130Y	Flask, 50ml	£2·36
FHM-290-150C	Flask, 100ml	£2·99
FHM-290-170T	Flask, 200ml	£3·28
FHM-290-190N	Flask, 250ml	£3·39
FHM-290-210K	Flask, 500ml	£4·03
FHM-290-230E	Flask, 1000ml	£4·83
FHM-290-250V	Flask, 2000ml	£7·59

AMBER GLASS FLASKS WITH STOPPERS

FLASKS, *TECHNICO*, **Class B,** low-actinic amber stained glass, with interchangeable polypropylene stopper. Shape as FHM-240.

FHM-340-110S	Flask, 25ml	£1·44
FHM-340-130M	Flask, 50ml	£1·50
FHM-340-150G	Flask, 100ml	£1·96
FHM-340-170A	Flask, 250ml	£2·59
FHM-340-190R	Flask, 500ml	£3·39
FHM-340-210X	Flask, 1000ml	£4·60

BOROSILICATE CLEAR GLASS FLASKS WITH STOPPERS

FLASKS, borosilicate glass, BS 1792, Class B, with interchangeable plastics stopper.

FHM-400-110P	Flask, 25ml	£1·04
FHM-400-130J	Flask, 50ml	£1·08
FHM-400-150D	Flask, 100ml	£1·35
FHM-400-170U	Flask, 250ml	£2·03
FHM-400-190X	Flask, 500ml	£2·64
FHM-400-210L	Flask, 1000ml	£3·38
FHM-400-230F	Flask, 2000ml	£5·36



FHM-600

KOHLRAUSCH FLASKS

With permanent graduations and inscriptions in amber glass.

FLASKS, Kohlrausch, *TECHNICO*, BS 615, Class B.

FHM-600-130Q	Flask, 50ml	£1·73
FHM-600-150K	Flask, 100ml	£2·19
FHM-600-170E	Flask, 200ml	£2·70

FLASKS, Kohlrausch, *TECHNICO*, BS 615, Class A.

FHM-640-130L	Flask, 50ml	£1·90
FHM-640-150F	Flask, 100ml	£2·59
FHM-640-170W	Flask, 200ml	£3·16

Technico VOLUMETRIC FLASKS

SUGAR FLASKS

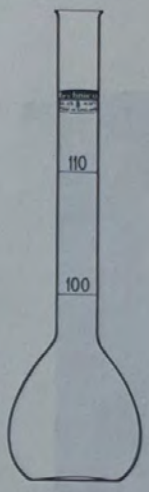
With permanent graduations and inscriptions in amber stain.

FLASK, sugar, *TECHNICO*, BS 675, Type 1, Class B, with two marks at 100 and 110ml.

FHM-680-T Flask, 100/110ml **£2·07**

FLASK, sugar, *TECHNICO*, BS 675, Type 2, Class A, with narrow neck having one mark at 100ml.

FHM-700-V Flask, 100ml **£2·59**



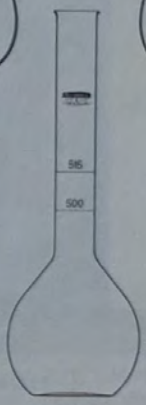
FHM-680


FHM-700

BREWERS' MASH FLASK

FLASK, brewers' mash, *TECHNICO*, BS 701, Class B, with two marks at 500 and 515ml.

FHM-740-Q Flask, 500/515ml **£2·59**



FHM-740

HIRSCHSOHN FLASKS

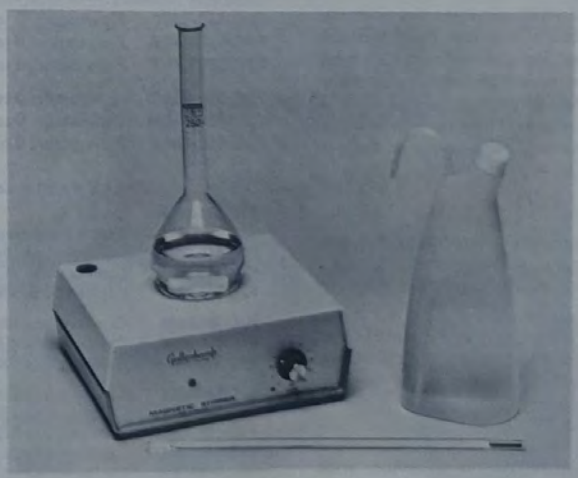
FLASKS, Hirschsohn, *TECHNICO*, BS 676, Class B.

Capacity bulb, ml	150	200
Capacity neck, ml	10	25
Neck subdivision, ml	0·1	0·2

FHM-780-030C Flask, 150ml **£3·91**

FHM-780-050T Flask, 200ml **£4·72**


FHM-780



Dissolving some materials in volumetric flasks to make primary volumetric standards can be difficult. The problem is simplified if a magnetic stirrer is used to provide constant stirring. Once the solute has dissolved completely the magnetic stirring bar can be removed from the flask using a glass covered magnetic retriever and washbottle containing distilled water for rinsing down the retriever and stirrer to ensure no loss of standard solution.

Magnetic stirrer See *SWT-310*

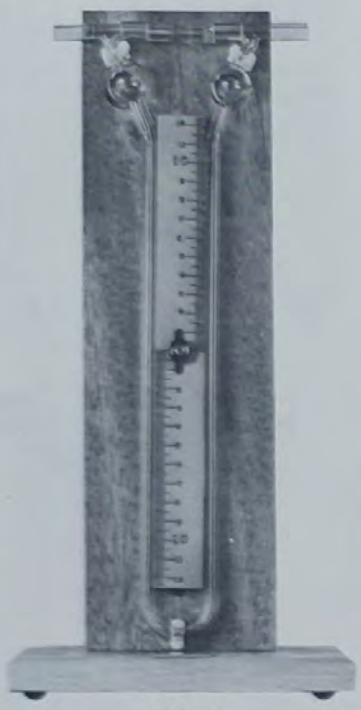
Retriever See *SWX-490*

Washbottle See *WBS-450*

Gallenkamp GAS FLOWMETERS



FJC-300



FJC-550

ORIFICE FLOWMETER

A compact and robust instrument which measures the pressure drop across a jet. The jet is fitted into the main body which is bored out to form one limb of a manometer. The other limb is a glass tube fitted with an 80mm adjustable scale, providing easy zero adjustment and clear reading. A fine adjustment needle valve is fitted as an integral part of the main body. The whole instrument can be dismantled easily for cleaning, topping-up or for jet changing. It is not suitable for corrosive gases.

INTERCHANGEABLE JETS

The flowmeter is available with any one of five interchangeable jets which cover an air-flow range from 0·07 to 5 litres/min.

CALIBRATION

Accessory jets are available calibrated for air only. The certificates of calibration which are supplied show measured values at five points on the scale from which a calibration curve may be constructed.

FLOWMETERS, ORIFICE, *GALLENKAMP*, as specified, with nozzles for flexible tubing connections, one uncalibrated jet and instructions.

FJC-300-050B	Flowmeter, 0·07 to 0·25 litres/min	£36·00
FJC-300-060V	Flowmeter, 0·15 to 0·5 litres/min	£36·00
FJC-300-070S	Flowmeter, 0·4 to 1·25 litres/min	£36·00
FJC-300-080P	Flowmeter, 0·8 to 2·5 litres/min	£36·00
FJC-300-090M	Flowmeter, 1·5 to 5 litres/min	£36·00

SPARE PARTS

FJC-340-030C	Gauge glasses	Pack of 5 £0·52
FJC-340-050T	Washers, for jets	Pack of 10 £0·17

ACCESSORIES

Jets, interchangeable, uncalibrated, with washer.

FJC-340-550W	Jet, 0·07 to 0·25 litres/min	£0·84
FJC-340-560T	Jet, 0·15 to 0·5 litres/min	£0·84
FJC-340-570Q	Jet, 0·4 to 1·25 litres/min	£0·84
FJC-340-580N	Jet, 0·8 to 2·5 litres/min	£0·84
FJC-340-590K	Jet, 1·5 to 5 litres/min	£0·84

Jets, as FJC-340 but calibrated. With certificate of calibration for air.

FJC-345-550P	Jet, 0·07 to 0·25 litres/min	£5·05
FJC-345-560M	Jet, 0·15 to 0·5 litres/min	£5·06
FJC-345-570J	Jet, 0·4 to 1·25 litres/min	£5·06
FJC-345-580G	Jet, 0·8 to 2·5 litres/min	£5·06
FJC-345-590D	Jet, 1·5 to 5 litres/min	£5·06

CAPILLARY FLOWMETER

Comprises a borosilicate glass U-tube manometer across the top of which is connected a short length of precision bore capillary. Various ranges are obtained by inserting capillaries of different bores. The readings are taken on a boxwood scale graduated 125–0–125 × 1 mm. The scale is mounted on a polished hardwood stand, to which the glass U-tube is attached by spring clips so that it may easily be removed for cleaning.

INTERCHANGEABLE CAPILLARIES

The flowmeter is available with any one of 6 interchangeable capillaries which cover an air-flow range 0 to 10ml/min to 0 to 500ml/min. Accessory jets are available to extend the range to 0 to 10 litres/min.

CALIBRATION

Accessory jets are available calibrated for air only. The certificates of calibration which are supplied show measured values at five points on the scale from which a calibration curve may be constructed.

FLOWMETERS, CAPILLARY, as specified, with one uncalibrated capillary.

FJC-550-030C	Flowmeter, 0 to 10ml/min	£19·52
FJC-550-040W	Flowmeter, 0 to 25ml/min	£19·52
FJC-550-050T	Flowmeter, 0 to 50ml/min	£19·52
FJC-550-060Q	Flowmeter, 0 to 100ml/min	£19·52
FJC-550-070N	Flowmeter, 0 to 250ml/min	£19·52
FJC-550-080K	Flowmeter, 0 to 500ml/min	£19·52

SPARE PARTS and ACCESSORIES

FJC-580-010K	U-tube	£5·63

Capillaries, interchangeable, uncalibrated.

FJC-580-030E	Capillary, 0 to 10ml/min	£0·28
FJC-580-040B	Capillary, 0 to 25ml/min	£0·28
FJC-580-050V	Capillary, 0 to 50ml/min	£0·28
FJC-580-060S	Capillary, 0 to 100ml/min	£0·28
FJC-580-070P	Capillary, 0 to 250ml/min	£0·28
FJC-580-080M	Capillary, 0 to 500ml/min	£0·28
FJC-580-090J	Capillary, 0 to 1 litre/min	£0·28
FJC-580-100J	Capillary, 0 to 2·5 litres/min	£0·28
FJC-580-110G	Capillary, 0 to 5 litres/min	£0·28
FJC-580-120D	Capillary, 0 to 10 litres/min	£0·28

Capillaries, as FJC-580 but calibrated. With certificate of calibration for air.

FJC-585-030U	Capillary, 0 to 10ml/min	£6·19
FJC-585-040R	Capillary, 0 to 25ml/min	£6·19
FJC-585-050X	Capillary, 0 to 50ml/min	£6·19
FJC-585-060L	Capillary, 0 to 100ml/min	£6·19
FJC-585-070Y	Capillary, 0 to 250ml/min	£6·19
FJC-585-080F	Capillary, 0 to 500ml/min	£6·19
FJC-585-090C	Capillary, 0 to 1 litre/min	£6·19
FJC-585-100C	Capillary, 0 to 2·5 litres/min	£6·19
FJC-585-110W	Capillary, 0 to 5 litres/min	£6·19
FJC-585-120T	Capillary, 0 to 10 litres/min	£6·19

FLOWMETER LAB-KIT

For measurement of liquid and gas flowrates

- **Flow ranges**
  25 ml/min to 100 litres/min for air
  7·5 ml/min to 5 litres/min for water
- **Floats and metering tubes readily changed**
- **Continuous direct reading of flowrate**



FJD-200

Comprises a series of precision bore borosilicate glass metering tubes, anodised aluminium and stainless steel floats, stainless steel end nozzles for 5 to 13mm bore flexible tubing, mounting frame and tripod for vertical mounting.

Clearly indicated readings are obtained on the 100mm scale and a clip-on plastics front gives protection to the tube.

Overall height of tubes mounted on tripod 400mm.

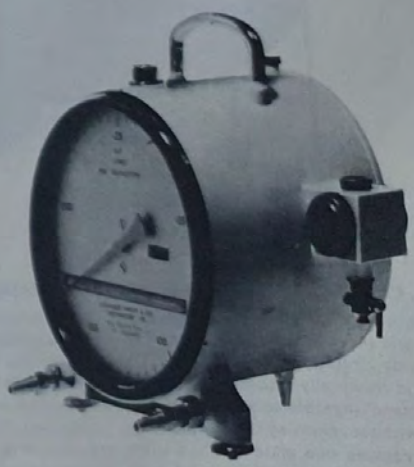
FLOWMETER LAB-KIT, *GAPMETER*, as specified, comprising five metering tubes, nine floats, three pairs of nozzle connections, mounting frame and tripod. Any of 10 ranges for air and six for water may be assembled. Calibration charts are supplied for the 16 ranges. Supplied in carrying case.

FJD-200-X Flowmeter lab-kit **£57·20**

GAS METERS

Wet type meters for the measurement of total gas volume used and, by timed observation, the rate of gas flow

- **Drum capacities 0·5 and 2dm³**
- **Cumulative reading by totaliser and index dials respectively**



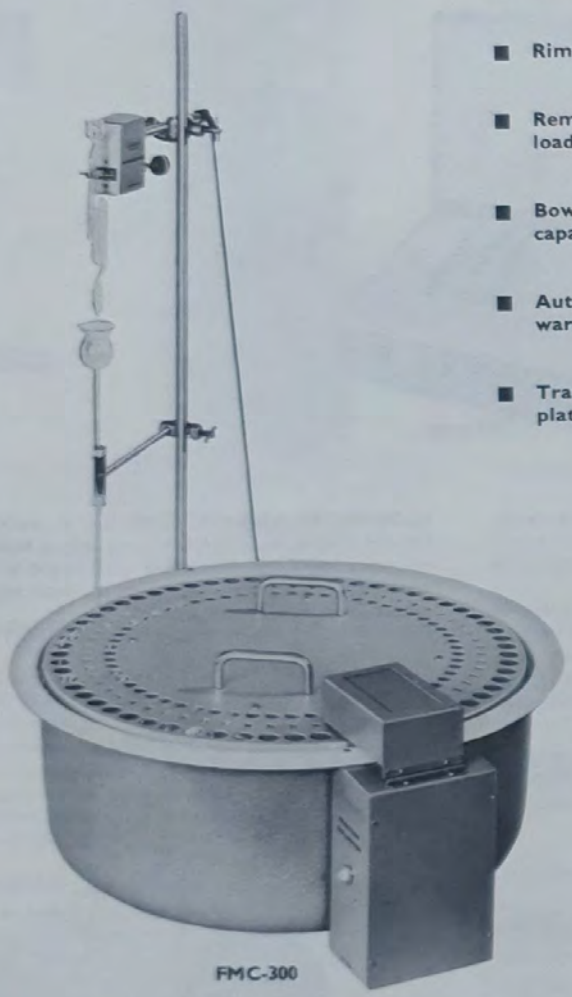
See GJF-300-M and GJF-340-P

For dry type meter *See GJF-450-A*

Gallenkamp FRACTION COLLECTOR

A versatile, spillproof fraction collector which offers volumetric or timed flow fraction cutting simply by the selection of the appropriate module

- **Volumetric or timed flow collection**
- **Accepts up to 60 fractions in either 12 or 19mm diameter rimmed test tubes, up to 150mm long**
- **Collector plate rotated by self-locating rim drive**
- **Rim-drive mechanism operates on 24V**
- **Removable free standing collector plates can be pre-loaded in seconds**
- **Bowl construction with drain cock provides large capacity for spillage collection**
- **Automatic arrest at end of track with facility for warning or stopping flow of eluent**
- **Transparent rigid cover accessory protects collector plate during long collection periods**



FMC-300

BOWL, COLLECTOR PLATE AND DRIVE MECHANISM

Bowl construction provides exceptionally large capacity for spillage and protection for the tubes. There are no mechanisms, bearings or circuits within the bowl. The inside of the bowl is finished in chemically resistant enamel and a drain cock is fitted.

The interchangeable collector plates can be stood on any level surface without removing the sample tubes. This facility allows the user to remove one plate of filled tubes and replace it within seconds by another plate of empty tubes to continue the collection.

The rim-drive system of advancing the collector plate operates on a 24V supply.

A transparent rigid plastics dome cover, which fits over the collector plate to protect the samples from dust, is available as an accessory. Bowl diameter 600mm, overall height 700mm, net mass 8kg.

METHODS OF FRACTION CUTTING

By Volumetric Fractions

The siphon delivers its calibrated volume by siphoning when filled. It is mounted on a balance which tilts when the siphon has half filled or half emptied. The collector plate advances by one tube each time the balance tilts during the siphon filling cycle and a logic circuit prevents its movement at any other time. Siphons with capacities from 2·5 to 25ml are listed under FMC-410 and FMC-420.

By Timed Fractions

The timer allows the eluent to flow into each tube for a predetermined time after which the collector plate advances to the next tube.

It can be set to any required interval between 1 and 45 minutes. It is fitted with a RESET switch which automatically returns the mechanism to zero prior to resetting the operating period. Fail-safe devices are built-in to provide protection for the timer in the event of an electrical breakdown.

Timed flow permits fractions to be collected directly off the end of the chromatography column where this is important to reduce the effects of 'tailing', e.g. with radioactive tracer investigations.



FMC-350

OUTFITS

FRACTION COLLECTOR OUTFIT, *GALLENKAMP*, for volumetric collection comprising collector with drive assembly, collector plate for rimmed tubes, support rod, siphon balance with 5ml aqueous solution siphon and bosshead, funnel with clamp and bosshead and three spare rubber drive wheels. With instructions. For 220–240V and 110–120V 50–60Hz single phase supplies.

FMC-300-G Fraction collector **£187·88**

For other siphons *See FMC-410 and FMC-420*

FRACTION COLLECTOR OUTFIT, *GALLENKAMP*, for timed flow collection, comprising collector with drive assembly, collector plate for rimmed tubes, support rod, timer and three spare rubber drive wheels. With instructions. For single phase supplies.

FMC-330-010F Fraction collector, 110–120V and 220–240V 50Hz **£241·31**

FMC-330-030W Fraction collector, 110–120V and 220–240V 60Hz **£242·44**

CONVERSION KITS

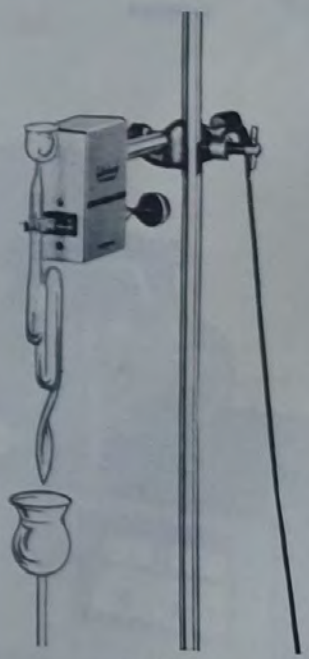
CONVERSION KITS, to convert FMC-300-G to FMC-330 comprising timer module. For single phase supplies.

FMC-350-010X Conversion kit, 110–120V and 220–240V 50Hz **£109·69**

FMC-350-030Y Conversion kit, 110–120V and 220–240V 60Hz **£110·81**

CONVERSION KIT, to convert FMC-330 to FMC-300-G comprising siphon balance with bosshead, 5ml aqueous solution siphon and funnel with bosshead and clamp. With instructions.

FMC-380-T Conversion kit **£56·25**


FMC-380

SPARE PARTS

Siphons, glass, for use with aqueous solutions.

FMC-410-030F Siphon, 2·5ml **£2·19**
FMC-410-050W Siphon, 5ml **£2·19**
FMC-410-070Q Siphon, 10ml **£2·31**
FMC-410-090K Siphon, 25ml **£2·43**

Siphons, as FMC-410 but for use with non-aqueous solutions.

FMC-420-230N Siphon, 2·5ml **£2·19**
FMC-420-250H Siphon, 5ml **£2·19**
FMC-420-270B Siphon, 10ml **£2·31**
FMC-240-290S Siphon, 25ml **£2·43**

Collector plate, with 60 holes for 12mm tubes and 60 holes for 19mm tubes. For rimmed tubes only up to 150mm long.

FMC-420-350D Collector plate **£20·25**

Funnel, for use with siphon balance *See FPM-850-F*

ACCESSORIES

Cover, transparent rigid plastics, to protect the collector plate from dust during long collection periods.

FMC-420-510H Cover **£15·19**

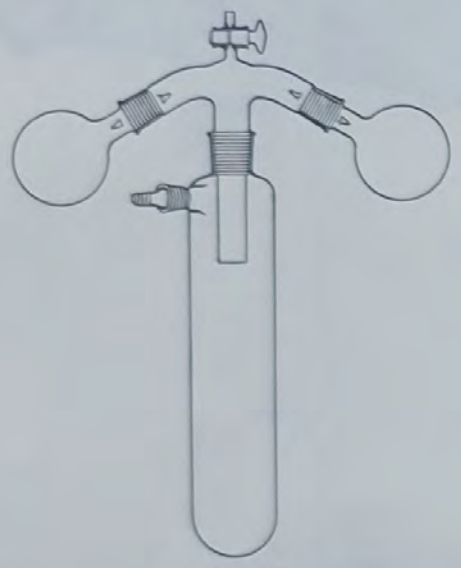
Test tubes, rimmed, up to 150mm long, 12 and 19mm diameter *See TES-200, TES-630 and TES-680*

Gallenkamp FREEZE DRYING APPARATUS

For drying labile and other biological substances by the sublimation of ice from pre-frozen solutions contained in flasks

Principle

Ice can be removed from evenly distributed films of frozen solution at an average rate of 40g/hour using a vacuum of about 0·4torr. The collecting trap should be immersed in a vacuum flask containing liquid air or solid carbon dioxide/ethanol mixture to condense the evaporated moisture. The working capacity of the apparatus is approximately 500ml.



FMW-300

Construction

Comprises a head with four side arms each with hooks for spring connectors and a flask fitted by a 24/29 joint. The head which has a 34/35 cone fits into the collecting trap. A vacuum connector arm is situated at the top of the trap and the head is fitted with a vacuum release stopcock.

FREEZE DRYING APPARATUS, *GALLENKAMP*, borosilicate glass, as specified, with head, trap, vacuum adapter, four 250ml flasks and four pairs of spring connectors, 38mm long.

FMW-300-N Freeze drying apparatus **£27·14**

SPARE PARTS

FMW-320-010T	Head	**£9·49**
	Trap, with 34/35 socket and side arm with 19/26 socket. Diameter 65mm, length to neck 330mm.	
FMW-320-030N	Trap	**£6·33**
	Adapter, with 19/26 cone for vacuum connection.	*See QAL-110-R*
	Flasks, with 24/29 cone and hooks for spring connectors.	
FMW-320-070B	Flask, 100ml	**£2·30**
FMW-320-090S	Flask, 250ml	**£2·70**
FMW-320-110P	Flask, 500ml	**£2·93**
	Spring connectors, length 38mm	*See QJH-870-V*
	Rotary pump, single stage	*See PYB-670-N*

EDWARDS FREEZE DRYING APPARATUS

Suitable for research and pilot plant applications

Comprises air cooled refrigerator compressor, a stainless steel condenser chamber with a vacuum pipeline for connection to a suitable two-stage oil sealed rotary vacuum pump, and an eight-port drum manifold. Each port is fitted with a rubber valve which accepts a 24/29 cone connector for fitting to round glass flasks containing frozen samples.

Refrigerator heat extraction rate 180kcal/hour at −35°C. Supplied with Pirani vacuum gauge and gauge head. Overall dimensions 332 × 535 × 622mm. Mass 45kg.



FMW-500

FREEZE DRYING APPARATUS, *EDWARDS MODULYO*, for bench top or trolley mounting, as specified. For single phase supplies. **Requires but does not include vacuum pump.**

FMW-500-U Freeze drying apparatus, 220–240V 50Hz **£977·13**

ACCESSORY

FMW-520-010D	Connector, 24/29 cone	**£4·62**
	Vacuum pump	*See PYB-740-D*

FREEZE DRYING AMPOULES, BS 795

In clear, BP quality, neutral glass. The top 11mm of the open ends have internal neck diameter 5·9 to 6·1mm and are glazed.

BS type	L/05	K/205	K/10
Nominal capacity, ml	0·5	2·5	10
Nominal length, mm	100	154	158

FMW-600-010J	Ampoules, L/05	Pack of 525 **£15·08**
FMW-600-020G	Ampoules, K/205	Pack of 368 **£39·38**
FMW-600-030D	Ampoules, K/10	Pack of 176 **£22·73**

FUNNELS

FUNNELS, soda-lime glass, plain pattern.

FPH-300-010M	Funnel, 55mm dia.	£0·51
FPH-300-030G	Funnel, 70mm dia.	£0·52
FPH-300-050A	Funnel, 100mm dia.	£0·64
FPH-300-070R	Funnel, 150mm dia.	£1·10
FPH-300-090L	Funnel, 200mm dia.	£2·08
FPH-300-110Y	Funnel, 250mm dia.	£3·71



FPH-300
FPH-360

FUNNELS, *PYREX* glass, BS 1923. Length of stem is similar to top diameter of funnel.

FPH-360-010Q	Funnel, 50mm dia.	£0·83
FPH-360-012M	Funnels, 50mm dia.	Pack of 24 £16·62
FPH-360-030K	Funnel, 75mm dia.	£0·99
FPH-360-032G	Funnels, 75mm dia.	Pack of 24 £19·78
FPH-360-050E	Funnel, 100mm dia.	£1·15
FPH-360-052A	Funnels, 100mm dia.	Pack of 24 £23·46
FPH-360-070V	Funnel, 150mm dia.	£2·07
FPH-360-072R	Funnels, 150mm dia.	Pack of 12 £21·51
FPH-360-090P	Funnel, 200mm dia.	£2·47
FPH-360-092L	Funnels, 200mm dia.	Pack of 6 £13·40



FPH-390

FUNNELS, *PYREX* glass, BS 1923, precision pressed, with long stem and fluted internally for quick filtration.

FPH-390-030M	Funnel, 75mm dia.	£1·02
FPH-390-032Y	Funnels, 75mm dia.	Pack of 24 £20·47
FPH-390-050G	Funnel, 100mm dia.	£1·31
FPH-390-052C	Funnels, 100mm dia.	Pack of 24 £26·57



FPH-450

FUNNELS, polypropylene, with external ribs.

FPH-450-010P	Funnels, 40mm dia.	Pack of 10 £0·48
FPH-450-030J	Funnels, 63mm dia.	Pack of 10 £0·79
FPH-450-050D	Funnels, 90mm dia.	Pack of 10 £1·24
FPH-450-070U	Funnels, 115mm dia.	Pack of 10 £2·25
FPH-450-090X	Funnels, 140mm dia.	Pack of 5 £1·35
FPH-450-110L	Funnels, 165mm dia.	Pack of 5 £2·08
FPH-450-130F	Funnels, 190mm dia.	Each £0·70



FPH-470

FUNNEL, polythene, with parallel-sided top 220mm i.d. (F)

FPH-470-E	Funnel, 220mm dia.	£1·34



FPH-550

FUNNELS, stainless steel, with handle. (F)

FPH-550-030B	Funnel, 150mm dia.	£9·68
FPH-550-050S	Funnel, 200mm dia.	£11·03
FPH-550-070M	Funnel, 250mm dia.	£12·60

FUNNELS, *PYREX* glass, with short stem for powders. Top diameter 75mm.

FPH-700-030U	Funnel, 75mm dia.	£1·22
FPH-700-032Q	Funnels, 75mm dia.	Pack of 12 £12·71



FPH-700

FUNNELS, polypropylene, for powders. Top diameter 100mm with parallel-sided stem 26mm o.d. to minimise clogging. (F)

FPH-750-R	Funnels, 100mm dia.	Pack of 5 £3·30

FUNNEL, polythene, for powders, with adapter to convert to a conventional funnel. Top diameter 240mm with parallel-sided stem 50mm o.d. to minimise clogging. (F)

FPH-780-T	Funnel, 240mm dia.	£9·34



FPH-780

SintAGlass FILTER FUNNELS



FPJ-300

Porosity	Code colour	BS 1752 range of maximum pore diameter	Sintaglass range of maximum pore diameter
		μm	μm
0	White	150–250	200–250
1	Yellow	90–150	100–120
2	Green	40–90	40–50
3	Black	15–40	20–30
4	Orange	5–15	5–10
5	Blue	Not greater than 2	1–1·8

For additional data see page heading Sintered Glassware.

FUNNELS, *SINTAGLASS,* **cylindrical,** with flat, sintered glass plate.

Capacity, ml	30	60	120	
Plate dia., mm	30	40	40	
FPJ-300-050D	Funnel, 30ml, porosity 1			**£1·90**
FPJ-300-060A	Funnel, 30ml, porosity 2			**£1·90**
FPJ-300-070U	Funnel, 30ml, porosity 3			**£1·90**
FPJ-300-080R	Funnel, 30ml, porosity 4			**£1·90**
FPJ-300-090X	Funnel, 30ml, porosity 5			**£2·82**
FPJ-300-150W	Funnel, 60ml, porosity 1			**£1·96**
FPJ-300-160T	Funnel, 60ml, porosity 2			**£1·96**
FPJ-300-170Q	Funnel, 60ml, porosity 3			**£1·96**
FPJ-300-180N	Funnel, 60ml, porosity 4			**£1·96**
FPJ-300-190K	Funnel, 60ml, porosity 5			**£3·05**
FPJ-300-250S	Funnel, 120ml, porosity 1			**£1·96**
FPJ-300-260P	Funnel, 120ml, porosity 2			**£1·96**
FPJ-300-270M	Funnel, 120ml, porosity 3			**£1·96**
FPJ-300-280J	Funnel, 120ml, porosity 4			**£1·96**



FPJ-330-140
to
FPJ-330-280

FUNNELS, *SINTAGLASS,* **Buchner,** with sintered glass plate. Plates diameter 65mm are flat; 90 and 120mm are domed.

Capacity, ml	140	400	700	
Plate dia., mm	65	90	120	
FPJ-330-050F	Funnel, 140ml, porosity 1			**£3·80**
FPJ-330-060C	Funnel, 140ml, porosity 2			**£3·80**
FPJ-330-070W	Funnel, 140ml, porosity 3			**£3·80**
FPJ-330-080T	Funnel, 140ml, porosity 4			**£3·80**
FPJ-330-090Q	Funnel, 140ml, porosity 5			**£5·64**
FPJ-330-140E	Funnel, 400ml, porosity 0			**£4·49**
FPJ-330-150B	Funnel, 400ml, porosity 1			**£4·49**
FPJ-330-160V	Funnel, 400ml, porosity 2			**£4·49**
FPJ-330-170S	Funnel, 400ml, porosity 3			**£4·49**
FPJ-330-180P	Funnel, 400ml, porosity 4			**£4·49**
FPJ-330-240A	Funnel, 700ml, porosity 0			**£5·98**
FPJ-330-250U	Funnel, 700ml, porosity 1			**£5·98**
FPJ-330-260R	Funnel, 700ml, porosity 2			**£5·98**
FPJ-330-270X	Funnel, 700ml, porosity 3			**£5·98**
FPJ-330-280L	Funnel, 700ml, porosity 4			**£5·98**



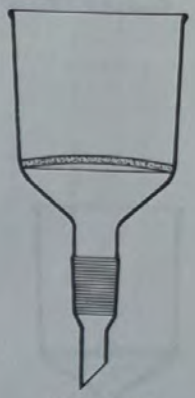
FPJ-370

FUNNELS, *SINTAGLASS,* **cylindrical,** with flat, sintered glass plate and 24/29 cone on stem. Capacity approximately 60ml, plate diameter 40mm.

FPJ-370-170N	Funnel, 60ml, porosity 3	**£2·82**
FPJ-370-180K	Funnel, 60ml, porosity 4	**£2·82**

FUNNELS, *SINTAGLASS,* **Buchner,** with sintered glass plate and 24/29 cone on stem. Plate diameter 65mm is flat; 90 and 120mm are domed.

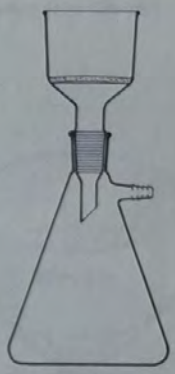
Capacity, ml	140	400	700	
Plate dia., mm	65	90	120	
FPJ-420-070V	Funnel, 140ml, porosity 3			£4·83
FPJ-420-080S	Funnel, 140ml, porosity 4			£4·83
FPJ-420-090P	Funnel, 140ml, porosity 5			£6·67
FPJ-420-170R	Funnel, 400ml, porosity 3			£6·21
FPJ-420-180X	Funnel, 400ml, porosity 4			£6·21
FPJ-420-270N	Funnel, 700ml, porosity 3			£7·36
FPJ-420-280K	Funnel, 700ml, porosity 4			£7·36



FPJ-420-170 to FPJ-420-280

FUNNELS, *SINTAGLASS,* **Buchner,** with sintered glass plate and 29/32 cone on stem. Plate diameter 65mm is flat; 90 and 120mm are domed.

Capacity, ml	140	400	700	
Plate dia., mm	65	90	120	
FPJ-450-070A	Funnel, 140ml, porosity 3			£6·56
FPJ-450-080U	Funnel, 140ml, porosity 4			£6·56
FPJ-450-090R	Funnel, 140ml, porosity 5			£6·79
FPJ-450-170T	Funnel, 400ml, porosity 3			£7·13
FPJ-450-180Q	Funnel, 400ml, porosity 4			£7·13
FPJ-450-270P	Funnel, 700ml, porosity 3			£7·82
FPJ-450-280M	Funnel, 700ml, porosity 4			£7·82



FPJ-420 with flask

FUNNELS, *SINTAGLASS,* **cylindrical,** with flat, sintered glass plate, 24/29 cone on stem and side tube for connection to a filter pump. Capacity approximately 60ml, plate diameter 40mm.

FPJ-490-170X	Funnel, 60ml, porosity 3	£3·57
FPJ-490-180L	Funnel, 60ml, porosity 4	£3·57



FPJ-490

FUNNELS, *SINTAGLASS,* **Buchner,** with sintered glass plate, 24/29 cone on stem and side tube for connection to a filter pump. Plate 65mm diameter is flat; 90mm is domed.

Capacity, ml	140	400	
Plate dia., mm	65	90	
FPJ-540-070W	Funnel, 140ml, porosity 3		£5·52
FPJ-540-080T	Funnel, 140ml, porosity 4		£5·52
FPJ-540-090Q	Funnel, 140ml, porosity 5		£8·05
FPJ-540-170S	Funnel, 400ml, porosity 3		£7·82
FPJ-540-180P	Funnel, 400ml, porosity 4		£7·82



FPJ-540-170
FPJ-540-180

FUNNELS, *SINTAGLASS,* **Buchner,** with sintered glass plate, 29/32 cone on stem and side tube for connection to a filter pump. Plate 65mm diameter is flat; 90mm is domed.

Capacity, ml	140	400	
Plate diam., mm	65	90	
FPJ-580-070R	Funnel, 140ml, porosity 3		£7·13
FPJ-580-080X	Funnel, 140ml, porosity 4		£7·13
FPJ-580-090L	Funnel, 140ml, porosity 5		£8·97
FPJ-580-170N	Funnel, 400ml, porosity 3		£8·97
FPJ-580-180K	Funnel, 400ml, porosity 4		£8·97



FPJ-540-170 with bottle

FUNNELS, *SINTAGLASS,* **Hirsch,** with flat sintered glass plate.

Capacity, ml	25	60	
Plate dia., mm	21	30	
Top dia., mm	55	80	
FPJ-650-070H	Funnel, 25ml, porosity 3		£2·19
FPJ-650-080E	Funnel, 25ml, porosity 4		£2·19
FPJ-650-170D	Funnel, 60ml, porosity 3		£2·30
FPJ-650-180A	Funnel, 60ml, porosity 4		£2·30



FPJ-650



FPJ-680 with tube

FUNNELS, *SINTAGLASS,* **Hirsch,** with flat sintered glass plate 21 mm diameter and 19/26 cone on stem. Capacity approximately 21 ml.

FPJ-680-070J	Funnel, 21 ml, porosity 3	**£4·49**
FPJ-680-080G	Funnel, 21 ml, porosity 4	**£4·49**



FPL-300

FUNNELS, slit sieve Buchner, *PYREX* **glass.** With glass plate, 60 mm diameter, sealed-in above the stem. Capacity approximately 180 ml.

FPL-300-070A	Funnel, 180 ml	**£3·37**
FPL-300-072T	Funnels, 180 ml	Pack of 4 **£12·25**



FPL-390

FUNNELS, Buchner, porcelain with perforated plate. Dimension given is the diameter of filter paper required for the funnel. (F)

FPL-390-030S	Funnel, 4·25 cm	**£2·25**
FPL-390-050M	Funnel, 5·5 cm	**£2·97**
FPL-390-070G	Funnel, 7 cm	**£3·80**
FPL-390-090A	Funnel, 9 cm	**£4·84**
FPL-390-110U	Funnel, 11 cm	**£6·83**
FPL-390-130X	Funnel, 12·5 cm	**£9·19**
FPL-390-150Y	Funnel, 15 cm	**£10·52**
FPL-390-170C	Funnel, 18·5 cm	**£13·50**
FPL-390-190T	Funnel, 24 cm	**£22·28**



FPL-480

FUNNELS, Buchner, rigid polythene, made in two pieces to allow ease of cleaning. Dimension given is the diameter of filter paper required for the funnel. (F)

FPL-480-070F	Funnel, 7 cm	**£1·93**
FPL-480-090W	Funnel, 9 cm	**£2·92**
FPL-480-110T	Funnel, 11 cm	**£3·96**
FPL-480-150H	Funnel, 15 cm	**£6·55**
FPL-480-190S	Funnel, 24 cm	**£13·20**

FUNNEL, Buchner, rigid polythene, three piece, upper cylindrical portion with integral perforated plate, central portion funnelled to lead filtrate into receiving vessel, lower portion which screws on to upper portion clamping the funnel between, with side tube for connection to filter pump. Complete with rubber gasket to enable funnel to rest on any container of neck diameter from 20 to 50 mm i.d.; to take 9 cm diameter filter paper. (F)

FPL-520-X	Funnel, 9 cm	**£4·90**

FUNNELS, Hirsch, porcelain, with fixed filter plate. (F)

Plate dia., mm	6	8	11	16	
Top dia., mm	20	30	40	50	
FPL-600-030L	Funnel, 6 mm				**£1·20**
FPL-600-050F	Funnel, 8 mm				**£1·35**
FPL-600-070W	Funnel, 11 mm				**£1·49**
FPL-600-090Q	Funnel, 16 mm				**£1·76**



FPL-520



FPL-600

DROPPING FUNNELS

CYLINDRICAL SHAPE

All capacities quoted are nominal

FUNNELS, cylindrical, dropping, open top, borosilicate glass, with interchangeable glass stopcock.

FPM-200-030K	Funnel, 25ml	£2·08
FPM-200-050E	Funnel, 50ml	£2·08
FPM-200-070V	Funnel, 100ml	£2·23
FPM-200-090P	Funnel, 250ml	£3·07

FUNNELS, cylindrical, dropping, BS 2021 Type 3, borosilicate glass with interchangeable glass stopcock, and interchangeable polypropylene stopper.

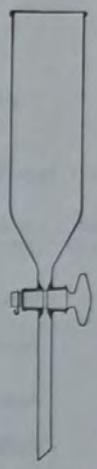
Capacity, ml		25	50	100	250	500	1000	
Stopper size		14/15	19/17	19/17	24/20	24/20	29/32	
FPM-240-030F	Funnel, 25ml							£4·35
FPM-240-050W	Funnel, 50ml							£4·48
FPM-240-070Q	Funnel, 100ml							£4·73
FPM-240-090K	Funnel, 250ml							£5·57
FPM-240-110H	Funnel, 500ml							£5·81
FPM-240-130B	Funnel, 1000ml							£6·41

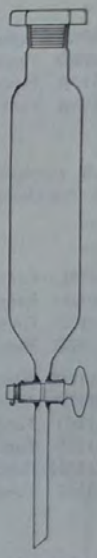
FUNNELS, cylindrical, dropping, as FPM-240 but graduated.

Capacity, ml		50	100	250	500	1000	
Stopper size		19/17	19/17	24/20	24/20	29/32	
FPM-270-050B	Funnel, 50ml						£4·35
FPM-270-070S	Funnel, 100ml						£4·73
FPM-270-090M	Funnel, 250ml						£6·17
FPM-270-110J	Funnel, 500ml						£6·53
FPM-270-130D	Funnel, 1000ml						£8·35

FUNNEL, cylindrical, dropping, borosilicate glass, with 14/15 socket and 14/15 drip end cone. Capacity 30ml, overall length 210mm. **Without** stopper.

FPM-310-E	Funnel, 30ml	£4·73
	Stopper, glass	*See SYH-200-070A*


FPM-200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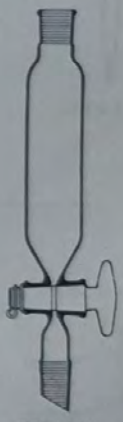
FPM-270


FPM-310

SEPARATING FUNNELS

CONICAL SHAPE

All capacities quoted are nominal

FUNNELS, conical, separating, BS 2021 Type 2A, borosilicate glass with interchangeable glass stopcock and interchangeable polypropylene stopper.

Capacity, ml		50	100	250	500	1000	
Stopper size		19/17	19/26	24/29	24/29	29/32	
FPM-400-050L	Funnel, 50ml						£4·73
FPM-400-070F	Funnel, 100ml						£4·95
FPM-400-090W	Funnel, 250ml						£6·05
FPM-400-110T	Funnel, 500ml						£6·30
FPM-400-130N	Funnel, 1000ml						£7·26

FUNNELS, conical, separating, as FPM-400 but graduated.

Capacity, ml		100	250	
Stopper size		19/26	24/29	
FPM-430-070H	Funnel, 100ml			£5·20
FPM-430-090B	Funnel, 250ml			£7·02


FPM-400



FPM-430

FUNNELS, conical, separating, as FPM-400 but with PTFE stopcock.

Capacity, ml		100	250	500	1000
Stopper size		19/26	24/29	24/29	29/32
FPM-460-070J	Funnel, 100 ml				**£5·09**
FPM-460-090D	Funnel, 250 ml				**£6·17**
FPM-460-110A	Funnel, 500 ml				**£6·41**
FPM-460-130R	Funnel, 1000 ml				**£7·38**

FUNNELS, conical, separating, BS 2021 Type 2A, *PYREX* **glass,** with interchangeable glass stopper.

Capacity, ml		100	250	500	1000	2000
Stopper size		19/26	24/29	24/29	29/32	34/35
FPM-490-070L	Funnel, 100 ml					**£4·60**
FPM-490-072H	Funnels, 100 ml					Pack of 6 **£25·13**
FPM-490-090F	Funnel, 250 ml					**£5·06**
FPM-490-092B	Funnels, 250 ml					Pack of 6 **£27·54**
FPM-490-110C	Funnel, 500 ml					**£5·41**
FPM-490-112V	Funnels, 500 ml					Pack of 6 **£29·15**
FPM-490-130T	Funnel, 1000 ml					**£6·14**
FPM-490-132P	Funnels, 1000 ml					Pack of 4 **£22·31**
FPM-490-150N	Funnel, 2000 ml					**£8·35**
FPM-490-152J	Funnels, 2000 ml					Pack of 2 **£15·18**



FPM-460



FPM-600

SPHERICAL SHAPE

All capacities quoted are nominal

FUNNELS, spherical, separating, BS 2021 Type 1A, borosilicate glass with interchangeable glass stopcock and interchangeable polypropylene stopper.

Capacity, ml		50	100	250	500	1000
Stopper size		19/17	19/17	24/20	24/20	29/32
FPM-600-050S	Funnel, 50 ml					**£4·35**
FPM-600-070M	Funnel, 100 ml					**£4·42**
FPM-600-090G	Funnel, 250 ml					**£4·73**
FPM-600-110D	Funnel, 500 ml					**£5·32**
FPM-600-130U	Funnel, 1000 ml					**£6·41**

FUNNELS, spherical, separating, as FPM-600 but with PTFE stopcock.

Capacity, ml		100	250	500	1000
Stopper size		19/17	24/20	24/20	29/32
FPM-630-070X	Funnel, 100 ml				**£4·55**
FPM-630-090Y	Funnel, 250 ml				**£4·84**
FPM-630-110F	Funnel, 500 ml				**£5·46**
FPM-630-130W	Funnel, 1000 ml				**£6·53**

FUNNELS, spherical, separating, BS 2021 Type 1A, *PYREX* **glass,** with interchangeable glass stopper.

Capacity, ml		50	100	250	500
Stopper size		19/26	19/26	24/29	24/29
Capacity, ml		1000	2000		5000
Stopper size		29/32	34/35		34/35
FPM-690-050B	Funnel, 50 ml				**£5·18**
FPM-690-052U	Funnels, 50 ml				Pack of 6 **£27·83**
FPM-690-070S	Funnel, 100 ml				**£5·43**
FPM-690-072X	Funnels, 100 ml				Pack of 6 **£29·61**
FPM-690-090M	Funnel, 250 ml				**£5·64**
FPM-690-092Y	Funnels, 250 ml				Pack of 6 **£30·71**
FPM-690-110J	Funnel, 500 ml				**£5·98**
FPM-690-112F	Funnels, 500 ml				Pack of 6 **£32·26**
FPM-690-130D	Funnel, 1000 ml				**£6·21**
FPM-690-150U	Funnel, 2000 ml				**£8·03**
FPM-690-170X	Funnel, 5000 ml				**£11·36**



FPM-690

THISTLE FUNNELS

FUNNELS, thistle, soda-lime glass, with straight stem. Overall length 300mm.

FPM-850-F Funnels, thistle Pack of 5 **£1·89**

FUNNEL, thistle, as FPM-850-F but with bend and two safety bulbs. Overall length 300mm.

FPM-870-X Funnel, thistle **£1·35**

FUNNELS, thistle, with short, narrow bore, tapered stem, for filling barometer tubes, density bottles, etc.

FPM-910-C Funnels, thistle Pack of 6 **£2·95**

POLYTHISTLE HEADS, *GRIFFIN*, replace conventional thistle funnels and have many other uses in laboratories. Translucent polythene, top diameter 35mm, with a short stem into which 6–7mm o.d. glass tubing is a push fit.

Can be used for filling small vessels without the use of a glass stem, and, if provided with a long or bent stem, facilitate the addition of solutions to awkwardly located vessels.

FPM-970-G Polythistle heads Pack of 6 **£0·98**


FPM-850


FPM-870


FPM-970


FPM-910

FUNNEL SUPPORTS

Hardwood stands with funnel holder See *STA-200-060L et seq.*

Spring clamps, 7 to 20mm diameter See *STE-940-030N et seq.*

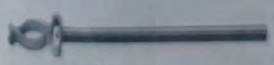
Open ring, 35mm diameter See *STF-490-R*

Closed rings, 50 to 160mm diameter See *STF-520-010J et seq.*











Gallenkamp

Gallenkamp LABORATORY FURNACES

GALLENKAMP furnaces are tested using methods recommended in BS 4309

The wide range of furnaces which we offer includes types to suit practically all laboratory applications. The outstanding performance and reliability of each furnace results directly from our use of modern methods and materials and our design and production experience accumulated over many years of manufacturing

- **Furnaces are designed for reliable operation at the published maximum temperature**
- **All furnaces are robustly constructed and are efficiently thermally insulated**
- **Furnaces are, whenever practicable, self-contained with all controls and accessories necessary for efficient operation**
- **Thermal fuses and other safety devices are fitted where stated**

FURNACE SECTION INDEX

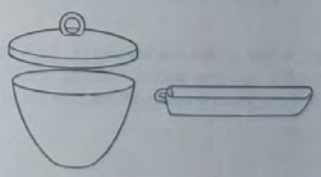
List No.	Description	Maximum temperature	Internal dimensions	Controls	Page
FSE-250	Muffle furnace, wire wound	1100°C	100 × 125 × 150 mm	Manual	275
FSE-450 to FSE-570	Muffle furnaces, wire wound	1100°C	80 × 150 × 235 mm 135 × 190 × 380 mm 200 × 230 × 460 mm	Manual or automatic	276
FSL-300 to FSL-320	Box furnaces, panel heaters	1200°C	120 × 150 × 250 mm 165 × 190 × 370 mm	Automatic	278
FSW-200	Box furnace, wire wound	1250°C	150 × 150 × 300 mm	Automatic	280
FSW-400 to FSW-420	Box furnace, silicon carbide elements	1400°C	100 × 125 × 180 mm	Manual	281
FSW-450 to FSW-670	Box furnaces, silicon carbide elements	1400°C	100 × 150 × 300 mm 150 × 230 × 380 mm	Automatic	282
FSW-850	Box furnace, molybdenum disilicide elements	1500°C	180 × 180 × 320 mm	Automatic	283
FTH-350 to FTH-370	Tube furnaces, wire wound	1200°C	300 × 38 mm	Manual	284
FTH-500	Tube furnace, silicon carbide elements	1400°C	150 × 30 mm	Manual	285
FTH-700	Tube furnaces, molybdenum disilicide elements	1500°C	270 × 39 mm 320 × 80 mm	Automatic	286
FTM-560	Carius furnace	300°C	70 × 30 mm	Manual	287
FTM-800	Crucible furnace, gas heated	1000°C	–	–	287

FURNACE APPLICATIONS

MUFFLE FURNACES used in	BOX FURNACES used in	TUBE FURNACES used in
Fuel Testing **Food Science** **Metallurgy** **Chemistry** **Glass Manufacture**	**Chemistry** **Cement Testing**	**Cement Testing** **Fertiliser Industry**
Paint Technology **Medicine**	**Glass Manufacture** **Fuel Testing**	**Metallurgy** **Ceramics production** **Chemistry**
Dentistry **Mineralogy** **Ceramics Production** **General Industrial Applications**	**Metallurgy** **Ceramics Production**	**Organic Analysis** **Fuel Testing**
for	**for**	**for**
Metal melting Alloying Tempering and hardening of tools Precipitate drying and ignition Assaying	Enamelling Annealing prior to hot forming or drawing	Carbon and sulphur in steels Fusion of coal ash Tempering
Inorganics in paints and resins Heat treatment of metals Fusions Annealing of glass and metals	Ceramic firing Fusions Tempering Glass melting	Elemental analyses of organic substances Heat treatments of metals in controlled atmospheres
Sintering Decoration and glazing of ceramics Ash determination Incineration and ignition	Case hardening of steels Silica in cement Heat treating tools and piece parts	General combustion analyses Hydrogen, chlorine, sulphur, nitrogen in compounds

ACCESSORIES FOR SAMPLE HANDLING

■ To contain particulate samples in muffle and tube furnaces.



See page headings Boats and Crucibles

■ For large samples and piece parts in muffle furnaces.



See page headings Tongs and Trays

■ For operator protection.



See page heading Safety and Protection

ACCESSORIES FOR FURNACE OPERATION

■ For remotely switching furnace supplies ON or OFF.



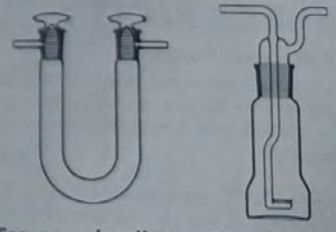
See page heading Timers

■ For temperature measurement.



See page heading Pyrometers

■ For gas scrubbing and absorption.



See page headings Absorption and Gas Washbottles

Gallenkamp

Gallenkamp LABORATORY FURNACES

TECHNICAL INFORMATION

HEATING ELEMENTS

Wire-wound heating elements

Wire-wound muffle and tube furnaces and box furnaces with panel or internal spiralled wire elements, utilise high quality resistance wires. Suitable materials for these wires were selected only after extensive life tests and many years of experience have confirmed the designs of the elements.

Silicon carbide heating elements

Silicon carbide elements are capable of attaining high temperatures without the need for a protective atmosphere. They have a low ageing rate which, together with efficient furnace design enables furnaces which use these elements to be used reliably at temperatures up to 1400°C. All designs permit quick and easy replacement of elements when necessary.

Some models are offered with built-in **element economiser transformers** which can be adjusted to increase the voltage on the heating elements as they age. For an initial extra cost less than that of a set of replacement elements, the useful life of each set of elements may be substantially increased.

Molybdenum disilicide heating elements

These elements are of molybdenum disilicide, modified by the addition of metallic and ceramic materials.

They can be heated to 1600°C in air for extended periods with little increase in electrical resistance. This enables furnaces to be constructed which are capable of operation up to 1500°C with minimum element deterioration. Molybdenum disilicide elements are unsuitable for routine operation below 1000°C.

CONSTRUCTION

Outer cases are constructed from steel sheet or corrosion resistant asbestolite. Highest grade refractory and insulating materials are used throughout. Doors are efficiently insulated and accurately counterpoised or mounted for easy movement between stable open and closed positions. The refractory linings of doors on larger furnaces radiate away from the operator when opened. On furnaces operating up to 1100°C, thermocouples are chromel-alumel and for higher temperatures they are platinum-13% rhodium platinum.

TEMPERATURE CONTROL

To ensure that control methods, circuits and safety equipment on furnaces are the most modern and satisfactory at reasonable cost, regular exhaustive tests are made on new equipment which becomes available. The principal controls used on GALLENKAMP furnaces are:

1. Manual control (by energy regulator)

This is the least expensive method of control and, although very simple, it can provide a good performance over long periods. An energy regulator approximately compensates for moderate fluctuations in mains voltage, and is quite adequate for many laboratory applications. The operating setting is found by trial and error, and temperature stabilisation and recovery are relatively slow. A temperature drift results from significant changes in ambient temperature such as may be caused by draughts.

2. Automatic ON-OFF control (by ON-OFF controller and energy regulator)

Using this type of control, the disadvantages of manual control are largely overcome. The working temperature rises rapidly to the value set on the calibrated scale, recovery after loading the furnace is brisk and accurate, and the effects of ambient temperature changes are negligible. Temperature fluctuations due to the cycling of the controller are minimised by use of the energy regulator.

3. Automatic proportional control (by proportional controller and where necessary energy regulator)

Two types of instrument are used, the 'blind' controller with an independent indicator pyrometer and the indicating controller which gives continuous readout of furnace temperature.

With both types, the pointer has merely to be set on the scale and the controller takes over completely. As with the simpler control, the furnace recovers briskly and is independent of supply voltage fluctuations. With automatic proportional control, however, the mean energy input is gradually reduced as the required temperature is approached, thus reducing temperature overshoot and fluctuations. An energy regulator is, in certain furnaces, retained to permit control of heating and cooling rates when this also is desirable.

4. Automatic three-term control

This type of control provides the advantages of proportional control plus rate control which eliminates temperature overshoot. In addition it has reset control which maintains the temperature even though the load may change.

SAFETY DEVICES

1. Thermal fuses

These are precious metal wires which are looped in the furnace interior. They have specific melting points. Should a furnace overheat, the fuse will melt and this switches off the current to the heater.

2. Safety circuits

All automatic controllers fail safe and have thermocouple breakage devices which protect the furnace by switching it off in the event of a break in the thermocouple circuit.

3. Door switches

In box furnaces where elements at mains voltage are exposed to the furnace interior, a switch operates to switch off the power supply when the door is opened.

ELECTRICITY SUPPLY

Voltage and frequency

Electrical apparatus manufactured by GALLENKAMP is offered and labelled for one, or for a choice of two or more voltage ranges and, where necessary, frequencies of mains electricity supplies.

GALLENKAMP cannot accept any responsibility for the operation of any such apparatus should it be connected to electricity supplies which are nominally outside or vary outside the stated voltage and frequency values for which it is designed.

Power rating

Throughout this catalogue power rating is included in the tabulated data. this is the maximum power that the apparatus will require for any combination of control settings. The electricity supply outlet to which the apparatus is connected must have sufficient current carrying capacity to supply this power otherwise the mains installation may be damaged. Over a period of time the actual power consumption of an apparatus incorporating controls for temperature, motor speed, etc., will be normally less than the maximum rating. Values cannot be quoted because they depend on the working temperature, ambient conditions and the manner of use of the apparatus.

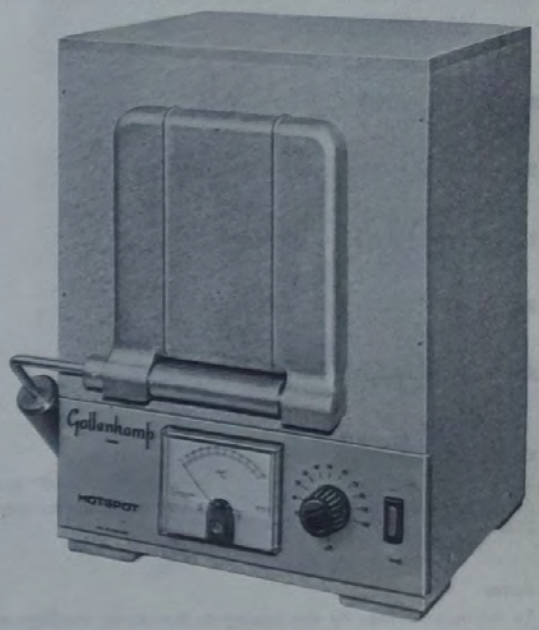
Gallenkamp HOTSPOT MUFFLE FURNACE, 1000°C or 1100°C

WIRE-WOUND HEATING ELEMENTS

MANUAL CONTROL

A compact bench furnace for general laboratory purposes

- **Heating to 1000°C in under 1 hour**
- **Fluctuation less than 3°C**
- **Built-in automatic cold junction temperature compensation**
- **Cast muffle provides smooth interior**



FSE-250

This furnace may be operated at temperatures up to 1000°C or for limited periods between 1000°C and 1100°C. A 1000°C thermal fuse to protect the heating element is supplied fitted to every furnace; for working up to 1100°C this must be replaced by the accessory thermal fuse FSE-270-502Q.

Technical data

	H	W	D
Internal, mm	100	125	150
Overall, mm	390	350	300
Base, mm		305	245
Mass, kg	23		
Maximum power rating, W	1500		

For additional technical information refer to page 274.

MUFFLE FURNACE, HOTSPOT, *GALLENKAMP*, **manual control,** for 1000°C operation, as specified with energy regulator, 80mm scale indicating pyrometer and thermal fuse. For a.c. single phase supplies.

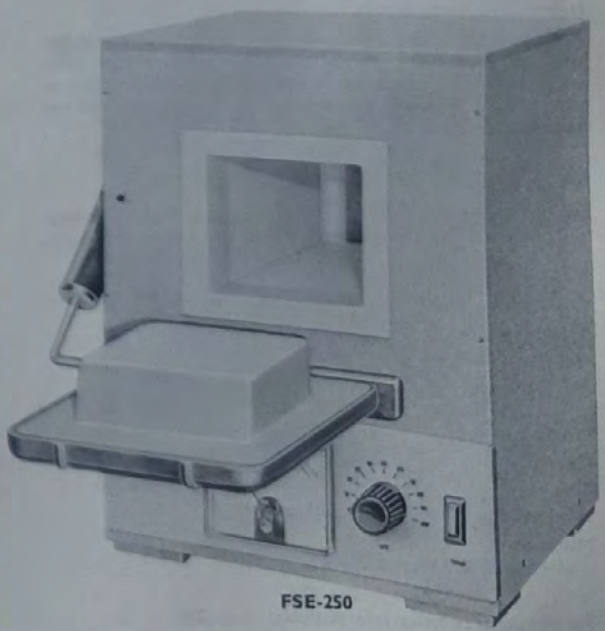
FSE-250-010F	Furnace, 220–240V	£203-63
FSE-250-030W	Furnace, 110–120V	£207-00

SPARE PARTS

	Wound muffle complete with insulating wrap.	
FSE-270-010X	Muffle, 220–240V	£23-63
FSE-270-030Y	Muffle, 110–120V	£23-63
FSE-270-110K	Fuse, 1000°C	£3-09
FSE-270-130E	Outer sheath for fuse	Pack of 3 £5-68
FSE-270-150V	Thermocouple element	£1-91

ACCESSORIES

FSE-270-502Q	Fuse, 1100°C	£10-90
	Silica trays	See TRC-550



FSE-250

Gallenkamp GENERAL PURPOSE MUFFLE FURNACES, 1000°C/1100°C

WIRE-WOUND HEATING ELEMENTS

MANUAL OR AUTOMATIC CONTROL

A range of muffle furnaces in three sizes with three alternative forms of control suitable for laboratory or tool room use. These furnaces may be operated at temperatures up to 1000°C or for limited periods between 1000°C and 1100°C when fitted with accessory thermal fuse supplied.

- **Heating to 1000°C in 1½ hours**
- **±2°C control with proportional controller**
- **Draught-control chimneys fitted at rear**
- **Thermal fuses easily replaced**
- **Outer cases corrosion resistant asbestolite**

Controls

The alternative forms of manual, proportional 'blind' and proportional indicating are offered. For further details see page 274.

Fuses

To minimise damage by overheating to the heater windings or workpieces, every furnace is fitted with a 1000°C thermal fuse. For operation to 1100°C this must be replaced with the interchangeable accessory thermal fuse, which is supplied with every furnace. Factory assembled replacement thermal fuses require only inserting and connecting.

Doors

All three sizes are offered with swing-up doors and the two smaller sizes can be supplied with the alternative slide-and-lock doors which are recommended if the furnaces are to be used for ashing or similar work requiring large air flows. All doors open with hot surfaces away from the operator.

Ventilation

All furnaces have a 50mm diameter ventilation hole in the back wall fitted with a chimney and adjustable vane to control draught.

Technical data

Working volume, litres	2·5			9·5			21		
	H	W	D	H	W	D	H	W	D
Internal, mm	83	150	235	135	190	380	200	230	460
Overall, mm	760	510	500	840	510	670	1000	650	790
Base, mm	445	335		445	490		485	575	
Mass, net, kg	50			80			125		
Maximum power rating, kW	2			3·5			5		

For additional technical information see page 274.

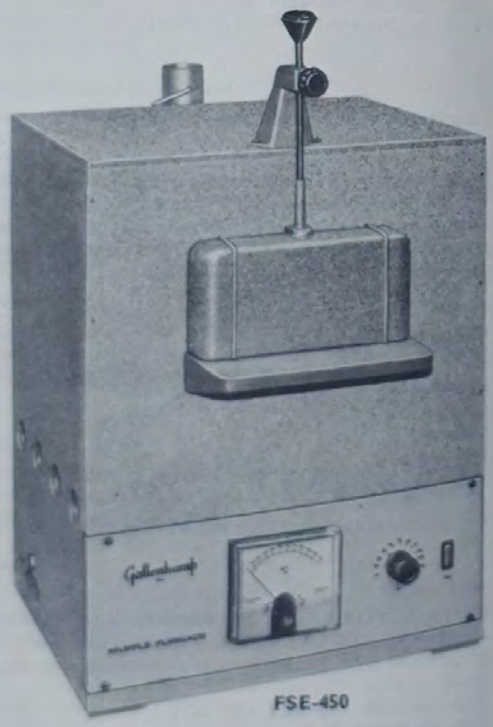
MANUAL CONTROL

MUFFLE FURNACES, *GALLENKAMP*, manual control, for 1000/1100°C maximum operation, as specified. With slide-up door, 80mm scale pyrometer indicator and power relay. A 1000°C thermal fuse is fitted and an 1100°C thermal fuse is also supplied. For a.c. single phase supplies.

FSE-450-010M	Furnace, 2·5 litres, 220–240V	**£304·88**
FSE-450-030G	Furnace, 2·5 litres, 110–120V	**£317·25**
FSE-450-110Y	Furnace, 9·5 litres, 220–240V	**£358·88**
FSE-450-130C	Furnace, 9·5 litres, 110–120V	**£382·50**

MUFFLE FURNACES, *GALLENKAMP*, as FSE-450 but with swing-up door.

FSE-470-010V	Furnace, 2·5 litres, 220–240V	**£319·50**
FSE-470-030P	Furnace, 2·5 litres, 110–120V	**£331·88**
FSE-470-110R	Furnace, 9·5 litres, 220–240V	**£373·50**
FSE-470-130L	Furnace, 9·5 litres, 110–120V	**£397·13**
FSE-470-210N	Furnace, 21 litres, 220–240V	**£540·00**
FSE-470-230H	Furnace, 21 litres, 110–120V	**£576·00**



FSE-450

Gallenkamp GENERAL PURPOSE MUFFLE FURNACES

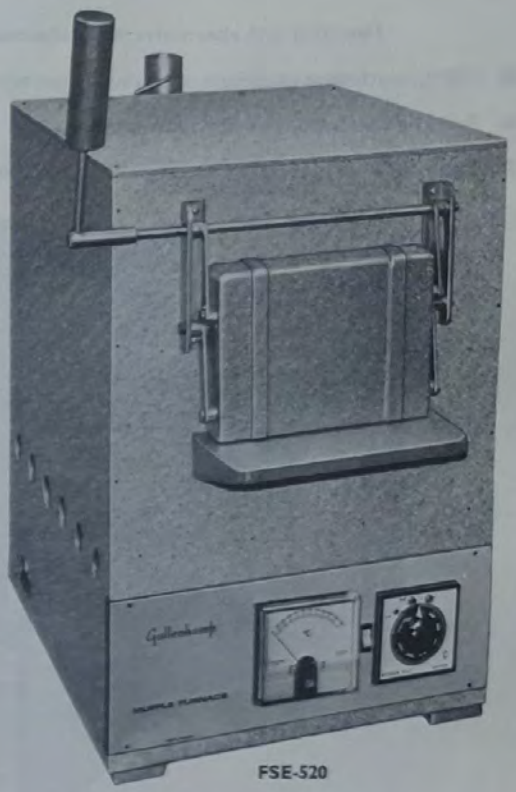
AUTOMATIC PROPORTIONAL CONTROL

MUFFLE FURNACES, *GALLENKAMP*, automatic proportional control for 1000/1100°C maximum operation, as specified. With slide-up door, solid state controller calibrated in °C, push switch operated 80mm scale pyrometer indicator for occasional reading of furnace temperature and power relay. A 1000°C thermal fuse is fitted and an 1100°C thermal fuse is also supplied. For a.c. single phase supplies.

FSE-500-010Q	Furnace, 2·5 litres, 220–240V	£349·88
FSE-500-030K	Furnace, 2·5 litres, 110–120V	£373·50
FSE-500-110M	Furnace, 9·5 litres, 220–240V	£403·88
FSE-500-130G	Furnace, 9·5 litres, 110–120V	£433·13

MUFFLE FURNACES, *GALLENKAMP*, as FSE-500 but with swing-up door.

FSE-520-010C	Furnace, 2·5 litres, 220–240V	£364·50
FSE-520-030T	Furnace, 2·5 litres, 110–120V	£388·13
FSE-520-110V	Furnace, 9·5 litres, 220–240V	£418·50
FSE-520-130P	Furnace, 9·5 litres, 110–120V	£447·75
FSE-520-210R	Furnace, 21 litres, 220–240V	£573·75
FSE-520-230L	Furnace, 21 litres, 110–120V	£609·75



FSE-520

AUTOMATIC PROPORTIONAL INDICATING CONTROL

MUFFLE FURNACES, *GALLENKAMP*, automatic proportional indicating control for 1000/1100°C maximum operation, as specified. With slide-up door, solid state 130mm scale combined indicator/controller calibrated in °C which provides continuous indication of furnace temperature, and power relay. A 1000°C thermal fuse is fitted and an 1100°C thermal fuse is also supplied. For a.c. single phase supplies.

FSE-550-010E	Furnace, 2·5 litres, 220–240V	£435·38
FSE-550-030V	Furnace, 2·5 litres, 110–120V	£465·75
FSE-550-110A	Furnace, 9·5 litres, 220–240V	£489·38
FSE-550-130R	Furnace, 9·5 litres, 110–120V	£524·25

MUFFLE FURNACES, *GALLENKAMP*, as FSE-550 but with swing-up door.

FSE-570-010N	Furnace, 2·5 litres, 220–240V	£450·00
FSE-570-030H	Furnace, 2·5 litres, 110–120V	£480·38
FSE-570-110J	Furnace, 9·5 litres, 220–240V	£504·00
FSE-570-130D	Furnace, 9·5 litres, 110–120V	£559·13
FSE-570-210F	Furnace, 21 litres, 220–240V	£651·38
FSE-570-230W	Furnace, 21 litres, 110–120V	£687·38



FSE-570

SPARE PARTS

Wound muffles, complete with insulating wrap.

FSE-610-010B	Muffle, 2·5 litres, 220–240V	£29·25
FSE-610-030S	Muffle, 2·5 litres, 110–120V	£29·25
FSE-610-110U	Muffle, 9·5 litres, 220–240V	£55·69
FSE-610-130X	Muffle, 9·5 litres, 110–120V	£55·69
FSE-610-210Q	Muffle, 21 litres, 220–240V	£87·75
FSE-610-230K	Muffle, 21 litres, 110–120V	£87·75
FSE-610-280S	Fuse, 1000°C, for 2·5 litres	£2·51
FSE-610-290P	Fuse, 1000°C, for 9·5 and 21 litres	£3·77
FSE-610-360U	Fuse, 1100°C, for 2·5 litres	£11·85
FSE-610-370R	Fuse, 1100°C, for 9·5 and 21 litres	£12·65
FSE-610-390L	Thermocouple element	£2·08
FSE-610-400L	Outer sheath, for thermocouple	£3·04
	Outer sheath, for fuse	See *FSE-270-130E*
	Silica trays	See *TRC-550*

Gallenkamp

Gallenkamp GENERAL PURPOSE BOX FURNACES 1200°C

PANEL HEATERS

AUTOMATIC CONTROLS

Two sizes with alternative forms of automatic control suitable for laboratory or tool room use

- 1200°C continuous maximum operating temperature
- Panel heaters form the walls of the working space
- Stoved enamel external case with stainless steel door surround
- Graded asbestos-free insulation
- Independent safety circuit
- Thermal fuse easily replaced



ANNOUNCEMENT

These products are under development and are expected to become available late 1977

DESIGN

Interior

Four high efficiency panel heaters form the top, bottom and sides of the working space. Easily changed in the event of failure.

These heaters, the rear wall and the door inner surface have smooth hard surfaces that reduce to a minimum wear and the possibility of sample contamination.

Insulation

The work space is insulated on all sides by modern, graded, asbestos free, insulating materials which result in thin, space saving walls with low external surface temperatures.

Case

All-metal construction enclosing all controls, etc. Stainless steel door surround.

Door

Swing-up type with insulating plug for efficient closure. The operating mechanism is enclosed within the outer shell which has the same width and top line as the case.

Ventilator

Fitted as standard, adjustable.

Thermal Fuse

Each furnace is fitted with a thermal fuse designed to protect it against overheating in the event of a fault in the setting or operation of the control. The fuse is in a circuit which is independent of the other controls.

Controls

Two versions are offered. Both have platinum-13% rhodium platinum thermocouples and direct reading pyrometers calibrated in °C and giving continuous indication of furnace temperature. Both controllers have control knobs with direct reading scales calibrated 0 to 1200°C.

The general purpose controller gives simple time proportioning action.

The advanced controller gives three term (PID) control action which eliminates overshoot and control point offset.

Technical data

Working volume, litres	4	11·5
	H W D	H W D
Internal, mm	120 × 150 × 250	165 × 190 × 370
External, mm	425 × 360 × 475	500 × 400 × 590
Base, mm	305 × 415	345 × 535
Power rating, kW	3	4·5

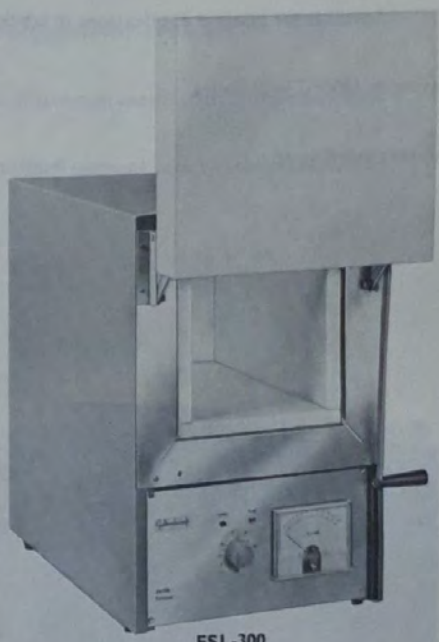
Gallenkamp GENERAL PURPOSE BOX FURNACES

BOX FURNACES, *GALLENKAMP*, automatic proportional ON-OFF control for 1200°C maximum operation, as specified. With indicator and controller calibrated in °C, swing-up door, power relay and fitted 1200°C thermal fuse. For a.c. single phase supplies.

FSL-300-010Y	Furnace, 4 litres, 220–240V	**£441·00**
FSL-300-030C	Furnace, 4 litres, 110–120V	**£452·25**
FSL-300-110E	Furnace, 11·5 litres, 220–240V	**£490·50**
FSL-300-130V	Furnace, 11·5 litres, 110–120V	**£506·25**

BOX FURNACES, *GALLENKAMP*, as FSL-300 but with automatic proportional three-term indicating controller for 1200°C maximum operation.

FSL-320-010R	Furnace, 4 litres, 220–240V	**£518·63**
FSL-320-030L	Furnace, 4 litres, 110–120V	**£534·38**
FSL-320-110N	Furnace, 11·5 litres, 220–240V	**£571·50**
FSL-320-130H	Furnace, 11·5 litres, 110–120V	**£590·63**



FSL-300

SPARE PARTS

Heater panels for 110–120V and 220–240V supplies.

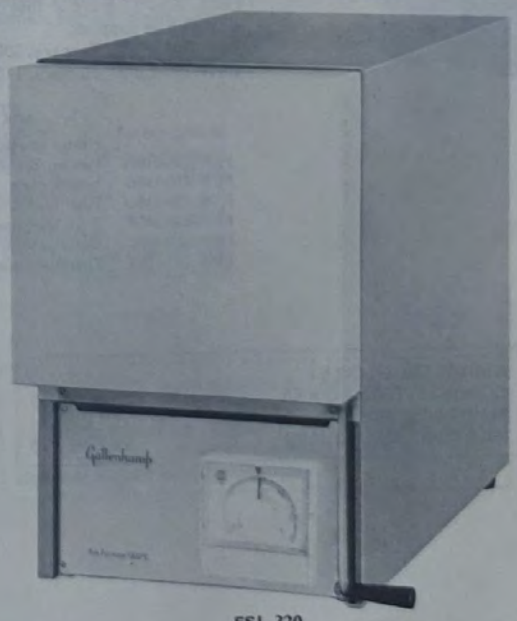
FSL-360-010M	Heater panel, side, for 4 litre furnace	**£12·94**
FSL-360-030G	Heater panel, top/bottom, for 4 litre furnace	**£16·88**
FSL-360-110Y	Heater panel, side, for 11 litre furnace	**£17·44**
FSL-360-130C	Heater panel, top/bottom, for 11 litre furnace	**£20·25**
FSL-360-180K	Fuse, 1200°C	**£15·41**
FSL-360-190H	Outer sleeve for fuse and thermocouple	**£5·18**
FSL-360-210E	Thermocouple	**£39·38**

ACCESSORIES

Refractory plates to protect bottom element from contamination.

FSL-360-502X	Refractory plate, for 4 litre furnace	**£6·75**
FSL-360-512L	Refractory plate, for 11 litre furnace	**£7·88**

see availability announcement page 278



FSL-320

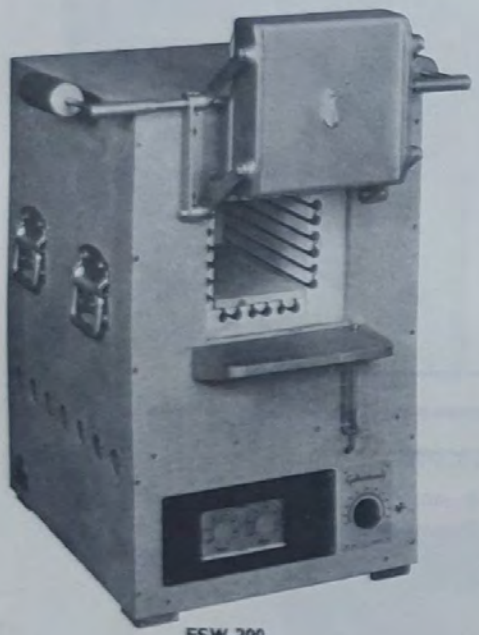
Gallenkamp GENERAL PURPOSE BOX FURNACE, 1250°C

WIRE-WOUND HEATING ELEMENTS

AUTOMATIC CONTROL

Suitable for general applications in laboratories or tool rooms and for small scale ceramic firings

- **Heating to 1250°C in 2¼ hours**
- **Counterpoised door**
- **Easily replaced heater spirals and thermal fuses**
- **Reliable operation at maximum temperature**



FSW-200

Because the elements are exposed to the furnace interior, a switch operates to switch off the power supply as the door is opened. A 1250°C thermal fuse safeguards the furnace from overheating.

Technical data

	H	W	D
Internal, mm	150	× 150	× 300
Overall, mm	1000	× 640	× 660
Base, mm		460	× 550
Mass, kg		140	
Maximum power rating, kW		5	

For additional technical information refer to page 274.

BOX FURNACE, *GALLENKAMP,* **automatic indicating proportional control** for 1250°C maximum operation as specified, with swing-up counterpoised door, hearth plate, solid state 130mm scale combined indicator controller calibrated in °C which provides continuous indication of furnace temperature, power relay, 1250°C thermal fuse and door operated switch. For a.c. single phase supplies.

FSW-200-010V	Furnace, 200–250V	**£781·88**
FSW-200-030P	Furnace, 110–120V	**£787·50**

SPARE PARTS

Heater spirals, twelve are required for the furnace.

FSW-220-010H	Heater, 200–250V and 110-120V	**£5·78**
FSW-220-110D	Hearth plate	**£7·37**
FSW-220-130U	Fuse, 1250°C	**£15·19**
FSW-220-140R	Twin bore sleeves, for fuse	Pack of 5 **£1·80**
FSW-220-160L	Outer sheath, for fuse or thermocouple	**£5·06**
FSW-220-170Y	Thermocouple element, with insulators	**£39·38**

ASBESTOS GLOVES	*See SAR-570-U*
COMBUSTION BOATS	*See BSH-300*
FURNACE TONGS	*See TNS-730-070H*
HEATING CRUCIBLES	*See CWB-710*

Gallenkamp SMALL BOX FURNACES, 1400°C

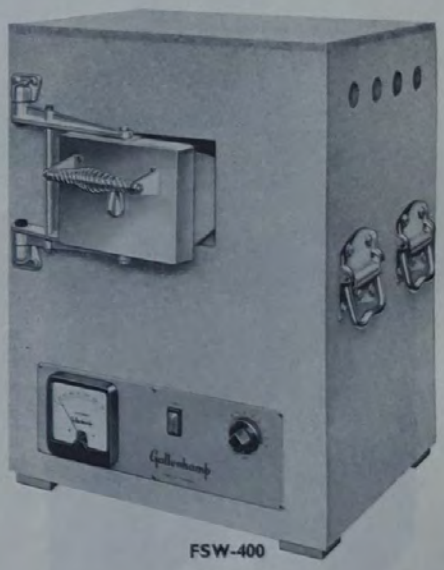
SILICON CARBIDE HEATING ELEMENTS

MANUAL CONTROL

Furnaces for general laboratory work and heat treatment processes

- **Heating to 1400°C in 2¼ hours**
- **Reliable operation at maximum temperature**
- **Unobstructed access with swing-away door**
- **Optional element economiser transformer**

A microswitch is fitted which disconnects the power supply from the elements as the door opens. A 1400°C thermal fuse safeguards the elements from overheating.



FSW-400

Technical data

	H	W	D
Internal, mm	100	125	180
Overall, mm	610	480	570
Base, mm		510	420
Mass, kg		80	
Maximum power rating, kW		3	

For additional technical information refer to page 274.

BOX FURNACE, *GALLENKAMP*, **manual control,** for 1400°C maximum operation, as specified. With energy regulator, 90mm scale indicating pyrometer and 1400°C thermal fuse. For a.c. single phase supplies.

FSW-400-010F Furnace, 220–240V **£572·63**

BOX FURNACE, *GALLENKAMP*, **manual control,** as FSW-400 but with element economiser transformer. For a.c. single phase supplies.

FSW-420-010X Furnace, 220–240V **£619·88**

SPARE PARTS

FSW-440-010A	Heaters, for FSW-400-010F	Set of 6 **£106·88**
FSW-440-030R	Heaters, for FSW-420-010X	Set of 6 **£106·88**
FSW-440-090W	Fuse, 1400°C	**£11·03**
	Outer sheath for fuse or thermocouple.	
FSW-440-110T	Outer sheath	**£5·06**
	Twin bore sleeve (2 required) for fuse	*See FSW-220-140R*
	Thermocouple element	*See FSW-220-170Y*

ELEMENT ECONOMISER TRANSFORMER

This can be adjusted to increase the voltage on the elements as they age. By this means the useful life of each set of elements may be substantially increased.

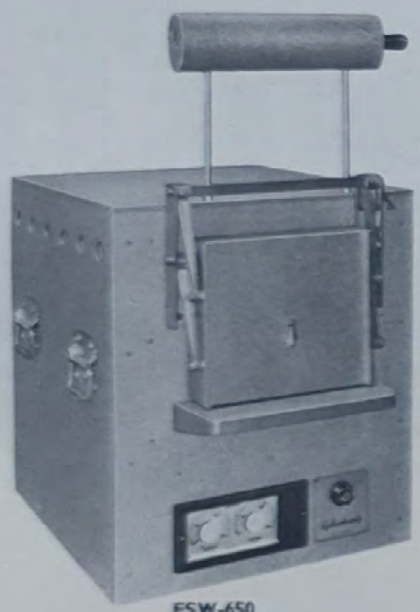
Gallenkamp BOX FURNACES, 1400°C

SILICON CARBIDE HEATING ELEMENTS

AUTOMATIC CONTROL

Furnaces for general laboratory work and heat treatment processes

- **Heating to 1400°C in under 3 hours**
- **Fluctuation less than 5°C**
- **Reliable operation at maximum temperature**
- **Optional element economiser transformer**
- **Counterpoised doors**



FSW-650

Operator and furnace are protected by a door switch, a thermocouple breakage protection circuit, and a 1400°C thermal fuse, each of which disconnects the power supply from the elements.

Technical data

Working volume, litre	4·5			12·5		
	H	W	D	H	W	D
Internal, mm	100	150	300	150	230	380
Overall, mm	930	570	700	1020	610	790
Base, mm		535	550		610	625
Mass, net, kg		138			185	
Maximum power rating, kW		4·5			7·5	

For additional technical information including details of the element economiser transformer see page 274.

BOX FURNACES, *GALLENKAMP*, automatic ON/OFF control for 1400°C maximum operation, as specified, with 130mm scale combined indicator controller, energy regulator, door operated safety switch and 1400°C thermal fuse. For a.c. single phase supplies.

FSW-650-010A	Furnace, 4·5 litres, 220–240V	**£964·13**
FSW-650-110T	Furnace, 12·5 litres, 220–240V	**£1104·75**

BOX FURNACES, *GALLENKAMP*, automatic ON/OFF control, as FSW-650 but with element economiser transformer. For a.c. single phase supplies.

FSW-670-010J	Furnace, 4·5 litres, 220–240V	**£1020·38**
FSW-670-110F	Furnace, 12·5 litres, 220–240V	**£1211·63**

SPARE PARTS

FSW-690-010S	Heaters for FSW-650-010A	Set of 6 **£144·00**
FSW-690-030M	Heaters for FSW-650-110T	Set of 6 **£144·00**
FSW-690-110X	Heaters for FSW-670-010J	Set of 8 **£215·66**
FSW-690-130Y	Heaters for FSW-670-110F	Set of 8 **£215·66**
FSW-690-190N	Fuse, 1400°C	**£14·85**
	Twin bore sleeve for fuse	*See FSW-220-140R*
	Outer sheath for fuse or thermocouple	*See FSW-220-160L*
	Thermocouple element	*See FSW-220-170Y*

Gallenkamp BOX FURNACE, 1500°C

MOLYBDENUM DISILICIDE HEATING ELEMENTS

AUTOMATIC CONTROL

A box furnace for control and research applications concerned with the behaviour of metals, ceramics and other materials in air at high temperatures

- **Heating to 1500°C in 6 hours**
- **Fluctuation 5°C**
- **Low voltage heating**

The furnace stands on a control console which houses the temperature controls and the transformer needed to provide the low heater voltages. The switch on the front panel is used to select the heater voltage for particular operating conditions.

Safety Devices

The controller is 'fail safe' and has a thermocouple breakage protection circuit. A 1500°C thermal fuse safeguards the furnace from overheating.

NOTE: Molybdenum disilicide elements are specifically designed for high temperature operation and owing to their nature this furnace is not suitable for routine operation below 1000°C.

Technical data

Furnace

	H	W	D
Working space, mm	180	180	320
Overall, mm	1070	840	850
Base, mm		635	750
Mass, kg		250	
Maximum power rating, kVA		10	

Control console

	H	W	D
Overall, mm	920	630	760
Mass, kg		195	

For additional technical information refer to page 274.



FSW-850

BOX FURNACE, *GALLENKAMP*, automatic ON/OFF control for 1500°C maximum operation, as specified. With 1500°C thermal fuse and control console housing transformer, 130mm scale combined indicator controller and energy regulator. For 200–250V a.c. single phase supplies.

FSW-850-K Furnace **£1941·75**

SPARE PARTS

FSW-870-010Q	Heaters, 200–250V	Set of 4 **£329·96**
FSW-870-070V	Fuse, 1500°C	**£5·63**
	Twin bore sleeve for fuse	*See FSW-220-140R*
	Outer sheath for fuse or thermocouple	*See FSW-220-160L*
	Thermocouple element	*See FSW-220-170Y*

THE HEAT TREATMENT OF METALS

The use of GALLENKAMP furnaces for the precision heat treatment of metals has become an accepted practice. A muffle furnace for preheating or for tempering combines ideally with a box furnace for hardening.

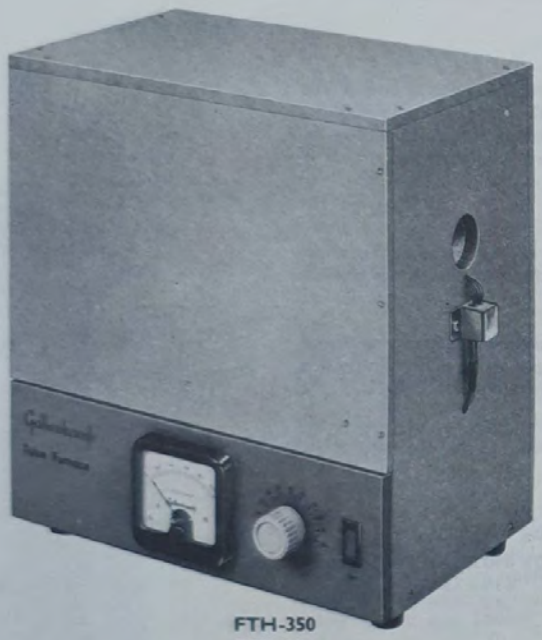
Gallenkamp TUBE FURNACES, 1000°C or 1200°C

WIRE-WOUND HEATING ELEMENTS

MANUAL CONTROL

General purpose tube furnaces especially suited to the determination of carbon and sulphur in steel and for other combustion or reduction work requiring horizontal work tubes

- **Heating to 1200°C in 1¼ hours**
- **Suitable for use with or without additional work tubes**



FTH-350
FTH-370

Safety Devices

Each furnace is equipped with an easily replaceable thermal fuse designed to protect it against overheating.

Thermocouples

Furnaces FTH-350 are fitted with a chromel: alumel thermocouple. Furnaces FTH-370 are fitted with platinum: 13% rhodium platinum thermocouple.

Technical data

Bore, mm	38		
Length, mm	300		
	H	W	D
Overall, mm	370	330	230
Base, mm		325 × 220	
Mass, kg		20	
Maximum power rating, kW		1	

For additional technical information refer to page 274.

TUBE FURNACES, *GALLENKAMP*, **manual control,** for 1000°C maximum operation, as specified. With energy regulator, 57 mm-scale pyrometer indicator, power relay and 1000°C thermal fuse. For a.c. single phase supplies.

FTH-350-010C	Furnace, 220–240 V	**£187·88**
FTH-350-030T	Furnace, 110–120 V	**£193·50**

TUBE FURNACES, *GALLENKAMP*, **manual control,** as FTH-350 but for 1200°C maximum operation. With 1200°C thermal fuse.

FTH-370-010L	Furnace, 220–240 V	**£204·75**
FTH-370-030F	Furnace, 110–120 V	**£210·38**

SPARE PARTS

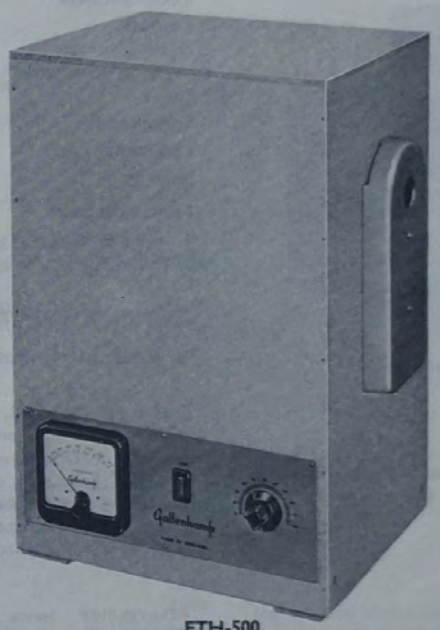
FTH-390-010U	Wound tube, 220–240 V	**£21·94**
FTH-390-030X	Wound tube, 110–120 V	**£25·31**
FTH-390-150E	Fuse, 1000°C	**£28·41**
FTH-390-170V	Fuse, 1200°C	**£37·80**
FTH-390-190P	Single bore sleeves, for fuses	Pack of 3 **£2·14**
FTH-390-210M	Thermocouple element for FTH-350	**£1·58**
FTH-390-230G	Thermocouple element for FTH-370	**£26·55**
	Combustion boats	*See BSH-300 to BSH-380*
	Furnace work tubes	*See FTM-210-X to FTM-290-S*

Gallenkamp TUBE FURNACES, 1400°C

SILICON CARBIDE HEATING ELEMENTS

MANUAL CONTROL

- **Heating to 1400°C in under 2 hours**
- **Easily replaceable heating elements**



FTH-500

High temperature horizontal tube furnaces designed particularly for combustion work, including the determination of carbon and sulphur in all types of steel, and sulphur in coal and petroleum products. Also suitable for other tests including ash fusion points and general analysis of organic compounds in various atmospheres.

Technical data

Bore, mm	30		
Heated length, mm	150		
	H	W	D
Overall, mm	570	470	360
Base, mm		395	320
Maximum power rating, kW	1·25		
Mass, kg	7·7		

For additional technical information refer to page 274.

The furnace is fitted with a platinum-13% rhodium platinum thermocouple and pyrometer.

Removable covers at either side of the furnace provide easy access to both heating elements and their flexible connectors.

Power to the heating elements is supplied from a four-range stepdown transformer which permits the voltage applied across the elements to be increased as their resistance increases due to ageing, and so maximises the useful life of the elements.

TUBE FURNACE, *GALLENKAMP*, **manual control,** for 1400°C maximum operation, as specified. With four range stepdown transformer, energy regulator, and 90mm scale pyrometer indicator. For a.c. single phase supplies. **Requires but does not include work tube.**

FTH-500-010V	Furnace, 200–250V	**£400·50**
FTH-500-030P	Furnace, 110–120V	**£401·63**

SPARE PARTS

FTH-520-010H	Heaters, 200–250V and 110–120V	Set of 2 **£42·84**
FTH-520-110D	Thermocouple element	**£29·81**
FTH-520-130U	Outer sheath, for thermocouple	**£5·06**

Gallenkamp TUBE FURNACES, 1500°C

MOLYBDENUM DISILICIDE HEATING ELEMENTS

AUTOMATIC CONTROL

- **Heating to 1500°C in 4½ hours**
- **Reliable operation at maximum temperature**
- **Fluctuation about 1°C**



FTH-700 without control unit

Tube furnaces for research and control applications concerned with the behaviour of materials at high temperature in specific atmospheres.

Safety Devices

A thermocouple breakage protection circuit is built into the 'fail safe' controller and a 1500°C thermal fuse safeguards the furnace from overheating.

Control Console

The stepdown heater voltage transformer, temperature controller and energy regulator are housed in a separate control console.

Heating Elements

Molybdenum disilicide elements are specifically designed for high temperature operation and owing to their nature **these furnaces are not suitable for routine operation below 1000°C.**

Technical data

Furnace

Heating chamber bore × length, mm	39 × 270	80 × 320
	H W D	H W D
Overall, mm	460 × 530 × 380	530 × 710 × 460
Base, mm	520 × 360	700 × 450
Mass, kg	50	120

Control console

	H W D	H W D
Overall, mm	570 × 570 × 380	570 × 570 × 380
Mass, kg	85	140
Maximum power rating, kW	2·5	7

For additional information refer to page 274.

TUBE FURNACES, *GALLENKAMP*, automatic ON-OFF for 1500°C maximum operation, as specified. With 1500°C thermal fuse and control console housing transformer, 130mm scale combined indicator controller and energy regulator. For 200–250V a.c. single phase supplies.

FTH-700-010F Furnace, 39mm bore **£909·00**
FTH-700-030W Furnace, 80mm bore **£1083·38**

SPARE PARTS

FTH-720-010X	Heater, 200–250V, for 39mm bore	**£60·96**
FTH-720-030Y	Heaters, 200–250V, for 80mm bore	Set of 2 **£138·38**
	Fuse, 1500°C	*See FSW-870-070V*
	Twin bore sleeve for fuse	*See FSW-220-140R*
	Outer sleeve for fuse or thermocouple	*See FSW-220-160L*
	Thermocouple element	*See FSW-220-170Y*
	Combustion boats	*See BSH-300 to BSH-380*
	Furnace work tubes	*See FTM-210-X to FTM-290-S*

FURNACE WORK TUBES

All dimensions are nominal

FURNACE WORK TUBE, translucent fused silica, for use up to 1050°C with inert or oxidising atmospheres. High thermal shock resistance. Ext. dia. 31mm, int. dia. 25mm, length 610mm

FTM-210-X Furnace work tube **£9·51**

FURNACE WORK TUBES, impervious aluminous porcelain, for use up to 1500°C with inert or oxidising atmospheres. Moderate thermal shock resistance. (F)

Bore, mm	22·5	25·5
External dia., mm	28·5	32
Length, mm	660	600

FTM-240-030H Furnace work tube, 22·5mm bore **£3·94**
FTM-240-050B Furnace work tube, 25·5mm bore **£9·97**

FURNACE WORK TUBES, porous fused alumina, for use up to 1700°C with inert, oxidising or reducing atmospheres. High thermal shock resistance.

Bore, mm	28·5	65
External dia., mm	38·5	80
Length, mm	675	825

FTM-290-030S Furnace work tube, 28·5mm bore **£39·18**
FTM-290-050M Furnace work tube, 65mm bore **£80·49**

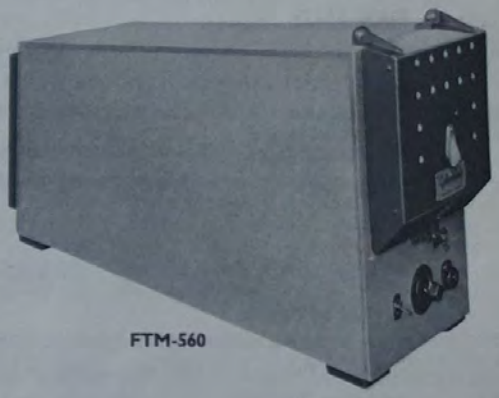
Gallenkamp CARIUS LOW TEMPERATURE FURNACE, 300°C

The Carius reaction for the determination of sulphur and halogens is known to be hazardous and precautions must be taken to minimise the risk of injury to personnel

The case is constructed of asbestolite panels and fitted with a hinged front cover which is secured by a screw clamp. Four open ended steel tubes are provided to contain glass reaction tubes. A perforated metal box at the rear and the door are filled with glass wool to reduce the effect should a reaction tube burst. The furnace temperature is controlled by an energy regulator and a thermometer pocket is provided.

Technical data

Inner steel tubes bore × length, mm	29 × 69
Overall dimensions, mm	41 × 280 × 750
Mass, kg	32
Maximum power rating, kW	1



FTM-560

CARIUS FURNACE, *GALLENKAMP*, as specified. With energy regulator, ON-OFF switch and indicator lamp. For a.c. single phase supplies.

FTM-560-010V	Carius furnace, 220–240V	**£343·13**
FTM-560-030P	Carius furnace, 110–120V	**£372·38**

SPARE PARTS

FTM-580-010H	Heater, 220–240V	**£5·63**
FTM-580-030B	Heater, 110–120V	**£5·63**

ACCESSORIES

Tubes, Carius, soda-lime glass, closed at one end. Two larger sizes have constriction approximately 50mm from open end. Dimensions given are external diameter × length.

FTM-580-510K	Tube, 10 × 350mm	**£0·27**
FTM-580-520H	Tube, 15 × 600mm	**£0·61**
FTM-580-530E	Tube, 25 × 600mm	**£1·16**
	Thermometer −10 to 360°C	*See THL-290-110R*

Gallenkamp GAS HEATED CRUCIBLE FURNACE

For temperatures up to 1000°C



FTM-800

CRUCIBLE FURNACE, *GALLENKAMP*, **Davies,** attains a temperature of 1000°C when used with a suitable Bunsen burner and is therefore ideal for the reduction, fusion and melting of many metals and alloys. Can also be used for incineration. When not in use as a furnace, it can serve in place of a tripod stand with the added advantage that it functions as a flame protector.

Comprises a fireclay body insulated with asbestos and contained in a sheet metal jacket supported on three braced feet. Will accept porcelain crucibles of 30 to 46mm diameter. **Without** burner.

FTM-800-T	Crucible furnace	**£14·63**

ACCESSORIES

Burners	*See BYB-400 et seq.*
Crucibles	*See CWB-300 et seq.*

LABORATORY FURNITURE AND FITTINGS

GALLENKAMP development and expertise, coupled with continuous close contact with scientists and architects concerned with the needs of every branch of science, have produced the many trend-setting items of laboratory furniture and fittings described in this catalogue. Ever increasing demand and improved productivity have resulted in such equipment becoming available at realistic prices. Timber and plastics faced standard furniture units are manufactured in three main styles of finish, each being obtainable with minor variations to suit six alternative types of bench assembly. This offers eighteen alternative approaches to every design project. It will be seen from the illustrations that we have maintained the clean functional lines which have distinguished our furniture for many years.

We offer consultation on all matters concerning laboratory design and will assist gladly in the selection of furniture and equipment to suit particular needs. Customers are invited to call at our showroom, or we can arrange a visit by a technical representative.

In addition to the finishes and bench assembly methods listed, we can also supply purpose-made benches and fittings to suit individual requirements.

SERIES FURNITURE

Styles of finish
Standard bench units are available to suit any budget, purpose and decor. Furniture can be supplied finished in oak, mahogany or melamine plastics. Descriptions of styles are given on pages 294–295.

Types of bench assemblies
Emphasis is placed on flexibility of furniture layout and we supply benches of the static or fully mobile types with varying degrees of mobility between the two extremes. Standard bench units are used for all these applications, with only minor variations to suit whichever type of bench assembly is selected. Descriptions of types are given on pages 292–293.

Range of bench units
A full range of 500 mm and 1000 mm width modules is available. Descriptions and prices are given on pages 296–300.

FUME CUPBOARDS AND EXTRACTION EQUIPMENT

It is recognised that efficient fume extraction equipment is essential in most chemical laboratories. Our current range of controlled and balanced draught fume cupboards is highly resistant to corrosion and easily cleaned and decontaminated. With the more advanced units we supply it is not necessary to have the sash lowered to retain fumes and suitably glazed it can be regarded as a safety screen. We are proud of our achievements in this field and customers are invited to approach us with their problems. Descriptions of fume cupboards, fans and ducting are given on pages 306–317.

ANCILLARY EQUIPMENT

A full selection of sinks, service taps and fittings are described on pages 320–334. Miscellaneous items necessary for a comprehensively furnished laboratory are described on pages 318–319.

IF YOU ARE PLANNING NEW LABORATORIES

a Gallenkamp negotiated contract will provide Free Specialist Consultancy

YOU WILL WANT TO KNOW –

Will the furniture suit the apparatus which will be used?

How much space is necessary for each worker and operation?

What are optimum gangway sizes?

How will instrumentation affect space requirements?

Should plastics faced or timber benches be specified?

Should an open, bay or enclosed plan be adopted?

What are the best materials for benches, services, fume cupboards and exhaust equipment?

Can a laboratory be comprehensively furnished when funds are limited?

Should benches be static, semi-fixed or fully mobile?

What is the best form of space heating in a laboratory?

What should be the sizes of the mains and the diversity factor for each service?

Are heavy duty fume cupboards available for open sash working?

How effectively is conditioned air conserved by balanced draught fume cupboards?

How should decor be planned?

Can the entire layout be altered, in say a year's time, at small expense?

These questions are illustrative of the many which confront the laboratory designer. No attempt is made here to provide the answers but clients who would like our views on these and similar points are invited to get in touch with the GALLENKAMP Laboratory Furniture Division.

Not so many years ago it was popularly held that a laboratory project was a simple exercise in joinery, but today it is recognised that the co-ordinated efforts of several specialist designers are necessary if the resulting installation is to be really efficient. Scientists and architects are able to obtain such consultancy at all stages, without charge, by specifying GALLENKAMP as the nominated contractor. The service includes pre-planning discussions and the preparation of drawings, specification and costs, together with liaison with allied contractors.

Examine the implications of such an arrangement. The advantage of having a team of specialist designers available is obvious. On the other hand users may feel they are losing the main benefit of competitive tendering – that of accepting the lowest price out of a number of offers. While this is true it is also a fact that GALLENKAMP frequently enjoy success in competitive tendering by reason of low price and unsuccessful bids are rarely more than a marginal amount above the lowest. It makes no difference whether estimates are competitive or in respect of a negotiated contract – quality and quoted prices do not vary. Thus the user is assured that the negotiated contract will be carried out at a reasonable price, and in return the GALLENKAMP Laboratory Furniture Division uses its full resources to ensure that the installation is successful in all respects. This company has a long term interest as a supplier to the user and the combination of scientist, architect and nominated contractor is ideal. Projects tackled in this way are certainly among the more successful.

Where competitive tendering is considered necessary, GALLENKAMP offer a useful service to assist users in the preparation of their specification and drawings, and there are representatives to discuss the details of a scheme before tenders are invited. It is particularly important that the specification sent out to tenderers should be complete in all details as otherwise the user is faced with an extremely difficult task when adjudicating the offers. We have known laboratories spoiled by points in the specification being misinterpreted by lay manufacturers, mistakes not realised until the contract had been awarded purely on the basis of the lowest estimated price. By the time such discrepancies are adjusted the final contract price is possibly by no means the lowest. A correctly framed specification will avoid such trouble.

GALLENKAMP welcome competitive enquiries but commend the Negotiated Contract system as being particularly worthy of consideration. Only in this way can the accumulated knowledge and experience of many and diverse specialist designers, working with the user and his advisers, be brought fully to bear.

This is an approach too important to be ignored!

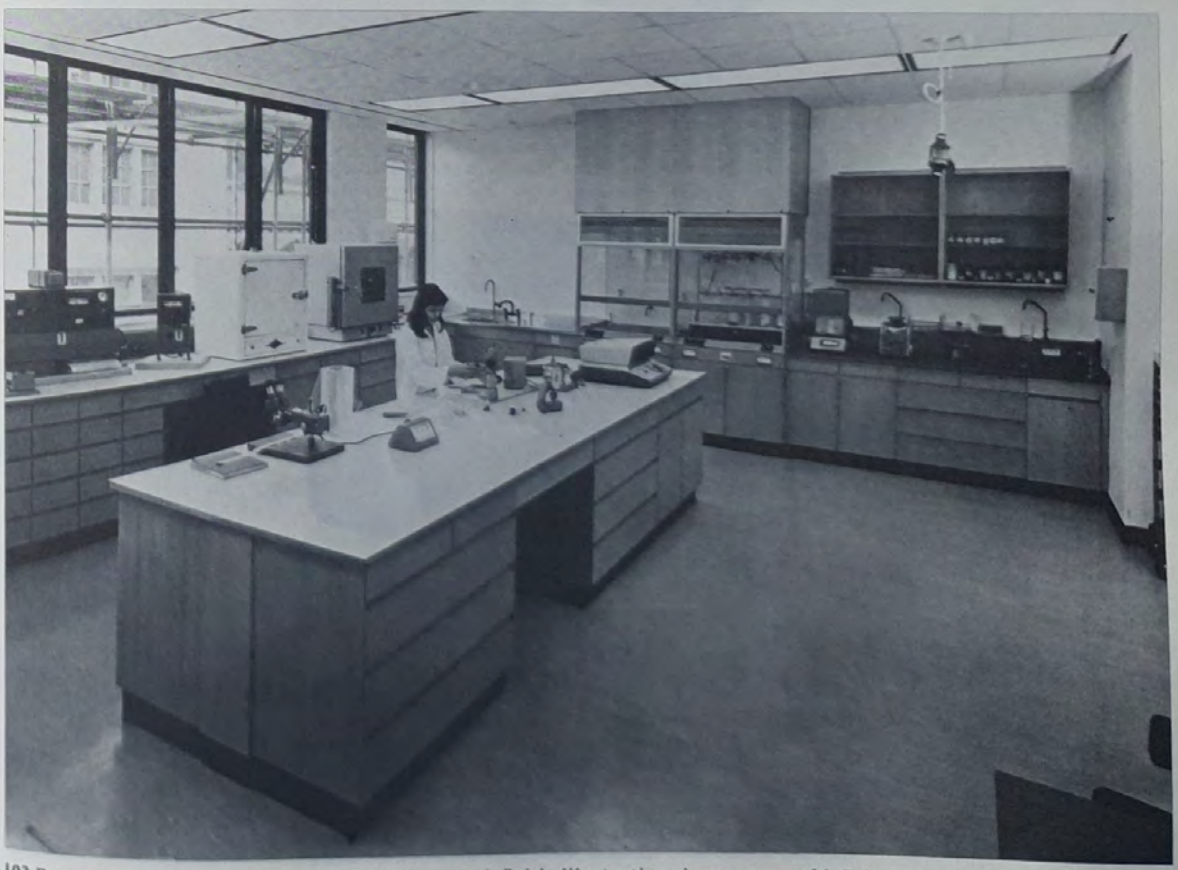
Why not investigate it with us?





103 Range Melamine plastics finish and 101 Range oak finish. Illustrations by courtesy of J Sainsbury Ltd. London SE1



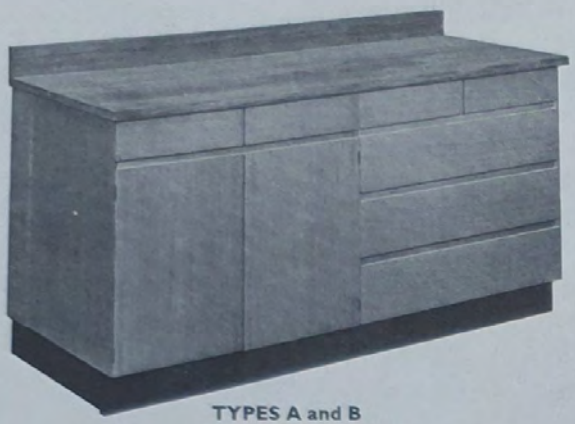


103 Range Melamine plastics finish and 101 Range oak finish. Illustrations by courtesy of J. Sainsbury Ltd, London SE1

Gallenkamp

TYPES OF BENCH ASSEMBLY

All dimensions are nominal



TYPES A and B

TYPE A

The bench top is mounted directly on to the units, which perform the dual functions of storing apparatus and supporting the bench top. Working height is 909mm. Pipes are mounted either on the walls behind units or on the units themselves; in the case of island benches they are run in the service space at the centre. This is the most economical form of bench construction.

TYPE B

The bench top is mounted directly on to the units, as in Type A. The working height is 834mm or 859mm, as specified. Pipe runs are accommodated exactly as for Type A benches.

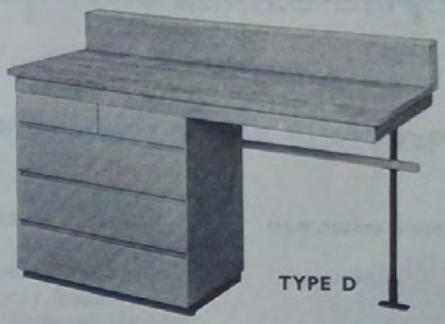


TYPE C

TYPE C

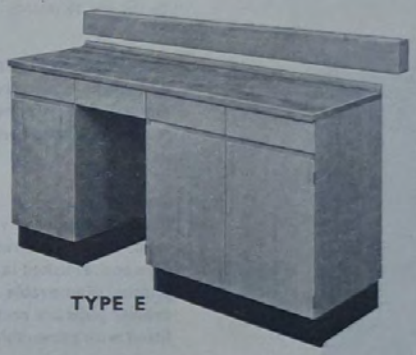
The bench top is mounted independently of the units by means of floor stands provided with integral cantilever brackets. The working height is 909mm. Bench units can easily be rearranged to suit changing requirements and all units are provided with height adjusters and dust covers. A continuous rail beneath the bench top provides space for mounting remote control taps. Pipe runs are mounted on the floor stands or directly to the wall behind the bench.

TYPES OF BENCH ASSEMBLY



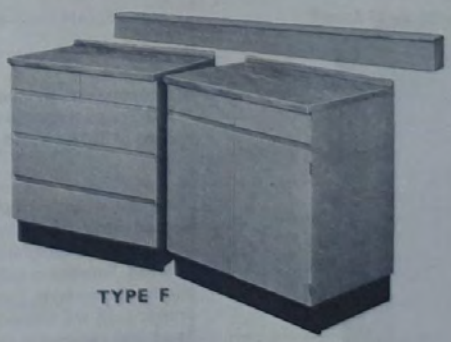
TYPE D

The bench top is mounted in a manner similar to Type C but there is the addition of a horizontal service box at the rear. This is particularly useful where bench top cleanliness is a criterion as it is unencumbered by service taps, which are mounted on the riser of the service box. Underbench units are fitted with height adjusters and dust covers.



TYPE E

The bench top is mounted directly on to the units but is quite separate from the service box, which runs horizontally at the rear of the bench or at the centre in the case of an island bench. The removable bench can be made to any desired length, but it is usual not to exceed 3000 mm. Working height is 909 mm. Plumbing runs are fixed to the supporting frame assembly which, in the case of a wall bench, is in turn fixed to the wall. For an island bench it is self supporting. Should access be required to the plumbing it is a simple matter to remove the entire bench to expose the services. Underbench units are fitted with height adjusters.



TYPE F

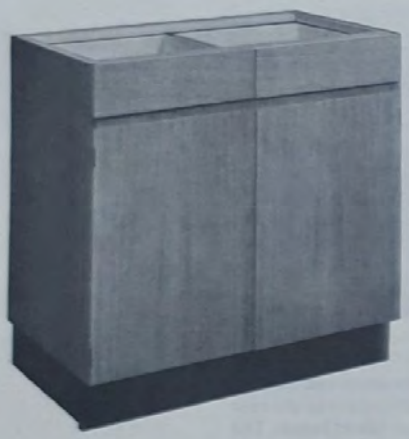
The sectional bench top is quite separate from the service box. Each bench unit is provided with an integral and separate working top and sections are butted one to another. Working height is 909 mm. A bench so assembled can be rearranged with little effort. Underbench units are fitted with height adjusters. Bench sections may be removed to give service space to floor standing apparatus.

Gallenkamp FXA SERIES BENCH UNITS

All dimensions are nominal

- Attractively styled and incorporating the best features of modern practice
- Exposed timber faces finished in natural colour, matt polished
- Veneers are carefully matched for continuity of grain
- Many units are fitted with removable backs for access to service runs

101 RANGE – OAK FINISH



Manufactured in module widths of 500 mm and 1000 mm to optimum standards of commercial joinery to provide a range of furniture of high quality for those requiring a prestige laboratory installation.

Constructed with chipboard ends, doors, and drawer fronts finished in matched veneers. Drawer sides and backs of hardwood, with all joints dovetailed. Drawer and cupboard bottoms of plywood. Finished in natural colour, matt polished, with ebonised plinths. Removable cupboard backs of hardboard. Door and drawer pulls are recessed to give a flush exterior. Cupboards are fitted with removable half depth shelf.

102 RANGE – MAHOGANY FINISH



A reasonably priced range of attractively styled and robustly constructed bench units manufactured in module widths of 500 mm and 1000 mm.

Constructed with chipboard ends, doors, and drawer fronts finished in matched veneers. Drawer sides and backs of hardwood, with all joints dovetailed. Drawer and cupboard bottoms of plywood. Finished in natural colour, matt polished, with ebonised plinths. Removable cupboard backs of hardboard. Door and drawer pulls are recessed to give a flush exterior. Cupboards are fitted with removable half depth shelf.

Gallenkamp FXA SERIES BENCH UNITS

103 RANGE – MELAMINE PLASTICS FINISH

Attractively styled and robustly constructed with a decorative appearance which is strictly functional; the units being easily cleaned and decontaminated. Manufactured in module widths of 500mm and 1000mm.

Constructed with chipboard ends, veneered both faces in mahogany. Doors and drawer fronts faced with white melamine plastics. Drawer sides and backs of hardwood, with all joints dovetailed. Drawer and cupboard bottoms of plywood. Removable cupboard backs of hardboard. Ebonised plinths. Door and drawer pulls are recessed to give a flush exterior. Cupboards are fitted with removable half depth shelf.



FXA SERIES BENCH UNITS

Specification variations to suit Assembly Types A to F described on pages 292–293

All storage units 533mm deep and either 500mm or 1000mm wide.		
Bench Unit for Assembly Type	**Bench Unit Height**	**Bench Unit Specification Variations**
A	889mm	Standard specifications as described on pages 294–295.
B	813mm or 839mm	Standard specifications as described on pages 294–295.
C and D	813mm	Fitted with four height adjusters and with top panelled to form a dust cover.
E and F	889mm	Fitted with four height adjusters.

Gallenkamp

Gallenkamp FXA SERIES BENCH UNITS

All units listed below are to Assembly Type A and are without bench tops

Contract quotations for units to Assembly Types B to F on request.

101 range – Oak finish
102 range – Mahogany finish
103 range – Plastics faced finish

For constructional details see pages 294 and 295.



FXA-111

CUPBOARD AND TWO DRAWER UNIT, 1000mm wide × 533mm deep.

FXA-111-A	Cupboard, 101 range	**£80·65**
FXA-112-R	Cupboard, 102 range	**£80·65**
FXA-113-L	Cupboard, 103 range	**£94·80**



FXA-121

CUPBOARD AND DRAWER UNIT, 500mm wide × 533mm deep.

FXA-121-Q	Cupboard, 101 range	**£57·97**
FXA-122-K	Cupboard, 102 range	**£57·97**
FXA-123-E	Cupboard, 103 range	**£68·20**

CUPBOARD AND SINGLE DRAWER UNIT, 1000mm wide × 533mm deep.

FXA-131-J	Cupboard, 101 range	**£77·92**
FXA-132-D	Cupboard, 102 range	**£77·92**
FXA-133-U	Cupboard, 103 range	**£91·22**

CUPBOARD UNIT, 1000mm wide × 533mm deep.

FXA-141-C	Cupboard, 101 range	**£71·45**
FXA-142-T	Cupboard, 102 range	**£71·45**
FXA-143-N	Cupboard, 103 range	**£84·40**

CUPBOARD UNIT, 500mm wide × 533mm deep.

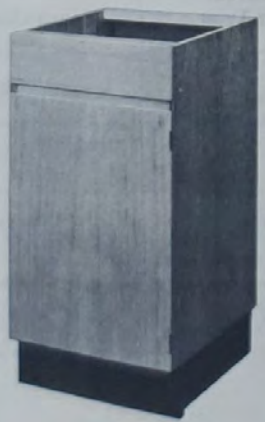
FXA-151-S	Cupboard, 101 range	**£56·10**
FXA-152-M	Cupboard, 102 range	**£56·10**
FXA-153-G	Cupboard, 103 range	**£65·65**



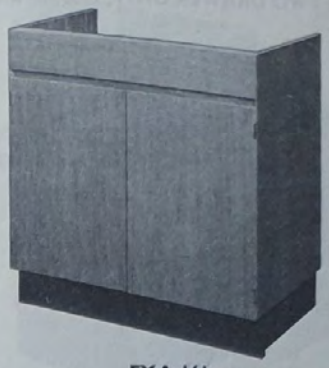
FXA-131



FXA-141



FXA-151



FXA-161



FXA-181



FXA-171



FXA-191

CUPBOARD UNIT, with low back to accommodate services, 1000mm wide × 533mm deep.

FXA-161-L	Cupboard, 101 range	**£71·45**
FXA-162-F	Cupboard, 102 range	**£71·45**
FXA-163-W	Cupboard, 103 range	**£84·40**

CUPBOARD UNIT, with low back to accommodate services, 500mm wide × 533mm deep.

FXA-171-E	Cupboard, 101 range	**£56·10**
FXA-172-V	Cupboard, 102 range	**£56·10**
FXA-173-P	Cupboard, 103 range	**£65·65**

NEST OF FIVE DRAWERS UNIT, 1000mm wide × 533mm deep.

FXA-181-U	Five drawers, 101 range	**£109·46**
FXA-182-X	Five drawers, 102 range	**£109·46**
FXA-183-Y	Five drawers, 103 range	**£128·70**

NEST OF FOUR DRAWERS UNIT, 500mm wide × 533mm deep.

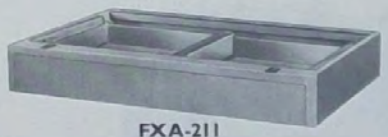
FXA-191-N	Four drawers, 101 range	**£80·65**
FXA-192-H	Four drawers, 102 range	**£80·65**
FXA-193-B	Four drawers, 103 range	**£94·80**

NEST OF TWENTY SMALL DRAWERS UNIT, 1000mm wide × 533mm deep.

FXA-201-W	Twenty drawers, 101 range	**£186·19**
FXA-202-Q	Twenty drawers, 102 range	**£186·19**
FXA-203-K	Twenty drawers, 103 range	**£219·10**



FXA-201



FXA-211

KNEEHOLE TWO DRAWER UNIT, 1000mm wide × 533mm deep.

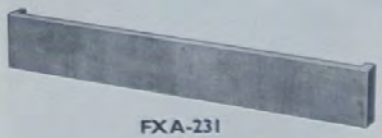
FXA-211-P	Kneehole drawers, 101 range	**£32·57**
FXA-212-J	Kneehole drawers, 102 range	**£32·57**
FXA-213-D	Kneehole drawers, 103 range	**£38·67**



FXA-221

KNEEHOLE DRAWER UNIT, 500mm wide × 533mm deep.

FXA-221-Y	Kneehole drawer, 101 range	**£20·46**
FXA-222-C	Kneehole drawer, 102 range	**£20·46**
FXA-223-T	Kneehole drawer, 103 range	**£24·20**



FXA-231

KNEEHOLE RAIL

FXA-231-B	Kneehole rail, 101 range	Metre **£4·61**
FXA-232-S	Kneehole rail, 102 range	Metre **£4·61**
FXA-233-M	Kneehole rail, 103 range	Metre **£4·61**

TABLE AND TWO DRAWER UNIT, 1000mm wide × 533mm deep.

FXA-241-R	Table, 101 range	**£54·05**
FXA-242-L	Table, 102 range	**£54·05**
FXA-243-F	Table, 103 range	**£63·77**



FXA-241

TABLE UNIT, 1000mm wide × 533mm deep.

FXA-251-K	Table, 101 range	**£36·66**
FXA-252-E	Table, 102 range	**£36·66**
FXA-253-V	Table, 103 range	**£36·66**

DRYING CUPBOARD UNIT, 500mm wide × 533mm deep, lined with asbestolite and fitted with three interior heaters and an ON-OFF fused switch. Maximum power rating 180W. For 200–250V a.c. single phase supplies.

FXA-261-D	Drying cupboard, 101 range	**£140·15**
FXA-262-U	Drying cupboard, 102 range	**£140·15**
FXA-263-X	Drying cupboard, 103 range	**£165·00**

DRYING CUPBOARD UNIT, 1000mm wide × 533mm deep, lined with asbestolite and fitted with three interior heaters and an ON-OFF fused switch. Maximum power rating 360W. For 200–250V a.c. single phase supplies.

FXA-271-T	Drying cupboard, 101 range	**£170·50**
FXA-272-N	Drying cupboard, 102 range	**£170·50**
FXA-273-H	Drying cupboard, 103 range	**£200·34**



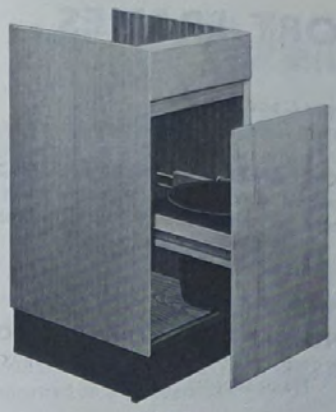
FXA-251



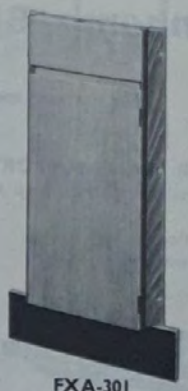
FXA-261



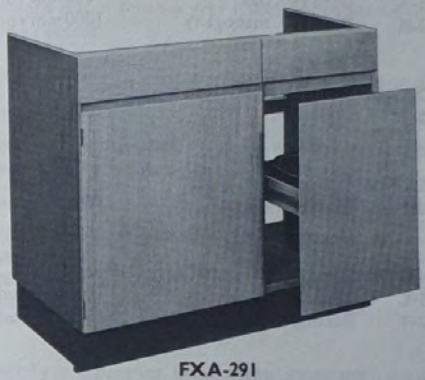
FXA-271



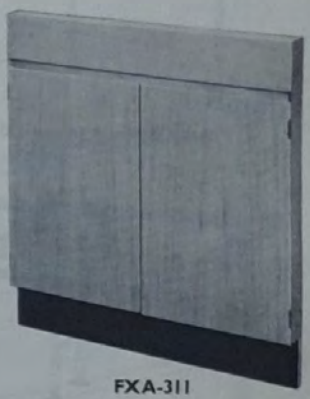
FXA-281



FXA-301



FXA-291



FXA-311

WASTE BOX UNIT, 500mm wide × 533mm deep.

FXA-281-M	Waste box, 101 range	£84·90
FXA-282-G	Waste box, 102 range	£84·90
FXA-283-A	Waste box, 103 range	£97·17

COMBINED CUPBOARD AND WASTE BOX UNIT, 1000mm wide × 533mm deep.

FXA-291-F	Cupboard, 101 range	£128·59
FXA-292-W	Cupboard, 102 range	£128·59
FXA-293-Q	Cupboard, 103 range	£147·81

CORNER DOOR UNIT, 355mm wide.

FXA-301-X	Corner door, 101 range	£22·85
FXA-302-Y	Corner door, 102 range	£22·85
FXA-303-C	Corner door, 103 range	£26·40

FRAMED DOOR UNIT, 1000mm wide.

FXA-311-H	Framed door, 101 range	£36·66
FXA-312-B	Framed door, 102 range	£36·66
FXA-313-S	Framed door, 103 range	£43·14



FXA-321

FRAMED DOOR UNIT, 500mm wide.

FXA-321-A	Framed door, 101 range	£23·87
FXA-322-R	Framed door, 102 range	£23·87
FXA-323-L	Framed door, 103 range	£28·14

END SERVICE PANEL, wall type, 127mm wide.

FXA-331-Q	Service panel, 101 range	£5·97
FXA-332-K	Service panel, 102 range	£5·97



FXA-331

END SERVICE PANEL, island type, 254mm wide.

FXA-341-J	Service panel, 101 range	£7·70
FXA-342-D	Service panel, 102 range	£7·70



FXA-341

Gallenkamp BENCH SUPPORT FRAMES

For use with movable bench assemblies Types C and D

WALL BENCH CANTILEVER FRAME SUPPORT, where both floor and wall fixings are available, 712mm deep × 889mm high, finished in epoxy paint.

FXA-500-E	Frame support, floor fixing	**£14·50**
FXA-504-D	Frame support, wall fixing	**£14·50**



Frame support in typical wall assembly



Frame support in typical island assembly

WALL BENCH CANTILEVER FRAME SUPPORT, where floor fixing only is possible and for single sided island and peninsular benches, 712mm deep × 889mm high, finished in epoxy paint.

FXA-510-U	Frame support	**£22·51**

ISLAND BENCH CANTILEVER FRAME SUPPORT, double sided, 1422mm deep × 889mm high, finished in epoxy paint.

FXA-520-N	Frame support	**£26·95**

DASH RAIL, 70mm high.

FXA-531-A	Dash rail, oak	1000mm run **£2·05**
FXA-532-R	Dash rail, mahogany	1000mm run **£2·05**

LAY-BOARD, for waste pipes, deal, unpolished.

FXA-540-W	Lay-board	1000mm run **£1·02**

WALL BATTEN, 51 × 25mm, deal.

FXA-550-P	Wall batten	1000mm run **£1·02**

BUTTING RAIL, for carcase units, 25 × 13mm.

FXA-561-C	Butting rail, oak	1000mm run **£1·02**
FXA-562-T	Butting rail, mahogany	1000mm run **£1·02**

PANELLING, veneered plywood to contain plumbing and form return ends. Manufactured to required sizes.

FXA-571-S	Panelling, oak	**Price on application**
FXA-572-M	Panelling, mahogany	**Price on application**

Gallenkamp SERVICE FRAMES

For use with movable bench assembly Types E and F

Prices given below do not include service fittings and pipes



Service frame in typical wall assembly



Service frame in typical island assembly

FOR WALL BENCHES

SERVICE BOX, teak, 127mm deep × 178mm high.

FXA-700-L	Service box, teak	1000mm run **£16·03**

WALL BATTEN, with fixing block for service box.

FXA-710-E	Wall batten	**£2·05**

Lay-board, for waste pipes — *See FXA-540-W*

FOR ISLAND BENCHES

SERVICE BOX, teak, 254mm deep × 178mm high.

FXA-760-P	Service box, teak	1000mm run **£32·05**

LEG SUPPORT, for floor fixing.

FXA-770-Y	Leg support	**£12·28**

Lay-board, for waste pipes — *See FXA-540-W*

DIAGONAL BRACE, for leg support.

FXA-780-B	Diagonal brace	1000mm run **£0·50**

Gallenkamp BENCH TOPS

Bench tops can be supplied to suit all purposes. Those in common use are listed. Tops may however be prepared from other materials, and we will gladly assist in selection.

MATERIALS

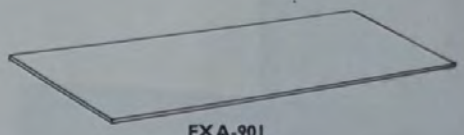
TEAK. 20mm thick, twice oiled. Exposed edges are rounded at the top and throated on the underside.

IROKO. 20mm thick, twice oiled. Exposed edges are rounded at the top and throated on the underside.

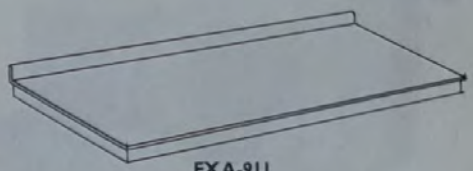
FORMICA. On face and reverse side of fabricated timber core approximately 20mm thick. Lipped on exposed edges with teak. The standard colour finish is grey linette, but alternatives will be quoted on request.

Tops also available in tile, stainless steel, asbestolite and PVC finishes. Details on request.

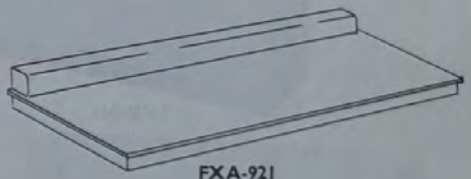
Specifications and prices are given for wall bench tops. Prices for island bench tops are approximately double those shown.



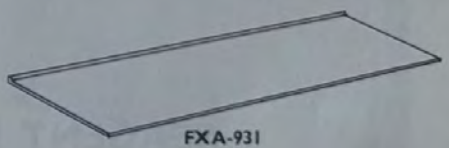
FXA-901



FXA-911



FXA-921



FXA-931



FXA-941

TOP, for Types A and B benches, 685mm deep × 1000mm long.

FXA-901-M	Top, teak	**£57·29**
FXA-902-G	Top, iroko	**£30·18**
FXA-903-A	Top, formica	**£30·18**

TOP, for Type C benches, fitted with skirting and front dash rail, 762mm deep × 1000mm long.

FXA-911-F	Top, teak	**£68·04**
FXA-912-W	Top, iroko	**£37·17**
FXA-913-Q	Top, formica	**£37·17**

TOP, for Type D bench, fitted with teak service box and front dash rail, 762mm deep overall × 1000mm long.

FXA-921-V	Top, teak	**£78·10**
FXA-922-P	Top, iroko	**£50·13**
FXA-923-J	Top, formica	**£50·13**

TOP, for Type E bench, fitted with quadrant at rear, 635mm deep × 1000mm long.

FXA-931-X	Top, teak	**£58·59**
FXA-932-Y	Top, iroko	**£30·69**
FXA-933-C	Top, formica	**£32·05**

UNIT TOP, for Type F bench, fitted with quadrant at rear, 635mm deep × 1000mm long.

FXA-941-H	Unit top, teak	**£58·49**
FXA-942-B	Unit top, iroko	**£30·69**
FXA-943-S	Unit top, formica	**£32·05**

ANCILLARY FITTINGS

HEADING JOINTS, tongued, grooved and bolted. Required when bench runs exceed 2000mm.

FXA-971-J	Joints, teak top	**£5·63**
FXA-972-D	Joints, iroko top	**£5·63**

WALL SKIRTING, teak, 100mm high × 16mm thick.

FXA-976-C	Wall skirting	Metre run **£5·97**

WALL QUADRANT, teak, 25mm high × 25mm thick.

FXA-980-Y	Wall quadrant	Metre run **£3·07**

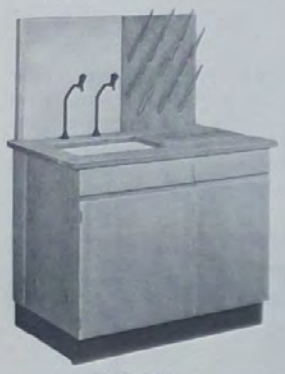
DRAINING BOARD GROOVES, cut into bench top. Each board approximately 460mm wide.

FXA-991-S	Grooves, teak top	**£4·77**
FXA-992-M	Grooves, iroko top	**£4·77**

SINK HOLES, cut into timber tops. Provided with throatings on the underside.

FXA-995-R	Sink holes	**£4·77**

Gallenkamp SINK UNITS



FXD-311

SINK UNIT, 1050 × 685 × 914 mm high.

Comprising:

FXA-901	Teak top with a sink hole and draining grooves
FXA-291	Combined cupboard and waste box unit
2 FXA-331	End panels
	Splashback framed to peg draining rack
FYS-340-150	Sink, 610 × 455 × 255 mm
FYS-690	Waste outlet
2 FYK-365	Water taps with standards

FXD-311-A	Sink unit, oak	**£307·27**
FXD-312-R	Sink unit, mahogany	**£307·27**
FXD-313-L	Sink unit, plastics faced	**£329·45**



FXD-341

SINK UNIT, 2050 × 685 × 914 mm high.

Comprising:

FXA-901	Teak top with a sink hole and draining grooves
FXA-281	Waste box unit
FXA-261	Drying cupboard
FXA-311	Framed doors in front of sink
2 FXA-331	End panels
	Splashback framed between two peg racks
FYS-340-190	Sink, 760 × 455 × 255 mm
FYS-690	Waste outlet
FYK-480	Hot and cold water mixing tap
FYK-320	Water tap at high level for burette washing

FXD-341-C	Sink unit, oak	**£515·16**
FXD-342-T	Sink unit, mahogany	**£515·16**
FXD-343-N	Sink unit, plastics faced	**£561·00**

FXD-311-A to FXD-343-N can be supplied with stainless steel bowl and drainers. Details on application.

REAGENT BOTTLE SHELVES

Overall height 533 mm, clearances 229 mm between bench top and first shelf and 216 mm between shelves. With rectangular ends and removable clear glass strip laid full width on shelves.



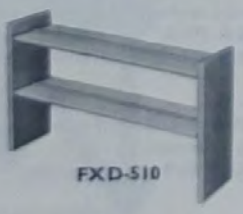
FXD-500

REAGENT BOTTLE SHELF, for wall benches, as specified, length 500 mm, depth 115 mm.

FXD-500-U	Bottle shelf, wall, 500 mm	**£24·73**

REAGENT BOTTLE SHELF, for wall benches, as specified, length 1000 mm, depth 115 mm.

FXD-506-H	Bottle shelf, wall, 1000 mm	**£38·37**



FXD-510

REAGENT BOTTLE SHELF, for island benches, as specified, length 500 mm, depth 230 mm.

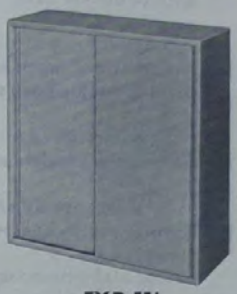
FXD-510-N	Bottle shelf, island, 500 mm	**£34·10**

REAGENT BOTTLE SHELF, for island benches, as specified, length 1000 mm, depth 230 mm.

FXD-516-A	Bottle shelf, island, 1000 mm	**£49·45**

Gallenkamp APPARATUS CUPBOARDS

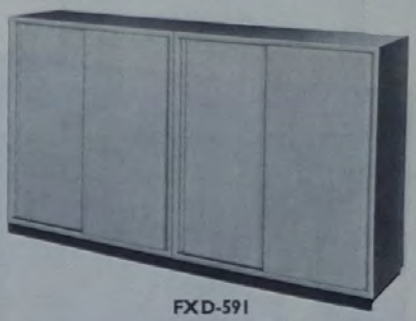
Units are of the stacking type. They can be assembled side by side, back to back, one on top of the other, and mounted on wall or floor



FXD-551



FXD-541



FXD-591

CUPBOARD UNIT, 1000mm wide × 380mm deep × 610mm high, fitted with one adjustable shelf. Enclosed by one pair of sliding oak faced doors. Suitable for wall fixing or mounting on plinth.

FXD-531-Q Cupboard, oak **£63·60**

CUPBOARD UNIT, 1000mm wide × 304mm deep × 610mm high, fitted with one adjustable shelf. Enclosed by one pair of sliding glass doors. Suitable for wall fixing or mounting on plinth.

FXD-541-J Cupboard, oak **£63·60**

CUPBOARD UNIT, 1000mm wide × 380mm deep × 914mm high, fitted with two adjustable shelves. Enclosed by one pair of sliding oak faced doors. Suitable for wall fixing or mounting on plinth.

FXD-551-C Cupboard, oak **£79·79**

CUPBOARD UNIT, 1000mm wide × 304mm deep × 914mm high, fitted with two adjustable shelves. Enclosed by one pair of sliding glass doors. Suitable for wall fixing or mounting on plinth.

FXD-561-S Cupboard, oak **£79·79**

PLINTH, mahogany, for floor mounted cupboard unit, 1000mm wide × 51mm high.

FXD-572-F Plinth, mahogany **£5·12**

CUPBOARD ASSEMBLY, 2000mm wide × 380mm deep × 914mm high, comprising two units FXD-551-C mounted on a mahogany plinth FXD-572-F.

FXD-591-U Cupboard, oak **£165·39**

CUPBOARD ASSEMBLY, 2000mm wide × 304mm deep × 914mm high. Comprising two units FXD-561-S with 1950mm run oak batten to provide support on wall.

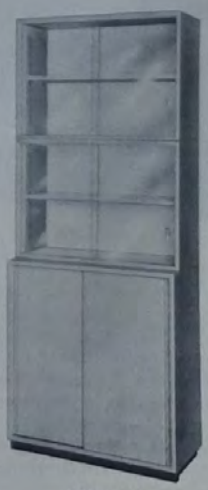
FXD-601-G Cupboard, oak **£163·34**

CUPBOARD ASSEMBLY, 1000mm wide × 380mm deep × 2185mm high. Comprising two units FXD-541-J mounted on one unit FXD-551-C with plinth FXD-572-F.

FXD-611-W Cupboard, oak **£213·64**



FXD-601

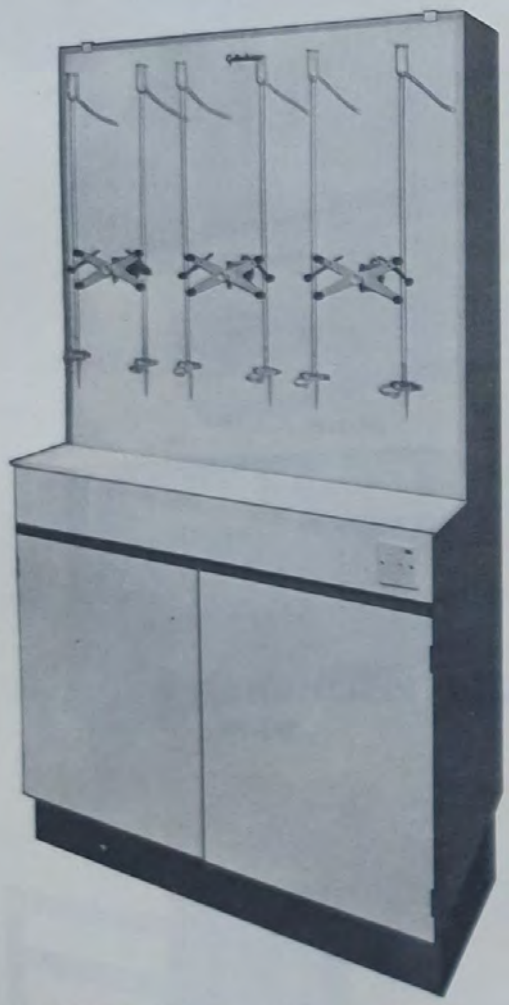


FXD-611

Gallenkamp TITRATION BENCHES

PNEUMATIC FILLING

- **Accommodates six automatic zero Class B burettes, each to deliver 50ml**
- **Automatic filling of each burette from stock bottle by turning double bore stopcock**
- **Alternative models with or without illumination**
- **Burette supply and overflow tubing concealed behind viewing back**
- **PVC tray in base cupboard to hold stock, overflow and air reservoir bottles**
- **Built-in diaphragm pump provides filtered air at steady pressure, controlled by automatic relief valve**
- **Door operated air pressure release valve protects against pressure accidents during servicing**



FXD-801 with burettes, glassware and fittings

TITRATION BENCH, auto zero, non-illuminated, pneumatic filling, 1000mm wide × 540mm deep × 1880mm high, with opalescent back and work top. Cupboard fitted with tray to accommodate bottles. Fitted with air pump with inlet filter, controlled by fascia mounted switch. An air manifold, provided with pressure gauge and two valves for door operated release and pressure control, also has nozzles for connection by the user to air reservoir bottle and six stock bottles. Three double spring clamps to accommodate six burettes are mounted on the viewing back. For 220–240V a.c. supplies.

FXD-801-N	Titration bench, oak	**£323·79**
FXD-802-H	Titration bench, mahogany	**£323·79**
FXD-803-B	Titration bench, plastics	**£336·74**

TITRATION BENCH, auto zero, illuminated, 1000mm wide × 540mm deep × 1880mm high, as above but with translucent plastics back and work top both illuminated by fluorescent tubes providing shadowless viewing. For 220–240V a.c. supplies.

FXD-811-G	Titration bench, oak	**£384·45**
FXD-812-A	Titration bench, mahogany	**£384·45**
FXD-813-R	Titration bench, plastics	**£397·27**

ACCESSORIES

Glassware and fittings, comprising 13 glass bottles 2 500ml, glass tubes, Neoprene stoppers, 30m coil vinyl tubing 5mm bore and instructions for fitting.

FXD-820-010C Glassware — Set **£16·71**

Burettes, 50ml with automatic zero and double oblique bore stopcock — *See BWJ-300*

NOTE: Benches FXD-801-N to FXD-813-R require but do not include six burettes 50ml capacity and one set of glassware and fittings FXD-820-010C.

To ensure satisfactory operation glassware, fittings and burettes should be ordered with the bench.

Gallenkamp TITRATION BENCHES

GRAVITY FILLING

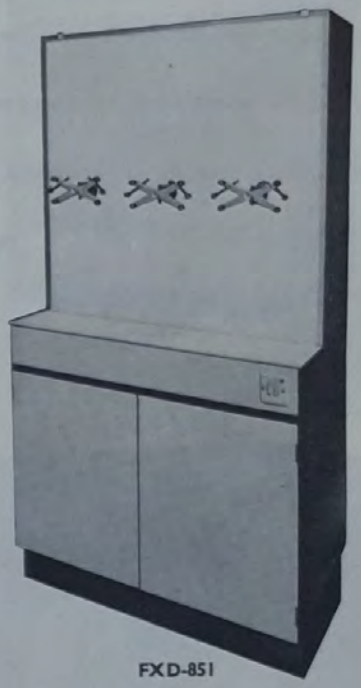
- Accommodates six burettes Class A or B each to deliver 50ml
- Gravity filling of each burette from stock bottle by turning double bore stopcock
- Alternative models with or without illumination
- Burette supply concealed behind viewing back
- Shelf at top of viewing back to accommodate stock bottles

TITRATION BENCH, gravity filling, non-illuminated. 1000mm wide × 540mm deep × 1880mm high. With opalescent back and work top. Cupboard provided with timber floor and shelf. Glass shelf on roof of viewing back to accommodate aspirator stock bottles. Three double spring clamps to accommodate six burettes are mounted on the viewing back.

FXD-841-Y	Titration bench, oak	**£248·60**
FXD-842-C	Titration bench, mahogany	**£248·60**
FXD-843-T	Titration bench, plastics	**£261·38**

TITRATION BENCH, gravity filling. 1000mm wide × 540mm deep × 1880mm high, as above but with translucent back and work top both illuminated by fluorescent tubes providing shadowless viewing. For 220–240V a.c. supplies.

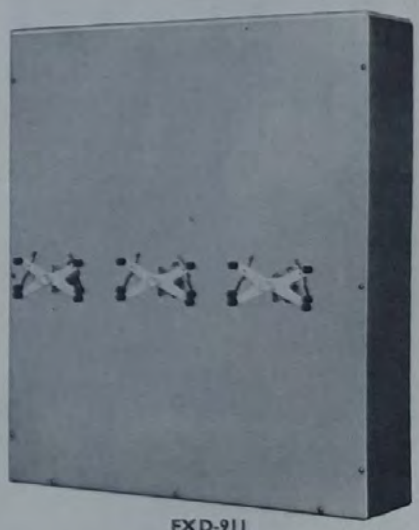
FXD-851-B	Titration bench, oak	**£296·18**
FXD-852-S	Titration bench, mahogany	**£296·18**
FXD-853-M	Titration bench, plastics	**£309·10**



FXD-851

ACCESSORIES

	Glassware and fittings, comprising six glass aspirator bottles 2000ml and 8m vinyl tubing 5mm bore.	
FXD-860-010U	Glassware	Set **£61·38**
	Burette, 50ml, Class B with double oblique bore stopcock	*See BWF-620-150S*
	Burette, 50ml, Class A with double oblique bore stopcock	*See BWF-650-150U*



FXD-911

VIEWING BACK UNITS

VIEWING BACK UNIT, non-illuminated. For wall or bench mounting, 1000mm wide × 250mm deep × 1000mm high, with opalescent back, glass roof cover. Timber frame, externally polished. Fitted with three double spring clamps.

FXD-901-F	Viewing back, oak	**£138·48**
FXD-902-W	Viewing back, mahogany	**£138·48**

VIEWING BACK UNIT, illuminated. For wall or bench mounting, 1000mm wide × 250mm deep × 1000mm high, with translucent back illuminated by fluorescent tubes controlled by switch mounted on left hand frame. Fitted with three double spring clamps. Roof cover of glass. Timber frame, externally polished.

FXD-911-V	Viewing back, oak	**£191·33**
FXD-912-P	Viewing back, mahogany	**£191·33**

NOTE: Benches FXD-841 to FXD-853 require but do not include six burettes 50ml capacity, either BWF-620-150S or BWF-650-150U, and one set of glassware and fittings FXD-860-010U.

To ensure satisfactory operation glassware, fittings and burettes should be ordered with the bench.

Gallenkamp STANDARD FUME CUPBOARDS

- Multiple assemblies can be made up with any number of units
- Duct opening at top to suit extraction requirements
- Back and roof lined with protective coated materials
- Narrow stiles give excellent view and access
- Inclined fascia improves air flow and mounts service taps and forms front lip to retain spillage
- Standard underbench unit
- Optional baffle controls air flow distribution
- Black asbestolite working top
- Shatter resistant external glazing



FXF-320

STANDARD EXTERNAL FINISH

Oak, light polished to match 101 range bench units. On request we can supply mahogany framed fume cupboards for use with ranges 102 and 103 benches.

The carcase is timber framed, the sash frame and inclined fascia are of teak. Only a very small amount of these timbers is exposed inside the cupboard, thus practically eliminating fire and corrosion hazards.

COUNTERPOISED SASH

Hangs on terylene lines.

GLAZING

For sash and ends, 4mm shatter resistant sheet. The back and roof linings are coated with polyurethane.

Alternative glazings and linings are available to meet specific requirements. Details and prices on application.

SERVICES

Front controlled services may be mounted on the inclined fascia with either integral nozzles, or remote controlled nozzles mounted at the back of the cupboard. Sinks may be fitted in the base, and electrical switches fixed to the top panel of the underbench unit.

OPEN SASH WORKING

When a baffle is fitted, the sash can be kept raised for many applications. If provided with protective glazing the sash can be regarded as a safety screen.

LIGHTING

Top lighting may be achieved by means of a fluorescent strip light fitted over a glazed panel let into the roof.

OPTIONAL EXTRA

Top panels may be extended to ceiling height to enclose duct-work.

Dimensions

Width 1000mm Depth 775mm Height 2108mm
Height to work top 939mm
Height overall with sash fully raised 2740mm approximately

Gallenkamp STANDARD FUME CUPBOARDS

FUME CUPBOARD, standard, 1000mm wide × 775mm deep × 1219mm high, for mounting on existing bench top or support. Shatter resistant externally glazed counterpoised sash and ends with protected asbestolite back and roof. Work top of black asbestolite. No service fittings are included.

FXF-300-Q Fume cupboard **£238·70**

ACCESSORY

Baffle, asbestolite, for fitting to standard fume cupboard FXF-300. Coated for protection against corrosion. Readily dismantled for cleaning. Gives excellent control of air flow.

FXF-310-010G Baffle **£35·81**



FXF-300

FUME CUPBOARD, standard, 1000mm wide × 775mm deep × 2108mm high. Comprises fume cupboard FXF-300 with two shatter resistant externally glazed ends and glazed sash. Fitted with baffle FXF-310-010. Working top of black asbestolite with hole cut for sink. Mounted on cupboard unit FXA-161.

Services

One panel mounting gas cock with integral nozzle FYL-400, one water tap front control FYL-500, one water bend FYL-610-010, one panel mounting compressed air tap with integral nozzle FYL-415, one panel mounting vacuum tap with integral nozzle FYL-410, one sink FYS-300-030, 205 × 150 × 150mm, one waste outlet, black polythene FYS-680, one pair straps FYS-310-030.

FXF-320-C Fume cupboard **£396·87**



FXF-350

FUME CUPBOARD, standard, 2000mm wide × 775mm deep × 2108mm high. Comprises two fume cupboards FXF-300 with two shatter resistant externally glazed ends and glazed division between, mounted on two cupboard units FXA-161. Two end service panels as FXA-331.

Services

Two panel mounting gas cocks with integral nozzles FYL-400, two water taps front control FYL-500, two water bends FYL-610-010, two sinks FYS-300-030, 205 × 150 × 150mm, two waste outlets, black polythene FYS-680, two pairs straps FYS-310-030, two compressed air taps FYL-415, two vacuum taps FYL-410.

FXF-350-E Fume cupboard **£742·94**

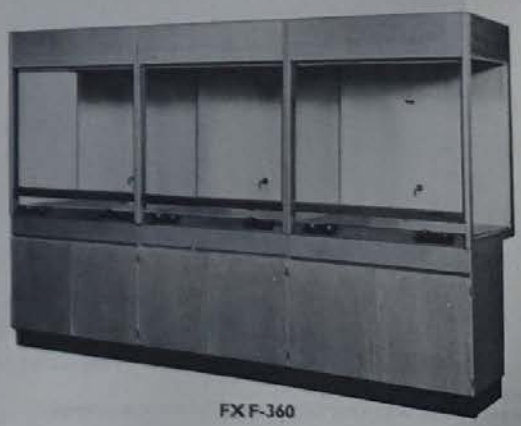
FUME CUPBOARD, standard, 3000mm wide × 775mm deep × 2108mm high. Comprises three fume cupboards FXF-300 having two shatter resistant externally glazed ends and two glazed centre divisions. Mounted on three cupboard units FXA-161. Two end service panels as FXA-331.

Services

Three panel mounting gas cocks with integral nozzles FYL-400, three water taps front control FYL-500, three water bends FYL-610-010, three sinks FYS-300-030, 205 × 150 × 150mm, three waste outlets, black polythene FYS-680, three pairs straps FYS-310-030, three compressed air taps FYL-415, three vacuum taps FYL-410.

FXF-360-U Fume cupboard **£1106·60**

Any of the above fume cupboards may be mounted on a table underframe. Prices on application.



FXF-360

Gallenkamp 'OPENFLOW I' FUME CUPBOARDS

For open sash working



- Positive air flow ensures minimum eddies into room
- Shatter resistant toughened glass sashes are used as safety screens – not to retain fumes inside cupboard
- Preset baffles control air-flow distribution
- No front stiles to impede access
- Removable ends (and divisions in multiple units) facilitate cleaning and decontamination
- Full width open bench top in range of cupboards when divisions are removed
- Corrosion resistant interior of toughened glass and protected asbestolite. Alternative materials available

Dimensions

Width 1000mm Depth 889mm Height 2184mm
Height to work top 978mm
Height overall with sash fully raised 3050mm approximately

STANDARD EXTERNAL FINISH

Oak, light polished, to match 101 series of bench units.

Cupboards can be supplied mahogany framed for use with 102 mahogany and 103 plastics faced bench units. Prices on application.

CONSTRUCTION

The carcase is cantilever framed in oak, the sash frame and inclined fascia being of teak. Only a very small amount of these timbers is exposed inside the cupboard, thus practically eliminating fire and corrosion hazards. The counterpoised sash is hung on terylene lines.

SERVICES

Front controlled services may be mounted on the inclined fascia with either integral nozzles, or remote controlled nozzles mounted at the back of the cupboard. Sinks may be fitted in the base, and electrical switches fixed to the top panel of the carcase unit.

LIGHTING

Top lighting may be achieved by means of a fluorescent strip light fitted over a glazed panel let into the roof. Price on application.

FIXING

These fume cupboards are self-supporting, but light wall fixing at the top is essential. Wherever possible we recommend that our installation engineers erect cupboards and extraction/induction plant.

Multiple units need overhead guide runners to facilitate even operation of the sashes.

Gallenkamp 'OPENFLOW I' FUME CUPBOARDS

For open sash working

FUME CUPBOARD, *OPENFLOW I*, **controlled draught,** 1036mm wide × 889mm deep × 1295mm high for mounting on existing bench top or table underframe. All glazing in shatter resistant toughened glass with side panels removable. Working top of black asbestolite with back and roof of protected asbestolite. The cupboard is fitted with baffle FXF-310-010.

Services

Two panel mounting gas taps with integral nozzles FYL-400.

FXF-500-A Fume cupboard **£451·24**



FXF-500

FUME CUPBOARD, *OPENFLOW I*, **controlled draught,** 1036mm wide × 889mm deep × 2184mm high. Comprises fume cupboard FXF-500 set on cupboard unit as FXA-161. Working top of black asbestolite. Two end service panels as FXA-331. The cupboard is fitted with baffle FXF-310-010.

Services

Two panel mounting gas taps with integral nozzles FYL-400.

FXF-510-Q Fume cupboard **£534·79**



FXF-510

FUME CUPBOARD, *OPENFLOW I*, 4036mm wide × 889mm deep × 2184mm high. Comprises four fume cupboards FXF-500 set on four cupboard units as FXA-161 and two end service panels as FXA-331. Each section fitted with baffle FXF-310-010. Working top of black asbestolite with four notches for sinks.

Services

Four sinks FYS-300-030, 205 × 150 × 150mm, four waste outlets FYS-680, eight water taps, front control FYL-500 with bends FYL-610-010, eight panel mounting gas taps with integral nozzles FYL-400, four panel mounting compressed air taps FYL-415, four pairs sink straps FYS-310-030.

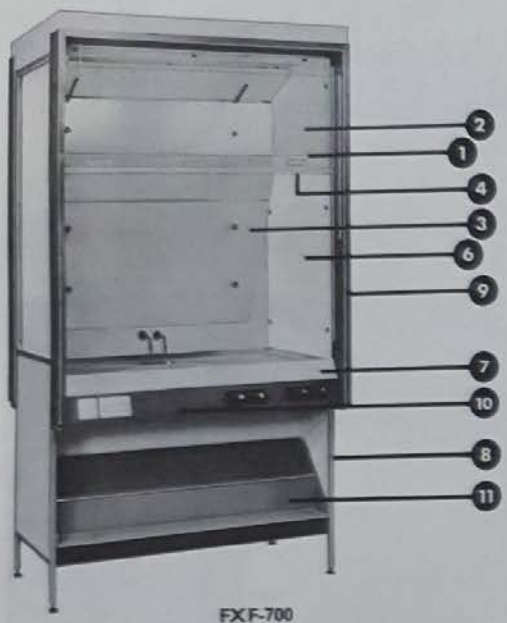
FXF-540-S Fume cupboard **£2348·50**



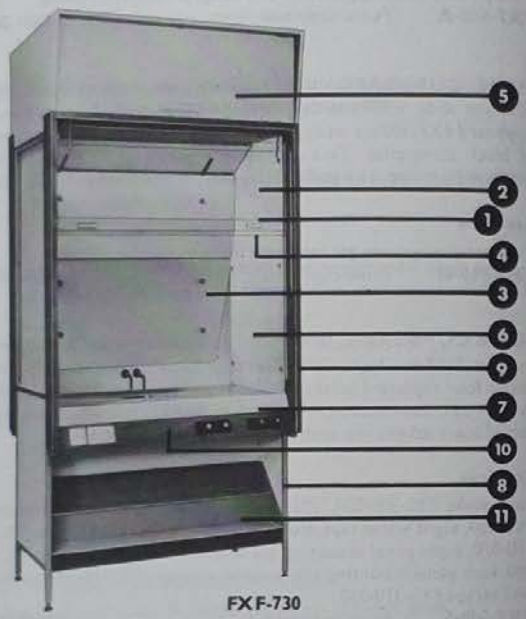
FXF-540

Gallenkamp 'OPENFLOW II' FUME CUPBOARDS

- **Shatter resistant external glazing**
- **Duct through double element sash (1) and main by-pass duct (2) provide progressive two stage by-pass which automatically controls air velocity beneath the sash as it is raised or lowered**
- **Three element fixed battle (3) stabilises extracted air flow**
- **Balanced draught duct incorporating baffle and filter (5) (when fitted) further conserves conditioned air in laboratory by replacing calculated proportion of extraction with fresh air taken from outside building**



FXF-700



FXF-730

HIGH EFFICIENCY AIR FLOW

The sash is used as a safety screen – not to retain fumes within the cupboard. Positive air flow ensures that no eddies pass into the room and efficient scavenging is achieved with the minimum consumption of air from the laboratory.

CORROSION RESISTANT MATERIALS

Toughened glass body. Ends (6) sash (4) extraction baffles (3). Stainless steel (FMB grade) back and outlet duct connector.

Stainless steel, FMB grade, tanked work top (7) with waste outlet.

Condensation, if occurring, forms mainly on toughened glass and stainless steel surfaces, to fall directly inside lips of tanked work top.

GENERAL FEATURES

Sectional construction facilitates handling and reduces freight charges.

End frames (8) of square section steel tube, with floor-level adjusters.

Front frame (9) of teak, finished with polyurethane. Front rail (10) mounts front controlled services. Rear frame also of teak.

Rimless double element sash (4) with interlocking weights counterpoised on stainless steel lines.

Top lighting by means of fluorescent tube mounted above the inner roof lining.

Stepped bottle shelves (11) of PVC. Can be vented by exhaust system as optional extra.

Cleaning and decontamination facilitated by smooth finish, rimless panels and sashes.

Toughened glass is capable of withstanding both considerable impact and distributed heat. It is normally unaffected by the action of all alkalis and organic substances and all acids, with the exception of hydrofluoric acid. To minimise the effect of the latter, the toughened glass used in the construction of the cupboard is obscured, by etching of the extraction baffle elements, and end panels. The result is that such etching as may occur is not readily discernible.

Gallenkamp 'OPENFLOW II' FUME CUPBOARDS

STABILISED EXTRACTION SYSTEM

When the sash is fully raised to provide an access height of 838mm the air drawn into the cupboard passes across the open face beneath the sash. Velocities are acceptably even. As the sash is lowered, the stage one by-pass between the two sash elements conveys air to the top of the cupboard to control velocity over the reduced face aperture. As the sash is brought down still further, the stage two main by-pass is operated, again to limit face velocity beneath the sash. This control is maintained until the sash is fully lowered. According to the task to be performed, nominal face velocities (with sash fully raised) can vary from 10 to 30m/min dependent on the fan and duct system employed. Within this range, the exceptionally gentle nature of the extraction will not normally interfere with the work being done, and efficient scavenging is assured.

ASSEMBLY AND INSTALLATION. Assembly instructions can be provided with each fume cupboard, but it is recommended wherever possible our factory-trained personnel should be employed. Quotations will be provided on request for assembly, installation, plumbing and electrical connections.

DIMENSIONS	
WIDTH, overall	1448mm
internal	1372mm
DEPTH, overall	914mm
internal	610mm
HEIGHT, overall	2438mm
inside	1422mm
fume cupboard	at front
	1321mm
	at rear

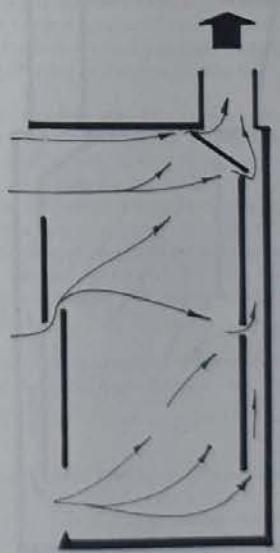
FUME CUPBOARD, *OPENFLOW II,* **with by-pass, for stabilised extraction.** Overall 1448mm wide × 914mm deep × 2438mm high. Body ends and extract baffle of externally shatter resistant obscured toughened glass. Back and duct connector (nominal 412mm × 159mm), of FMB grade stainless steel. Double element sash of transparent shatter resistant toughened glass, counterpoised with interlocking weights on stainless steel lines. Picture frame of teak. Rear frame of teak. Outer roof of laminated timber with white polyurethane finish. Tanked work top made from FMB grade stainless steel with waste outlet. End frames of square section steel, with floor-level adjusters and lower panels finished both sides in white melamine plastics. Stepped Winchester quart bottle rack of PVC fitted below cupboard with back finished in white melamine plastics. Front controlled services mounted on inclined fascia panel include one switch wired to interior lighting, two 13A electric sockets, two cold water fittings FYL-500, with two vertical mounting swan-necks FYL-620-010, two gas cocks FYL-400, one vacuum valve FYL-410 and one compressed air valve FYL-415.

Complete unit, dismantled into sections, excluding all plumbing and electrical connections and excluding exhaust fan and trunking.

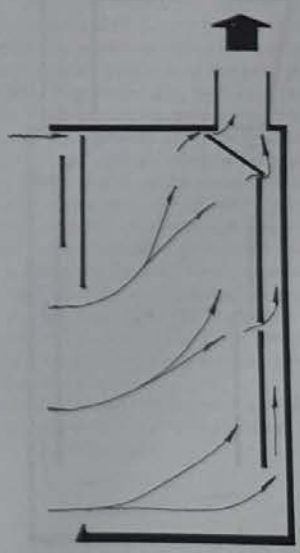
FXF-700-H Fume cupboard **£1322·50**

FLOW DIAGRAMS

STABILISED EXTRACTION SYSTEM



Sash raised 230mm



Sash fully raised

Gallenkamp 'OPENFLOW II' FUME CUPBOARDS

BALANCED DRAUGHT SYSTEM

It is wasteful if a fume cupboard removes excessive quantities of expensively conditioned air from the laboratory. This applies particularly in a small room accommodating several cupboards, and/or where a cupboard is provided with extraction involving a high face velocity, say 25m/min, to remove highly toxic or corrosive fumes. The balanced draught system overcomes the problem by replacing a calculated proportion of the extraction with untreated air drawn from outside the building. This balancing air is passed from the roof of the cupboard, through a larger filtered duct, to discharge at low velocity vertically behind the sash. It becomes entrained with air, induced from the room across the open face beneath the sash, to form a flow pattern resembling that of the stabilised extraction system. The result is a significant reduction of velocity across the open face. Usually approximately 55% replacement with untreated air is achieved but the proportion can be varied by selecting appropriate fans to suit specific requirements. The system, with its gentle action, offers minimal discomfort to the operator and will not normally interfere with work in hand. This, coupled with extremely efficient scavenging, is a condition rarely found in balanced and auxiliary air fume cupboards.

ASSEMBLY AND INSTALLATION. Assembly instructions can be provided with each fume cupboard, but it is recommended wherever possible our factory-trained personnel should be employed. Quotations will be provided on request for assembly, installation, plumbing and electrical connections.

FUME CUPBOARD, *OPENFLOW II,* **with by-pass, for balanced draught and stabilised extraction.** Overall 1448mm wide x 914mm deep and 991mm deep at ceiling x 2894mm high. As FXF-700 but with balanced draught duct mounted on roof. Duct fabricated from laminated timber, finished externally in white polyurethane, with interior baffle and filter. An inlet hole of 250mm diameter is provided in the roof of the duct to accommodate a flanged entry.

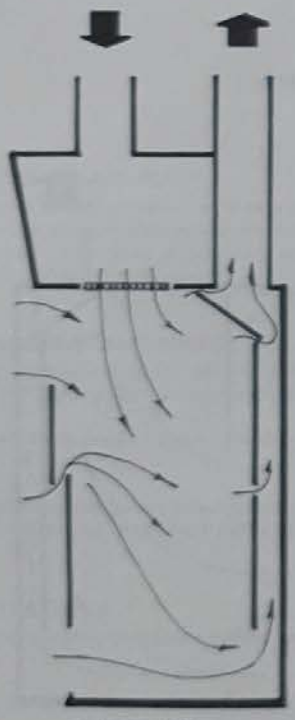
Complete unit, dismantled into sections, excluding all plumbing and electrical connections and excluding fans and trunking.

FXF-730-J Fume cupboard **£1467·40**

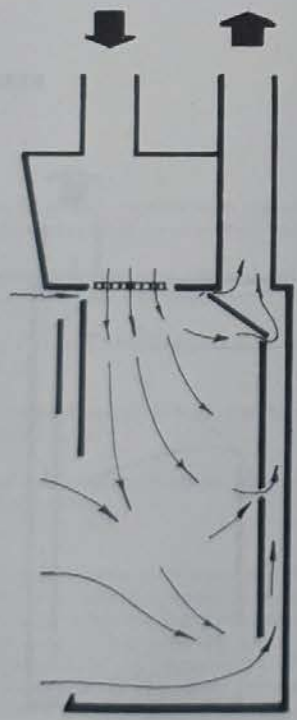
DIMENSIONS	
WIDTH, overall	1448mm
internal	1372mm
DEPTH, overall	991mm
internal	610mm
HEIGHT, overall	2894mm at front
inside fume cupboard	1321mm at rear

FLOW DIAGRAMS

BALANCED DRAUGHT SYSTEM



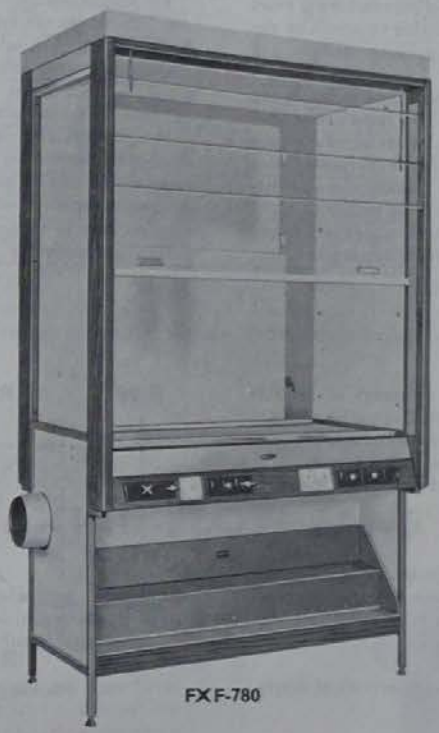
Sash raised 230mm



Sash fully raised

Gallenkamp 'OPENFLOW II' FUME CUPBOARD

With down-draught extraction, water cooled baffle and scrubbing chamber



FXF-780

STABILISED EXTRACTION SYSTEM

When the sash is fully raised to provide an access height of 838mm the air drawn into the cupboard passes across the open face beneath the sash. Velocities are acceptably even. As the sash is lowered, the stage one by-pass between the two sash elements conveys air to the top of the cupboard to control over the reduced face aperture. As the sash is brought down still further, the stage two main by-pass is operated, again to limit face velocity beneath the sash. This control is maintained until the sash is fully lowered. According to the task to be performed, nominal face velocities (with sash fully raised) can vary from 10 to 30m/min dependent on the fan and duct system employed. Within this range, the gentle nature of the extraction will not normally interfere with the work being done, and efficient scavenging is assured.

Down-draught extraction. In a down-draught extraction system fumes are drawn into a baffle which is fitted with a water spray to achieve cooling and, in some cases, partial absorption. The combined flow of fumes, air and water then passes through a scrubbing chamber, in which a further cold water spray operates, and thence fumes are conveyed through a duct and fan to atmosphere. This system, combined with consideration of the materials used, for the construction of the fume cupboard has caused many users to specify this equipment for the extraction of perchloric acid fumes.

The exhaust flue outlet is specified and illustrated as being at the left hand side of the unit. Right hand or rear connections can be arranged if required.

ASSEMBLY AND INSTALLATION. Assembly instructions are provided with each fume cupboard, but it is recommended wherever possible our factory-trained personnel should be employed. Quotations will be provided on request for assembly, installation, plumbing and electrical connections.

FUME CUPBOARD, *OPENFLOW II*, with by-pass, stabilised down-draught pattern, with water cooled baffle and scrubbing chamber. Overall 1448mm wide × 914mm deep × 2438mm high. Body ends and roof of externally shatter resistant obscured toughened glass. Double element sash of transparent shatter resistant toughened glass, counterpoised with interlocking weights on stainless steel lines. Back, double element baffle, tanked base and frame support for toughened glass work top made from FMB grade stainless steel. The tanked base has a combined flue and drain outlet. This outlet discharges directly into a scrubbing chamber, made from rigid PVC, which is fitted at the rear of the cupboard beneath the work top with a 203mm internal diameter PVC flue outlet at the left hand side of the unit, as illustrated. The scrubbing chamber is provided also with an internal water spray and drain outlet. Front picture frame and rear frame of teak. Outer roof of laminated timber with white polyurethane finish. End frames of square section steel with floor-level adjusters and lower panels finished both sides in white melamine plastics. Stepped Winchester quart bottle rack of PVC fitted below cupboard, in front of scrubbing chamber, with back of white melamine plastics. Front controlled services mounted on inclined fascia panel include one switch to operate the lighting, two 13A switch sockets, two cold water fittings FYL-500 with two vertical mounting swan-necks FYL-610-010, two gas cocks FYL-400, one vacuum valve FYL-410 and one compressed air valve FYL-415. An additional cold water control FYL-500 is fitted to control the water spray together with two valves to regulate the flow.

Complete unit, dismantled into sections, excluding all plumbing and electrical connections and excluding exhaust fan and trunking.

FXF-780-U Fume cupboard **£1773·20**

FUME EXHAUST FANS

Efficient fume extraction plant is one of the most important features in a chemical laboratory and GALLENKAMP are specialists in the field of designing, manufacturing and erecting such equipment. A complete service is offered based on many years experience and specialist engineers are available to advise on the selection of plant and subsequently to prepare designs and estimates.

Our standard centrifugal fans have been designed to satisfy the varied and exacting requirements of laboratory fume extraction. Casings are of polyester resin reinforced with glass fibres and such materials have proved particularly resistant to the corrosive fumes extracted from the majority of laboratory installations. Centrifugal fans operate satisfactory in temperatures up to 120°C.

Axial flow fans which have air-stream rated motors and epoxy resin impellers are designed essentially for light duties and must not be used for flammable gases, at temperatures above 40°C, or where acid concentration is high as in the case of Kjeldahl digestions.

For special applications where our standard centrifugal fans are not suitable we can supply fans made from alternative materials. Details of such fans will be supplied on request.

Ducting is generally of either anti-acid treated asbestolite or rigid PVC but other materials such as polypropylene can be supplied for special applications.

Many plants are designed to meet the exacting conditions created by radioactive dust and toxic or explosive fumes. In these cases a high rate of extraction is usually required, and fans and ducting associated with balanced extraction systems can be incorporated in such schemes to reduce loss of conditioned air within the laboratory.

Plant design. We can advise on the selection of suitable equipment and prepare designs and estimates. Our design staff is at the disposal of customers contemplating new installations and, if necessary, a ventilation engineer will call to discuss details.

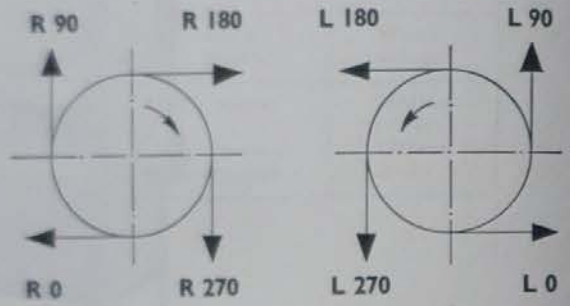
Projects, however, can be fully appreciated if the following information is provided.

Plans and sectional drawings or dimensioned sketches, indicating the proposed position of the fume chamber, possible sizing of the fan and an indication of the run of ducting.

Power supply. Please state voltage and characteristics of supply.

Hand of discharge. Please state prefix letter and figure required as shown on chart. (Applicable to centrifugal fans only.)

Nature of particularly corrosive fumes likely to be exhausted, with an indication of maximum temperature involved if likely to exceed 50°C.



Hands (directions) of discharge of centrifugal fans

The fans are viewed from the driving side and the angle of discharge is designated by the figures following the prefix, measured in degrees, and starting from the horizontal.

Fans with forward curved impellers have a right hand discharge only.

CENTRIFUGAL FANS

Centrifugal fans are designed for use in arduous extraction conditions and can be mounted for any angle of discharge.

Fan casings are moulded from polyester resin reinforced with glass fibres and constructed so that no bolts, nuts or screws project into the interior of the casing. Inlet plates are fitted with spigots for connection to ducting. Outlets are flanged and fitted with developments. Plastics condensate drain tubes are fitted at the lowest point of the casings.

Impellers are of the multi-vane type, cast in one piece from epoxy resin and fitted with rear boss for direct coupling to the motor.

Fans FXJ-300 and FXJ-330 are fitted with radial impellers.

Fans FXJ-360 and FXJ-400 are fitted with forward curved impellers.

Motors are totally enclosed, fan cooled with alternative models wound for single phase or three phase 50Hz a.c. supplies. Standard motors supplied are for use in locations where ambient conditions do not exceed 40°C and 80% relative humidity and at altitudes less than 975 m.



Centrifugal Fan
For performance graph see overleaf

Starters are of the pushbutton contactor type, fitted with no-volt and overload releases.

Flameproof motors to BS 4683 Part 2 Groups I1a and I1b and special motors and starters for other ambient conditions and electricity supplies can be supplied for centrifugal fans. Details on application.

Technical data

Discharge pipe diameters relate to asbestos ducting only

List No. of fan	Fan size	Speed rev/min	Load kW	Air delivery. Free intake and discharge m^3/h	Approx. mass kg	Fan inlet int. dia. mm	Discharge pipe int. dia. mm	Approx. overall dimensions mm
FXJ-300 and FXJ-330	1	1425	0·18	540	21	152	178	483 × 381 × 432
	2	1425	0·25	1100	27	203	228	533 × 508 × 483
	3	1425	0·55	2100	32	228	254	660 × 584 × 508
	4	1425	1·50	5300	55	305	305	660 × 635 × 559
FXJ-360 and FXJ-400	2	1425	0·55	1500	30	203	254	533 × 508 × 483
	3	1425	1·10	2600	41	228	305	660 × 584 × 508

Discharge outlets to suit PVC ducting can be manufactured on request.

AXIAL FLOW FANS

Axial flow fans provide an economical means of extraction from small fume cupboards. They may be inserted either in a short run of ducting or directly to the fume cupboard.

Fan casings are moulded from polyester resin and glass fibre. Exterior metal flanges to suit asbestos ducting are available and can be supplied for fitting to each end of the fan unit. Alternatively a PVC ring can be supplied for fixing the fan unit directly to the roof of the fume cupboard.

Fan blades are moulded from epoxy resin.

Motors are of the capacitor start and run type, totally enclosed with condensers mounted on the outside of the fan chamber and suitable for single phase 50Hz supplies. For use in locations where ambient conditions do not exceed 40°C and 80% relative humidity and at altitudes less than 975m.

Metal parts are treated with epoxy resin enamel.

Ducting for use with axial flow fans is listed on page 317.



Axial Flow Fan
For performance graph see overleaf

FUME EXHAUST FANS

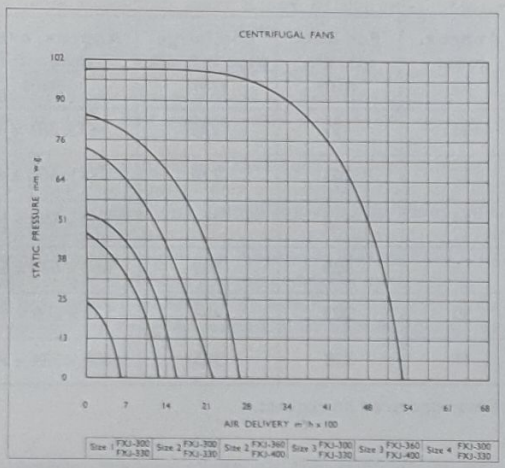
Technical data

List No. of fan	Fan size	Speed rev/min	Load kW	Air delivery. Free intake and discharge m^3/h	Approx. mass kg	Fan inlet int. dia. mm	Discharge pipe int. dia. mm	Approx. overall dimensions mm
FXJ-400	1	2700	0·04	400	5·5	175	175	228 × 254 dia.
	2	2700	0·04	1500	7	225	225	228 × 305 dia.
	3	1425	0·04	750	7	225	225	228 × 305 dia.

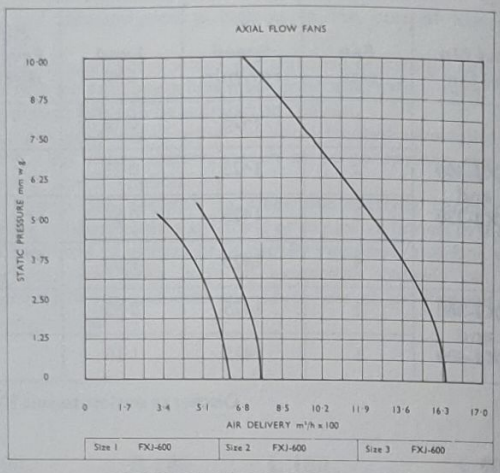
Gallenkamp

FUME EXHAUST FANS

For technical data see pages 314 and 315.



PERFORMANCE DATA FOR CENTRIFUGAL FANS



PERFORMANCE DATA FOR AXIAL FLOW FANS

CENTRIFUGAL FANS AND FITTINGS

FANS, centrifugal, fibreglass, direct coupled to motor, for single phase supplies. Fitted with radial impeller.

FXJ-300-010T	Fan, size 1, 200–220 V 50 Hz	**£229·50**
FXJ-300-030N	Fan, size 1, 230–240 V 50 Hz	**£229·50**
FXJ-300-050H	Fan, size 2, 200–220 V 50 Hz	**£252·00**
FXJ-300-070B	Fan, size 2, 230–240 V 50 Hz	**£252·00**
FXJ-300-090S	Fan, size 3, 200–220 V 50 Hz	**£304·88**
FXJ-300-110P	Fan, size 3, 230–240 V 50 Hz	**£304·88**
FXJ-300-130J	Fan, size 4, 200–220 V 50 Hz	**£425·25**
FXJ-300-150D	Fan, size 4, 230–240 V 50 Hz	**£425·25**

FANS, centrifugal, fibreglass, direct coupled to motor, for three phase supplies. Fitted with radial impeller.

FXJ-330-010V	Fan, size 1, 380–440 V 50 Hz	**£221·63**
FXJ-330-050J	Fan, size 2, 380–440 V 50 Hz	**£243·00**
FXJ-330-090U	Fan, size 3, 380–440 V 50 Hz	**£295·88**
FXJ-330-110R	Fan, size 4, 380–440 V 50 Hz	**£374·63**

FANS, centrifugal, fibreglass, direct coupled to motor for single phase supplies. Fitted with forward curved impeller. Right hand discharge only.

FXJ-360-050L	Fan, size 2, 200–220 V 50 Hz	**£259·88**
FXJ-360-070F	Fan, size 2, 230–240 V 50 Hz	**£259·88**
FXJ-360-090W	Fan, size 3, 200–220 V 50 Hz	**£349·88**
FXJ-360-110T	Fan, size 3, 230–240 V 50 Hz	**£349·88**

FANS, centrifugal, fibreglass, direct coupled to motor for three phase supplies. Fitted with forward curved impeller. Right hand discharge only.

FXJ-400-050W	Fan, size 2, 380–440 V 50 Hz	**£250·88**
FXJ-400-090K	Fan, size 3, 380–440 V 50 Hz	**£329·63**

STARTERS, pushbutton for FXJ-300 and FXJ-360 with combined thermal and magnetic overload releases.

FXJ-430-010N	Starter, size 1 fan	**£30·48**
FXJ-430-050B	Starter, size 2 fan	**£30·48**
FXJ-430-090M	Starter, size 3 fan	**£30·48**
FXJ-430-110J	Starter, size 4 fan	**£32·66**

STARTERS, pushbutton for FXJ-330 and FXJ-400 with combined thermal and magnetic overload releases.

FXJ-440-010G	Starter, size 1 fan	**£30·48**
FXJ-440-050R	Starter, size 2 fan	**£30·48**
FXJ-440-090F	Starter, size 3 fan	**£30·48**
FXJ-440-110C	Starter, size 4 fan	**£32·66**

SHELVES, asbestolite, with steel cantilevers for supporting fan and motor on wall.

FXJ-460-010P	Shelf, size 1 fan	**£36·47**
FXJ-460-050D	Shelf, size 2 fan	**£36·47**
FXJ-460-090X	Shelf, size 3 fan	**£37·01**
FXJ-460-110L	Shelf, size 4 fan	**£37·01**

AXIAL FLOW FANS AND FITTINGS

FANS, axial flow, fibreglass, with motor for 220–240V 50Hz single phase supplies.

FXJ-600-010S	Fan, size 1	**£106·25**
FXJ-600-050G	Fan, size 2	**£130·87**
FXJ-600-090R	Fan, size 3	**£136·36**

STARTERS, pushbutton for FXJ-600, with thermal overload release.

FXJ-630-010U	Starter, size 1 fan	**£9·95**
FXJ-630-050Y	Starter, size 2 fan	**£9·95**
FXJ-630-090T	Starter, size 3 fan	**£9·95**

FLANGES, matching, to connect axial flow fan to ducting.

FXJ-640-010N	Flanges, size 1 fan	Pair **£23·75**
FXJ-640-050B	Flanges, size 2 fan	Pair **£24·45**
FXJ-640-090M	Flanges, size 3 fan	Pair **£24·45**

GASKETS, jointing, for use with matching flanges.

FXJ-650-010G	Gaskets, size 1 fan	Pair **£2·22**
FXJ-650-050R	Gaskets, size 2 fan	Pair **£2·45**
FXJ-650-090F	Gaskets, size 3 fan	Pair **£2·45**

RINGS, angle, PVC, to connect axial flow fan to fume cupboard.

FXJ-660-010W	Ring, size 1 fan	**£15·90**
FXJ-660-050K	Ring, size 2 fan	**£16·14**
FXJ-660-090V	Ring, size 3 fan	**£16·14**



Axial Flow Fan

ASBESTOLITE DUCTING

Specially treated to resist acid fumes

Pipes are easily cut with a fine saw and secured to walls, etc., with ordinary fascia brackets

The ducting listed below is for use with axial flow fans.

Size 1 fans require 175mm diameter ducting.

Sizes 2 and 3 fans require 225mm diameter ducting.



FXJ-800

PIPES, straight, asbestolite, with socket. In lengths of 1830mm. The diameter given below is internal.

FXJ-800-010C	Pipe, 175mm dia.	**£28·06**
FXJ-800-050N	Pipe, 225mm dia.	**£34·98**



FXJ-810

BENDS, 90°, asbestolite, with socket. The internal diameter of pipes for which the bends are suitable for is given below.

FXJ-810-010S	Bend, 175mm dia.	**£12·51**
FXJ-810-050G	Bend, 225mm dia.	**£20·99**

COWLS, anti-pocket, asbestolite, with deflector cap and socket. The internal diameter of pipe for which the bends are suitable for is given below.

FXJ-850-010N	Cowl, 175mm dia.	**£41·85**
FXJ-850-050B	Cowl, 225mm dia.	**£52·47**



FXJ-850

CEMENT, for jointing asbestolite piping and bench tops. Supplied with a separate tin of solvent solution, and directions for use. Content 2kg.

FXJ-870-C	Cement	**£10·64**

LABORATORY STOOLS AND CHAIRS

All dimensions are nominal



FXS-300



FXS-330

STOOLS, beech frame with hardwood seat, polished to match light oak.

FXS-300-010V	Stool, 600mm height	**£8·04**
FXS-300-050J	Stool, 680mm height	**£8·44**

STOOLS, beech frame with padded seat covered with green 'Vynide'. Frame polished to match light oak.

FXS-330-010A	Stool, 600mm height	**£11·57**
FXS-330-050L	Stool, 680mm height	**£11·80**

STOOLS, tubular steel, with 330mm diameter seat upholstered and covered with green 'Vynide'. Grey stove enamelled finish.

FXS-360-010C	Stool, 600mm height	**£15·10**
FXS-360-050N	Stool, 680mm height	**£15·10**

CHAIRS, tubular steel, enamelled light grey, with grey polypropylene seat and back.

FXS-400-010N	Chair, 580mm height	**£12·17**
FXS-400-050B	Chair, 660mm height	**£12·24**

CHAIRS, adjustable height, aluminium base and black stem with grey polypropylene seat and back.

FXS-430-010P	Chair, 510 to 620mm height	**£33·31**
FXS-430-050D	Chair, 620 to 730mm height	**£34·93**



FXS-360



FXS-400



FXS-430

BENCH TROUGHS AND BOTTLE RACKS



FXS-504



FXS-514

BENCH TROUGH, island type, rigid PVC. Dimensions 915mm long x 100mm wide internally; 50mm high x 100mm high at stop end. With recessed hole to accommodate but not including waste outlet.

FXS-504-H	Bench trough	**£37·51**

TROUGHS, as above, can be supplied to alternative lengths as required; also, where specified, with back skirting for wall mounting. Price on application.

WINCHESTER QUART BOTTLE RACK, rigid PVC. To fit 1000mm wide cupboard.

FXS-514-A	Bottle rack	**£50·60**

LABORATORY ACCESSORIES



FXS-580

BLACKBOARD, oak framed, with black writing surface on hardboard ground and chalk trough. 910mm wide × 610mm high.
FXS-580-V Blackboard **£20·13**

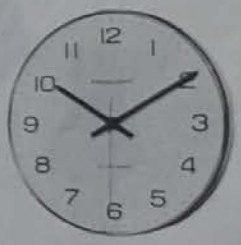
POISONS CUPBOARD, in accordance with BS 2881 for the storage of poisons and dangerous drugs. Timber construction 785mm high × 715mm wide × 280mm deep with top inclined at 30°. Exterior and interior finished white. Interior fitted with full width plastics covered shelf, two adjustable clear glass shelves and separate independently locked compartment in accordance with the Dangerous Drug Regulations. Three bayonet cap lampholders for use with 15 W bulbs are fitted to provide for internal lighting and a red glass dome in the roof acts as a warning signal. All lamps are controlled by door operated switches. A 3-pole terminal block mounted inside the cupboard and a 19mm entry hole are provided for connection to the electricity supply. **Without** 15 W bulbs.
FXS-650-L Poisons cupboard **£132·33**



FXS-650

OTHER LABORATORY ACCESSORIES

Clocks	See *TKL-210-B et seq.*
Draining racks	See *DRF-340-J et seq.*
Fire extinguisher	See *SAP-850-H*
Fire blanket	See *SAP-970-Y*
First-aid cabinet	See *SAR-280-X et seq.*
Safety screen	See *SAT-610-L*
Waste bins	See *WDS-300-010X et seq.*
Waste sack holders	See *WDS-500-010V et seq.*



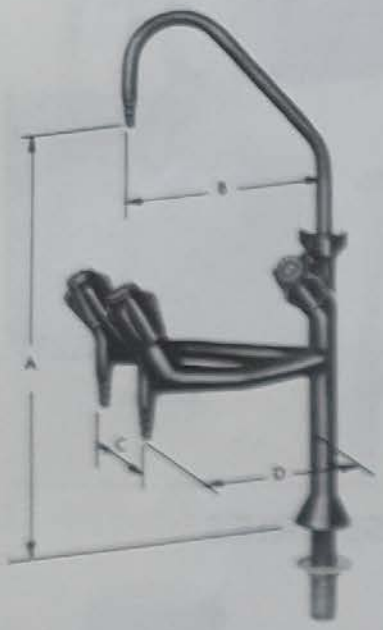




SERVICE CONTROLS FOR WATER, STEAM, GASES, COMPRESSED AIR AND VACUUM

Black plastics corrosion resistant finish. Control heads have distinctive shapes

Colour and letter-coded controls denote service



GENERAL CONSTRUCTION

This range with its attractive streamlined shape gives improved standouts and nozzle heights. Generally the fittings are manufactured from hard drawn brass tubing, brass pressings and extruded brass bar with the use of more specialised materials where advantageous.

FINISH

The fittings are protected against deterioration by the three coat 'TEKTACOTE' surface finish, which has been developed to give a complete and reliable protection under the range of working conditions normally encountered in Industrial, Educational and Medical Laboratories.

DIMENSIONS

The lettered illustrations on this page identify the dimensions in the tap specifications.

Bib taps. Standout 'D' is measured from the centre line of the nozzle to the inlet flange joint face.

Pillar standards. Standouts 'B' and 'D' are measured from the centre line of the outlet nozzle to the centre line of pillar. Dimension 'C' is measured between the nozzle outlet centres. Height 'A' is measured from the base under surface to the nozzle outlet.



CONNECTING THREADS

Inlet connecting threads are BSP parallel to BS 2779 Class B (ISO R228). Alternative threads or adapters are available. Details on application.

CONTROL HEADS

All handwheels and levers are made from high impact strength plastics and designed to shroud the valve spindles and provide easy-clean shapes. All controls are shaped according to the service and have appropriate coloured discs engraved with code letters as indicated in the panel below.

SERVICE IDENTIFICATIONS

SHAPE OF CONTROL HEAD)							
SERVICE	Cold Water	Hot Water	Steam	Vacuum	Compressed Air	Gas (mains)	Other Gases
COLOUR CODE	Azure Blue	Red	Aluminium	Lincoln Green	White	Canary Yellow	Grey
LETTER CODE	C W	H W	S	V	C A	G	
	The following do not conform to colour or letter codes, shape or finish indicated: FYK-860-H to FYK-850-S PVC Water fittings. FYL-330-J Water tap. All safety drop tail taps.						

WATER TAPS

Each tap includes an 'O' ring self-adjusting gland seal, protected non-rotating sealing washer and metering device to give flow control from about 500 ml/min to full bore flow with three turns of the handwheel.



WATER TAPS

GAS COCKS

The gas cocks incorporated in bench fittings will give long trouble-free service. The plug is spring loaded to remain in adjustment over a long period. All cocks are suitable for town (coal), natural or low pressure LPG (bottled) gases at working pressures up to 24in. (600mm) w.g.



GAS COCKS

NEEDLE VALVES

Incorporates non-rising headwork with soft seat and good control characteristics. This design ensures a long life performance and is superior to metal seat valves previously used. For use with compressed air, oxygen, nitrogen or steam.

DIAPHRAGM VALVES

Developed specially for laboratory work. When supplied for vacuum, throttles are fitted to nozzles to restrict throughput to 6 litres/min at 150 torr (25in. Hg).



GAS COCKS

SERVICE INLET DETAILS

Water fittings inlets are ¼in. BSP male thread and all other services have a ¼in. BSP male thread unless otherwise specified. Male inlets are supplied complete with flanged backnuts.

OUTLET DETAILS

Water swan-neck outlets have fixed serrated nozzles as standard.

Removable 'Y' type serrated nozzles are available to special order.

Steam and dry service outlets have fixed serrated nozzles.

INSTALLATION RECOMMENDATIONS

If a water tank is supplied, a minimum head of about 10m is required to operate water jet pumps.

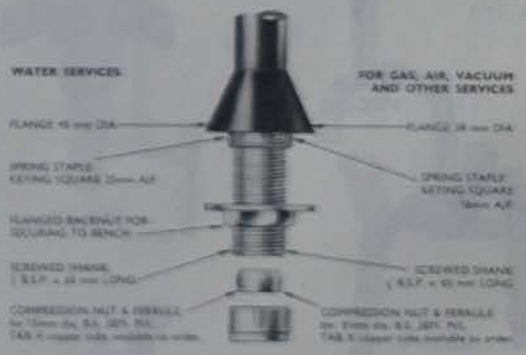
It is important to keep compressed air and other service pressures below 1 kgf/cm².

It is essential that all service piping be flushed or blown clear of solid matter before any of the bench valves are fitted.

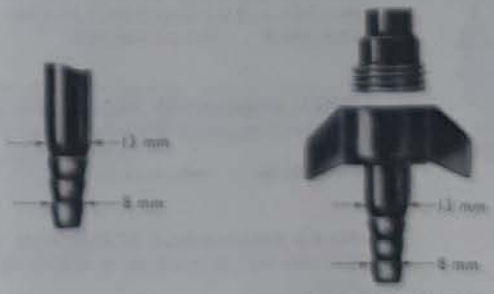
It is desirable that stop valves be fitted so that conveniently small sections of the laboratory can be isolated, both from safety and maintenance viewpoints.

Where a sink is to be used for wash-up purposes, the water supply should be by large bore individual water standards or mixer (FYK-365-V, FYK-480-G, FYK-485-W). Where front controlled valves are used on benches or in fume cupboards, single-way outlets only (FYL-650 etc.) are permissible.

We recommend that a proportion of water fittings are specified with detachable nozzles, to give long term flexibility to the laboratory.



INLET DETAILS
BENCH or VERTICAL MOUNTINGS


OUTLET NOZZLES

Gallenkamp

SERVICE CONTROLS FOR WATER, STEAM, GASES, COMPRESSED AIR AND VACUUM

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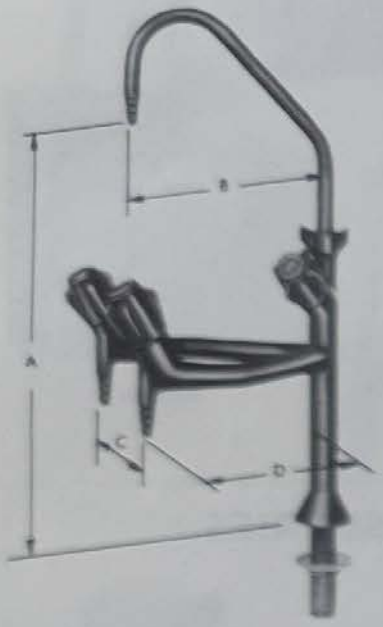

GENERAL CONSTRUCTION

This range with its attractive streamlined shape gives improved standouts and nozzle heights. Generally the fittings are manufactured from hard drawn brass tubing, brass pressings and extruded brass bar with the use of more specialised materials where advantageous.

FINISH

The fittings are protected against deterioration by the three coat 'TEKTACOTE' surface finish, which has been developed to give a complete and reliable protection under the range of working conditions normally encountered in Industrial, Educational and Medical Laboratories.

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CONNECTING THREADS

Inlet connecting threads are BSP parallel to BS 2779 Class B (ISO R228). Alternative threads or adapters are available. Details on application.

CONTROL HEADS

All handwheels and levers are made from high impact strength plastics and designed to shroud the valve spindles and provide easy-clean shapes. All controls are shaped according to the service and have appropriate coloured discs engraved with code letters as indicated in the panel below.

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SERVICE	Cold Water	Hot Water	Steam	Vacuum	Compressed Air	Gas (mains)	Other Gases
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LETTER CODE	C W	H W	S	V	C A	G	
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WATER TAPS

Each tap includes an 'O' ring self-adjusting gland seal, protected non-rotating sealing washer and metering device to give flow control from about 500 ml/min to full bore flow with three turns of the handwheel.



WATER TAPS

GAS COCKS

The gas cocks incorporated in bench fittings will give long trouble-free service. The plug is spring loaded to remain in adjustment over a long period. All cocks are suitable for town (coal), natural or low pressure LPG (bottled) gases at working pressures up to 24in. (600mm) w.g.



GAS COCKS

NEEDLE VALVES

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GAS COCKS

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Water fittings inlets are ½in. BSP male thread and all other services have a ¾in. BSP male thread unless otherwise specified. Male inlets are supplied complete with flanged backnuts.

OUTLET DETAILS

Water swan-neck outlets have fixed serrated nozzles as standard.

Removable 'Y' type serrated nozzles are available to special order.

Steam and dry service outlets have fixed serrated nozzles.

INSTALLATION RECOMMENDATIONS

If a water tank is supplied, a minimum head of about 10m is required to operate water jet pumps.

It is important to keep compressed air and other service pressures below 1 kgf/cm².

It is essential that all service piping be flushed or blown clear of solid matter before any of the bench valves are fitted.

It is desirable that stop valves be fitted so that conveniently small sections of the laboratory can be isolated, both from safety and maintenance viewpoints.

Where a sink is to be used for wash-up purposes, the water supply should be by large bore individual water standards or mixer (FYK-365-V, FYK-480-G, FYK-485-W). Where front controlled valves are used on benches or in fume cupboards, single-way outlets only (FYL-650 etc.) are permissible.

We recommend that a proportion of water fittings are specified with detachable nozzles, to give long term flexibility to the laboratory.



INLET DETAILS
BENCH or VERTICAL MOUNTINGS



OUTLET NOZZLES

WATER FITTINGS



FYK-300



FYK-305



FYK-320



FYK-325



FYK-340



FYK-360



FYK-365
FYK-370



FYK-375
FYK-380



FYK-400
FYK-405

PIPE MOUNTING

Dimension code see page 320

BIB TAP, screw down valve. Inlet ¾in. male, outlet ¾in. male complete with nozzle and wing nut for 13mm bore hose. (D=75mm.) With blue disc for cold water.

FYK-300-B Bib tap, 75mm **£8·78**

BIB TAP, screw down valve. Inlet ¾in. male. Serrated nozzle outlet. (D=45mm.) With blue disc for cold water.

FYK-305-R Bib tap, 45mm **£7·20**

DROP TAP, screw down valve. Inlet ¾in. male, outlet serrated nozzle. (D=90mm.) With blue disc for cold water.

FYK-320-K Drop tap, 90mm **£7·20**

DROP TAP, screw down valve. Inlet ¾in. male, outlet ½in. male for use with filter pump FYK-340. Complete with wing nut and nozzle. (D=100mm.) With blue disc for cold water.

FYK-325-D Drop tap, 100mm **£8·33**

Red discs for hot water *See FYK-670*

FILTER PUMP. ¾in. female wing nut connection. Fitted with non-return valve and bleed screw.

FYK-340-T Filter pump **£8·33**

BENCH MOUNTING

Dimension code see page 320

NOZZLE. ¾in. female wing nut connection. Serrated for hose.

FYK-360-F Nozzle **£1·13**

BIB TAP STANDARD. Plain anti-splash outlet, ¾in. male inlet. (A=230mm, B=150mm.) With blue disc for cold water.

FYK-365-V Bib tap standard **£16·09**

BIB TAP STANDARD. Plain anti-splash outlet, ¾in. male inlet. (A=305mm, B=150mm.) With blue disc for cold water.

FYK-370-V Bib tap standard **£16·58**

BIB TAP STANDARD. Serrated nozzle outlet, ¾in. male inlet. (A=230mm, B=150mm.) With blue disc for cold water.

FYK-375-X Bib tap standard **£15·75**

BIB TAP STANDARD. Serrated nozzle outlet, ¾in. male inlet. (A=305mm, B=150mm.) With blue disc for cold water.

FYK-380-X Bib tap standard **£16·46**

FIXED SWAN-NECK STANDARD. Serrated nozzle outlet, ¾in. male inlet. (A=230mm, B=150mm.) With blue disc for cold water.

FYK-400-G Swan-neck standard **£14·11**

FIXED SWAN-NECK STANDARD. Serrated nozzle outlet, ¾in. male inlet. (A=305mm, B=150mm.) With blue disc for cold water.

FYK-405-J Swan-neck standard **£14·90**

MOVABLE SWAN-NECK STANDARD. Serrated nozzle outlet, ½in. male inlet. (A=230mm, B=150mm.) With blue disc for cold water.
FYK-420-C Swan-neck standard **£14·60**

MOVABLE SWAN-NECK STANDARD. As FYK-420-C but A=305mm, B=150mm. With blue disc for cold water.
FYK-425-S Swan-neck standard **£15·10**

LARGE BORE, SWIVEL SWAN-NECK STANDARD. Plain anti-splash outlet, ½in. male inlet. (A=230mm, B=150mm.) With blue disc for cold water.
FYK-435-L Swan-neck standard **£18·07**

SWAN-NECK STANDARD, two movable swan-necks, serrated nozzle outlets. Inlet ½in. male. (A=305mm, B=150mm, C=150mm.) Both outlets with blue disc for cold water.
FYK-450-E Swan-neck standard **£33·41**

BIB TAP STANDARD, two bib taps, serrated nozzle outlets. Inlet ½in. male. (A=230mm, B=150mm, C=150mm.) Both outlets with blue discs for cold water.
FYK-455-U Bib tap standard **£28·09**

BIB TAP STANDARD, as FYK-455 but A=305mm. Both outlets with blue discs for cold water.
FYK-460-U Bib tap standard **£28·59**

MIXER TAP, swivel swan-neck, plain anti-splash outlet, ½in. male inlets at 180mm centres. (A=305mm, B=150mm.) **Not suitable for mains supply.** With one each red and blue discs for hot and cold water.
FYK-480-G Mixer tap **£27·23**

DIVIDED FLOW MIXER TAP, swivel swan-neck, outlet, ½in. male inlets at 180mm centres. (A=150mm, B=180mm.) With one each red and blue discs for hot and cold water.
FYK-485-W Divided flow mixer tap **£37·74**

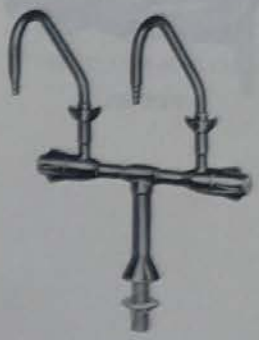
MIXER TAP, wrist action lever control, swivel swan-neck, plain anti-splash outlet, ½in. male inlets at 180mm centres. (A=305mm, B=150mm.) **Not suitable for mains supply.** With one each red and blue discs for hot and cold water.
FYK-500-Y Mixer tap **£38·36**

SWAN-NECK STANDARD, three-way, with movable swan-neck. Two side bib taps, ½in. male inlet. (A=305mm, B=150mm, C=150mm.) All outlets with blue discs for cold water.
FYK-505-B Swan-neck standard **£39·85**

SWAN-NECK STANDARD, three-way, as FYK-505-B but A=380mm.
FYK-510-B Swan-neck standard **£40·22**


FYK-420
FYK-425


FYK-435


FYK-450


FYK-455
FYK-460

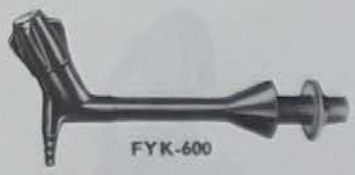

FYK-480


FYK-485


FYK-500


FYK-505
FYK-510

WATER FITTINGS



FYK-600

VERTICAL SURFACE MOUNTING

Dimension code see page 320

BIB TAP FITTING, serrated nozzle outlet, inlet ½in. male. (D=150mm.) With blue disc for cold water.

FYK-600-A Bib tap fitting **£12·87**



FYK-605

BIB TAP FITTING, two serrated nozzle outlets, inlet ½in. male. (D=150mm. C=150mm.) Both with blue discs for cold water.

FYK-605-Q Bib tap fitting **£24·38**



FYK-620

FLANGED TAP ADAPTER, to adapt pipe mounting taps ½in. male to vertical mounting. Inlet ½in. male.

FYK-620-J Flanged adapter **£5·63**

SWAN-NECK FITTING, forward fold down, with movable swan-neck, inlet ½in. male. (A=150mm, B=115mm.) Overall length 330mm. With blue disc for cold water.

FYK-630-C Swan-neck fitting **£28·46**



FYK-630

HOT WATER DISCS, red, available, free of charge, to replace the standard blue discs on water fittings FYK-300-B to FYK-630-C. Must be ordered in addition to the water fittings required and fitted by the user.

FYK-670-U Hot water discs Pack of 3 **No charge**



SINKS

Vitreous glazed fireclay and stainless steel

See page 333

RECEIVERS

Vitreous glazed fireclay and polythene

See pages 333 and 334

SINK FITTINGS

Polythene catchpot, waste outlets, drip washer, waste traps, pipe and fusion tool

See pages 333 and 334



PVC WATER FITTINGS

Dimension code see page 320

Designed for demineralised, distilled, sea and corrosive well waters, etc.

A diaphragm valve is used for control, with plastics handwheel and coded disc.



INLET CONNECTION

DETAIL OF INLET CONNECTION

PVC pillar tube runs through base with ½in. BSP connection. Metal ¾in. BSP bench fixing shank.

FIXED SWAN-NECK STANDARD, ½in. male inlet, serrated nozzle outlet. (A=305mm, B=150mm.) With blue disc for cold water.

FYK-800-H Swan-neck standard **£24·13**



FYK-800

ANGLE VALVE FITTING, ½in. male inlet, serrated nozzle outlet. (B=150mm.) With blue disc for cold water.

FYK-815-Q Angle valve fitting **£19·43**



FYK-815

SWAN-NECK OUTLET, ½in. male inlet, serrated nozzle outlet. (A=150mm, B=150mm.) For use with FYK-850-S control valve. With blue disc for cold water.

FYK-820-Q Swan-neck outlet **£17·57**

VERTICAL MOUNTING OUTLET, ½in. male inlet, serrated nozzle outlet. (B=150mm.) For use with FYK-850-S control valve. With blue disc for cold water.

FYK-830-J Vertical outlet **£15·10**



FYK-820



FYK-830

CONTROL VALVE. ½in. female connection, with extended spindle adjustable for lengths from 510mm to 760mm. For use with FYK-520 and FYK-530 outlets. With blue discs for cold water.

FYK-850-S Control valve **£28·09**



FYK-850

DEIONISERS

- Wall, bench and trolley mounted models
- Outputs up to 4000 litres/h
- Models for regeneration in situ and with expendable cartridge

See DCF-300-S to DCF-670-X

DIAPHRAGM CONTROL VALVES

For vacuum and pressure gases up to 7kgf/cm²



FYL-200



FYL-210



FYL-220



FYL-230



FYL-235



FYL-240

Colour code	Green	White	Grey
Service	Vacuum	Compressed air	Other gases

VERTICAL MOUNTING VALVE, ¼in. male inlet, serrated nozzle outlet.

FYL-200-010T	Vertical valve, green	£10·35
FYL-200-030N	Vertical valve, white	£10·35
FYL-200-050H	Vertical valve, grey	£10·35

BENCH MOUNTING VALVE, ¼in. male inlet, serrated nozzle outlet.

FYL-210-010M	Bench valve, green	£10·13
FYL-210-030G	Bench valve, white	£10·13
FYL-210-050A	Bench valve, grey	£10·13

ANGLE VALVE, pipe mounting, ¼in. male inlet, serrated nozzle outlet.

FYL-220-010F	Angle valve, green	£8·33
FYL-220-030W	Angle valve, white	£8·33
FYL-220-050Q	Angle valve, grey	£8·33

TWO-WAY BENCH MOUNTING VALVE, ¼in. male inlet, serrated nozzle outlets 180° apart.

FYL-230-010V	Two-way bench valve, green	£17·82
FYL-230-030P	Two-way bench valve, white	£17·82
FYL-230-050J	Two-way bench valve, grey	£17·82

TWO-WAY BENCH MOUNTING VALVE, ¼in. male inlet, serrated nozzle outlets 90° apart.

FYL-235-010X	Two-way bench valve, green	£17·82
FYL-235-030Y	Two-way bench valve, white	£17·82
FYL-235-050C	Two-way bench valve, grey	£17·82

TWO-WAY VERTICAL MOUNTING VALVE, ¼in. male inlet, serrated nozzle outlets 90° apart.

FYL-240-010X	Two-way vertical valve, green	£18·93
FYL-240-030Y	Two-way vertical valve, white	£18·93
FYL-240-050C	Two-way vertical valve, grey	£18·93

COMPRESSED AIR AND STEAM NEEDLE VALVES



FYL-300



FYL-310

COMPRESSED AIR IN-LINE VALVE, inlet ¼in. male, outlet serrated nozzle. Pipe mounting.

FYL-300-3X	Compressed air valve	£8·33

COMPRESSED AIR VALVE, inlet ¼in. male, outlet serrated nozzle. Pipe mounting.

FYL-310-4H	Compressed air valve	£10·80

COMPRESSED AIR VALVE, inlet ¼in. male, outlet serrated nozzle. Vertical surface mounting.
FYL-330-Q Compressed air valve £10·35

COMPRESSED AIR VALVE, two-way, inlet ¼in. male, outlets serrated nozzles set 180° apart. Bench mounting.
FYL-340-J Compressed air valve £19·43

STEAM VALVE, swan-neck standard, inlet ¼in. male, outlet serrated nozzle. (A=100mm, B=115mm.) Bench mounting.
FYL-350-C Steam valve £15·10

Dimension code see page 320.


FYL-330 FYL-340

FYL-350

FRONT CONTROLLED SERVICE FITTINGS

COMBINED HANDWHEEL AND OUTLET NOZZLE

Suitable for front panel mounting

GAS COCK, for fuel gases, inlet ¼in. female. Integral serrated nozzle mounted on 100×60mm back plate.
FYL-400-G Gas cock £11·70

VACUUM DIAPHRAGM VALVE, inlet ¼in. female. Integral serrated nozzle mounted on 100×60mm back plate.
FYL-410-W Diaphragm valve £15·10

COMPRESSED AIR NEEDLE VALVE, inlet ¼in. female. Integral serrated nozzle mounted on 100×60mm back plate.
FYL-415-P Needle valve £15·96


FYL-400


FYL-415
FYL-410 is similar

EXTENDED SPINDLE TYPE

Adjustable for lengths from 510mm to 760mm. Cocks and valves complete with black bench bearing bush, handwheel and coloured service insert.

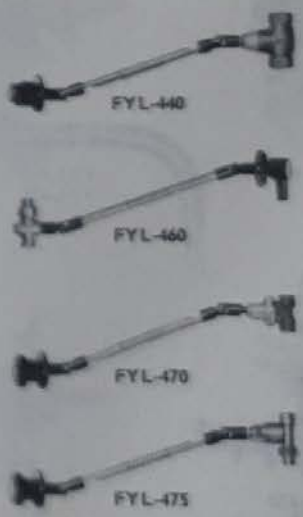
WATER TAP, inlet and outlet ¼in. female.
FYL-440-B Water tap £9·23

STEAM VALVE, inlet and outlet ¼in. female.
FYL-450-R Steam valve £15·10

GAS COCK, for fuel gases, inlet and outlet ¼in. female.
FYL-460-K Gas cock £8·33

VACUUM DIAPHRAGM VALVE, inlet and outlet ¼in. female.
FYL-470-D Diaphragm valve £11·25

COMPRESSED AIR NEEDLE VALVE, inlet and outlet ¼in. female.
FYL-475-T Needle valve £14·36


FYL-440
FYL-460
FYL-470
FYL-475

Gallenkamp



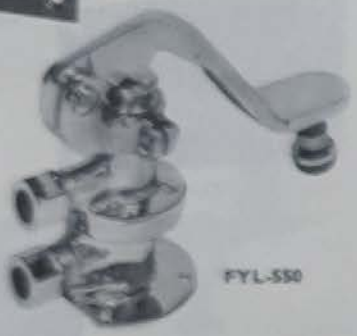
FYL-500



FYL-520
FYL-510 is similar



FYL-530



FYL-550

FRONT CONTROLLED SERVICE FITTINGS

Pipe connection type for front panel mounting

WATER FITTING, inlet ¼in. BSP male, outlet ¼in. BSP female, mounted on 100 x 60mm back plate. With blue disc for cold water.
FYL-500-V Water fitting **£11·70**

HOT WATER DISCS, red, to replace standard blue discs on water fittings. *See FYK-670-U*

STEAM VALVE, inlet and outlet ¼in. female, mounted on 100 x 60mm back plate.
FYL-510-X Steam valve **£14·60**

COMPRESSED AIR NEEDLE VALVE, fittings as FYL-510-X.
FYL-520-H Needle valve **£14·60**

GAS COCK, for fuel gases, inlet and outlet ¼in. female, mounted on 100 x 60mm back plate.
FYL-530-A Gas cock **£12·49**

VACUUM DIAPHRAGM VALVE, inlet and outlet ¼in. female, mounted on 100 x 60mm back plate.
FYL-540-Q Diaphragm valve **£13·61**

WATER FITTING, cold or hot, foot pedal operated. Self closing non-concussive valve. Flange drilled for floor or panel fixing. Inlet and outlet at back of valve has unions for ½in. copper tube. Chromium plated finish.
FYL-550-J Water fitting **£29·40**

NOZZLES FOR FRONT CONTROLLED SERVICE FITTINGS



FYL-600



FYL-610
FYL-620



FYL-630

Colour code	Blue	Red	Aluminium	Yellow
Service	Cold water	Hot water	Steam	Gas (mains)

SWAN-NECK, bench mounting, inlet ¼in. male, for use with *front control* water fittings. Inlet ¼in. male for steam fittings.
FYL-600-010K Swan-neck, blue **£8·55**
FYL-600-030E Swan-neck, red **£8·55**
FYL-600-050V Swan-neck, aluminium **£8·55**

SWAN-NECK, vertical mounting, inlet ¼in. male, for use with *front control* water fittings. Inlet ¼in. male for steam fittings. Standout 60mm.
FYL-610-010D Swan-neck, blue **£11·03**
FYL-610-030U Swan-neck, red **£11·03**
FYL-610-050X Swan-neck, aluminium **£11·03**

SWAN-NECK, vertical mounting, as FYL-610 but having 115mm standout.
FYL-620-010T Swan-neck, blue **£8·55**
FYL-620-030N Swan-neck, red **£8·55**
FYL-620-050H Swan-neck, aluminium **£8·55**

SWAN-NECK, vertical mounting, fold down movable swan-neck. Inlet ¼in. male.
FYL-630-010M Swan-neck, blue **£23·02**
FYL-630-030G Swan-neck, red **£23·02**
FYL-630-050A Swan-neck, aluminium **£23·02**

NOZZLE, bench mounting, inlet ¼in. male for use with front control gas, air and vacuum fittings.

FYL-650-010V	Nozzle, green	£4·61
FYL-650-030P	Nozzle, white	£4·61
FYL-650-050J	Nozzle, grey	£4·61
FYL-650-070D	Nozzle, yellow	£4·61


FYL-650

NOZZLE, vertical mounting, inlet ¼in. male, for use with front control gas, air and vacuum fittings.

FYL-670-010H	Nozzle, green	£3·83
FYL-670-030B	Nozzle, white	£3·83
FYL-670-050S	Nozzle, grey	£3·83
FYL-670-070M	Nozzle, yellow	£3·83


FYL-670

FUEL GAS FITTINGS


FYL-730


FYL-735


FYL-740

LEVER HANDLE COCK, pipe mounting, male.

FYL-730-010E	Cock, lever, ⅛in. thread	£2·03
FYL-730-030V	Cock, lever, ¼in. thread	£2·08


FYL-755

VERTICAL MOUNTING COCK, single-way. Inlet ¼in. male. Serrated nozzle outlet.

FYL-735-A	Cock, vertical	£5·29


FYL-750

VERTICAL MOUNTING COCK, two-way. Inlet ¼in. male. Serrated nozzle outlets 90° apart.

FYL-740-A	Cock, vertical, two-way	£8·10

TWO-WAY LEVER HANDLE COCK, pipe mounting. Inlet ¼in. male. Serrated nozzle outlets 90° apart.

FYL-750-Q	Cock, lever handle	£6·41


FYL-770

SINGLE BENCH COCK. Inlet ¼in. male. Serrated nozzle outlet. Colour-code base flange.

FYL-755-J	Cock, bench, single	£5·40


FYL-765

TWO-WAY BENCH COCK. Inlet ¼in. male. Serrated nozzle outlets 90° apart. Colour-code base flange.

FYL-765-C	Cock, bench, two-way	£7·20

TWO-WAY BENCH COCK. As FYL-765 but nozzles 180° apart.

FYL-770-C	Cock, bench, two-way	£7·20


FYL-790

THREE-WAY BENCH COCK. Inlet ¼in. male. Serrated nozzle outlets 90° apart. Colour-code base flange.

FYL-780-S	Cock, bench, three-way	£9·23


FYL-780

FOUR-WAY BENCH COCK. Inlet ¼in. male. Serrated nozzle outlets 90° apart. Colour-code base flange.

FYL-790-L	Cock, bench, four-way	£11·48

Gallenkamp

GAS FITTINGS

SAFETY DROP LEVER TAPS



FYL-850



FYL-855

GAS COCK, bench mounting, single-way, drop lever, screwed ¼in. male.
FYL-850-Y Gas cock **£6·53**

GAS COCK, bench mounting, two-way, 90° drop lever, screwed ¼in. male.
FYL-855-B Gas cock **£9·45**

GAS COCK, bench mounting, as FYL-855 but three-way, cocks 90° apart. Screwed ¼in. male.
FYL-860-B Gas cock **£12·15**

GAS COCK, bench mounting, as FYL-855 but four-way, cocks 90° apart. Screwed ¼in. male.
FYL-865-R Gas cock **£16·09**

ELECTRICAL FITTINGS

MOUNTING BOXES

For 3-pin flush mounting socket outlets to BS 1363 and BS 546.



FYL-900



FYL-900 with socket



FYL-925

MOUNTING BOX, single sided, one-gang, for mounting on a wall bench at the junction of wall and bench top. Accepts but **does not include** a flush mounting, one-gang, 3-pin socket outlet.
FYL-900-M Mounting box **£2·25**

MOUNTING BOX, single sided, two-gang, for mounting on a wall bench at the junction of wall and bench top. Accepts but **does not include** a flush mounting, two-gang, 3-pin socket outlet.
FYL-905-F Mounting box **£3·66**

MOUNTING BOX, double sided, one-gang, for mounting on centre line of island benches. Accepts but **does not include** two flush mounting, one-gang, 3-pin socket outlets.
FYL-920-V Mounting box **£3·66**

MOUNTING BOX, double sided, two-gang, for mounting on centre line of island benches. Accepts but **does not include** two flush mounting, two-gang, 3-pin socket outlets.
FYL-925-X Mounting box **£5·74**

Overall dimensions, nominal

	H	W	D
FYL-900	115	115	90 mm
FYL-905	115	210	90 mm
FYL-920	115	115	180 mm
FYL-925	115	210	180 mm



Melamine plastics finish fume cupboards fitted with by-pass. Illustration by courtesy of J. Sainsbury Ltd, London SE1



Custom built electrophoresis cabinets. Illustration by courtesy of the Biochemistry Dept., Imperial College, London SW7

SINKS



FYS-300

SINKS, white vitreous glazed fireclay, with ½in. rim projection all round, and 3in. flanged outlet with combined open weir overflow in centre at one end. White inside and out. Dimensions given are overall length × width × depth. Length × width are measured under the rim.

FYS-300-030E	Sink, 205 × 150 × 150mm	**£13·42**
FYS-300-070P	Sink, 305 × 255 × 150mm	**£13·42**
FYS-300-110G	Sink, 405 × 280 × 150mm	**£14·76**
FYS-300-130A	Sink, 430 × 330 × 150mm	**£14·76**
FYS-300-170L	Sink, 585 × 355 × 205mm	**£22·13**

Sink FYS-300-170L should be supported on wood bearers or stools. Full details and prices on application.

ACCESSORIES

	Straps, metal, to support sinks up to size 430 × 330 × 150mm. Dimension given is length of sink to be supported.	
FYS-310-030U	Straps, 205mm	Pair **£2·67**
FYS-310-070Y	Straps, 305mm	Pair **£2·67**
FYS-310-110W	Straps, 405mm	Pair **£2·67**
FYS-310-130Q	Straps, 430mm	Pair **£2·67**



FYS-340

SINKS, white vitreous glazed fireclay, with 3½in. chamfered outlet and combined open weir overflow in centre at one end. White inside and out. Dimensions given are overall length × width × depth.

FYS-340-030W	Sink, 455 × 380 × 205mm	**£15·84**
FYS-340-070K	Sink, 610 × 405 × 205mm	**£19·60**
FYS-340-150M	Sink, 610 × 455 × 255mm	**£21·29**
FYS-340-190A	Sink, 760 × 455 × 255mm	**£36·41**

STAINLESS STEEL SINKS



FYS-390

SINK BOWLS, seamless, pressed from 20 gauge FMB material. Internal corners radiused. Top edges have a 25mm wide flat flange all round. Satin polished finish inside and on face of flanges. All bowls have waste sinkage at the back centre, except size 230 × 355 × 180mm where it is centrally placed. Complete with 1½in. stainless steel outlet, plug, chain, and integral overflow, except for size 230 × 355 × 180mm which has a 1½in. stainless steel waste plug and chain only.

Length, mm	230	430	510	535	
Width, mm	355	355	355	380	
Depth, mm	180	180	180	205	
FYS-390-010Q	Sink bowl, 230mm				**£64·70**
FYS-390-050E	Sink bowl, 430mm				**£77·76**
FYS-390-070V	Sink bowl, 510mm				**£82·24**
FYS-390-090P	Sink bowl, 535mm				**£87·92**

Stainless steel sinks with or without draining boards can be supplied in larger sizes and in pairs for washing and rinsing. Details of sizes available and prices on application.



FYS-440

RECEIVER

RECEIVER, vitreous glazed fireclay, white inside and out. With integral fireclay outlet horn and siphon. External size 330 × 330 × 330mm.

FYS-440-A	Receiver	**£28·08**

For Recovery Trap/Receiver, Waste Outlets, etc., in polythene see page 333

SINK FITTINGS

All the polythene plumbing fittings have connections with Kauthene buttress type threads unless otherwise indicated. The standard size 1¼in. and 1½in. Kauthene thread will not match BSP screwed fittings; the appropriate Kauthene fitting must be used. Hot jointing of polythene pipe to the connectors is easily effected by use of fusion tools FYS-890-C and FYS-895-S.



FYS-600



FYS-610
FYS-620



FYS-630



FYS-640



FYS-680
FYS-690



FYS-730



FYS-740

CATCHPOT

CATCHPOT RECOVERY TRAP AND DILUTION RECEIVER, black polythene, 8 litres capacity. Two inlets and one outlet screwed 1½in. Kauthene thread; complete with blank cap on one outlet.

FYS-600-M Trap and receiver **£19·06**

LOOSE NUT SOCKET INLET, black polythene, for 1¼in. pipe connection, screwed 1½in. Kauthene thread.

FYS-610-F Socket inlet **£0·87**

LOOSE NUT SOCKET INLET, black polythene, for pipe connection, screwed 1½in. Kauthene thread.

FYS-620-V Socket inlet **£0·81**

COUPLER REDUCER, black polythene, 1¼in. thread to 1½in. plain pipe.

FYS-630-X Coupler reducer **£0·87**

ELBOW, black polythene, 90°, screwed 1¼in. Kauthene thread.

FYS-640-H Elbow **£1·24**

WASTE OUTLETS

WASTE OUTLET, black polythene, 3in. diameter flange, with stopper, strainer and shrouded backnut, also slotted for overflow. Screwed 1¼in. Kauthene thread. **Without** pipe connector. Suitable for sinks FYS-300.

FYS-680-C Waste outlet **£1·49**

WASTE OUTLET, black polythene, 3½in. diameter chamfered flange, with stopper, strainer and shrouded backnut, also slotted for overflow. Screwed 1¼in. Kauthene thread. **Without** pipe connector. Suitable for sinks FYS-340.

FYS-690-S Waste outlet **£1·73**

DRIP WASTES

DRIP WASTE, black polythene, with 3in. diameter flange; complete with strainer and backnut but **without** pipe connector. Screwed 1¼in. Kauthene thread.

FYS-730-G Drip waste **£2·17**

DRIP WASTE, black polythene, with 4in. circular flange, complete with removable anti-splash top to retain rubber or polythene tubes. Fitted large backnut but **without** pipe connector. Screwed 1¼in. Kauthene thread.

FYS-740-W Drip waste **£2·66**

SINK FITTINGS (continued)



FYS-745

DRIP WASTE, black polythene, circular with 6in. (152mm nominal) square flange. Complete with strainer and large backnut but **without** pipe connector. Screwed 1¼in. Kauthene thread.

FYS-745-P Drip waste **£8·04**

DRIP WASTE, black polythene, oval cup overall 8×4in. (204×102mm nominal). Complete with strainer and retaining clips but **without** pipe connector. Screwed 1¼in. Kauthene thread.

FYS-750-P Drip waste **£5·07**

DRIP CUP, black polythene, oval cup with rectangular flange overall 8×4in. (204×102mm nominal). Complete with strainer and retaining clips but **without** pipe connector. Screwed 1¼in. Kauthene thread.

FYS-760-Y Drip cup **£5·45**



FYS-750
FYS-760

WASTE UNITS

WASTE TRAP UNIT, black polythene, with detachable catchpot base, capacity about 500ml. Inlet loose nut coupler screwed 1¼in. Kauthene thread, outlet screwed 1¼in. Kauthene thread. Complete with socket inlet FYS-610.

FYS-800-T Waste trap unit **£4·83**

WASTE TRAP UNIT, black polythene, with detachable catchpot base, capacity about 500ml. Inlet and outlet fitted loose nut couplers, screwed 1¼in. Kauthene thread.

FYS-810-M Waste trap unit **£4·95**

WASTE TRAP UNIT, black polythene, with detachable catchpot base, capacity about 500ml. Inlet with fixed nut coupler screwed 1¼in. BSP thread, outlet coupler 1¼in. Kauthene thread.

FYS-820-F Waste trap unit **£4·58**



FYS-800

PIPE

PIPE, black polythene, normal gauge, internal diameter 1¼in.

FYS-870-Q Pipe, 1¼in Metre **£1·69**

PIPE, black polythene, as FYS-870-Q but internal diameter 1½in.

FYS-875-J Pipe, 1½in Metre **£2·35**

FUSION TOOLS

FUSION TOOL, for hot jointing of polythene pipe to couplers, 1¼in. size.

FYS-890-C Fusion tool, 1¼in **£7·92**

FUSION TOOL, as above, but 1½in. size.

FYS-895-S Fusion tool, 1½in **£8·66**

GAS ANALYSIS

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Gallenkamp ORSAT GAS ANALYSERS

BRITISH STANDARD PATTERN as described in BS 1756 Part 2

GAS ANALYSER, Orsat, *GALLENKAMP*, to BS 1756 Part 2, for the determination of CO, CO_2, and O_2 in flue gases, etc. With burette GAS-230-010T, two absorption vessels GAS-230-030N and two absorption vessels GAS-230-040K, in portable polished wood case with removable front and back. Dimensions 530 × 370 × 165mm.

GAS-210-N Gas analyser **£123-62**

SPARE PARTS for GAS-210-N only

Please note that these parts are not suitable for use with analysers GAS-280-K to GAS-330-X.

Burette, Class A, capacity 100ml, with 70ml in the bulb and 30ml in the tube which is graduated in 0·2ml.

GAS-230-010T Burette, Class A **£5-51**

GAS-230-020Q Burette jacket for burettes **£1-61**

Absorption vessel, filled with thin wall glass tubes.

GAS-230-030N Absorption vessel **£4-15**

Absorption vessel, as GAS-230-030N but for use with cuprous chloride absorbent, each glass tube containing a spiral of copper wire.

GAS-230-040K Absorption vessel **£8-19**

Stopcock manifold, with four side stopcocks, and T-bore end stopcock.

GAS-230-050H Stopcock manifold **£13-56**

GAS-230-060E Levelling bottle **£2-27**

Bellows *See 808-340-P*



GAS-210

Gallenkamp ORSAT GAS ANALYSERS

GENERAL PURPOSE



GAS-280

GAS ANALYSER, Orsat, two-vessel, *GALLENKAMP*, for the determination of CO_2 and O_2 in flue gases, etc. With burette and two absorption vessels GAS-350-050Y, with filling tubes GAS-350-060F in portable polished wood case with removable front and back. Dimensions 580 × 280 × 165 mm.

GAS-280-K Gas analyser **£90-65**

GAS ANALYSER, Orsat, three-vessel, *GALLENKAMP*, for the determination of CO_2 and O_2 and the approximate estimation of CO in flue gases, etc. With burette, three absorption vessels GAS-350-050Y, two sets of filling tubes GAS-350-060F and one set GAS-350-070C in portable polished wood case with removable front and back. Dimensions 600 × 340 × 165 mm.

GAS-310-F Gas analyser **£95-43**

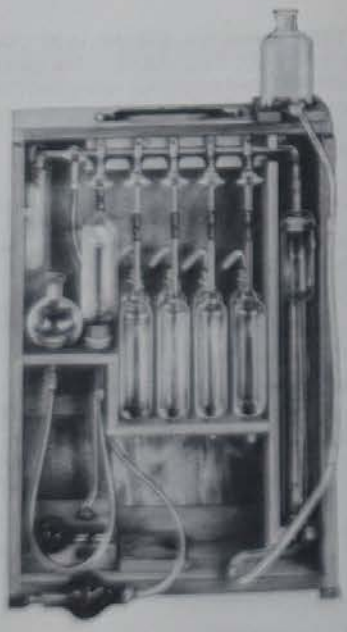
GAS ANALYSER, Orsat, four-vessel/combustion, *GALLENKAMP*, for the determination of CO, CO_2, O_2 and H_2 in flue gases, etc. With burette, four absorption vessels GAS-350-050Y, with two sets of filling tubes GAS-350-060F for CO_2 and O_2 and two sets GAS-350-070C for CO, and a Harden type slow combustion pipette GAS-350-090T for the determination of H_2, CH_4, etc., in portable polished wood case with removable front and back. With rheostat and terminals for battery connection but without battery. Dimensions 600 × 430 × 165 mm.

GAS-330-X Gas analyser **£157-07**

Battery See BMT-240-C



GAS-330



GAS-330

Gallenkamp ORSAT GAS ANALYSERS

SPARE PARTS

Burette, *TECHNICO*, with 60ml bulb and tube graduated 40 × 0·2ml.

GAS-350-010U Burette **£4·73**

Burette, as GAS-350-010U but fitted with water jacket using rubber stoppers.

GAS-350-020R Burette **£9·08**

GAS-350-030X Burette water jacket **£1·79**

Absorption vessel, **without** filling tubes.

GAS-350-050Y Absorption vessel **£4·61**

Filling tubes, thin wall glass. In pack sufficient to fill one absorption vessel.

GAS-350-060F Filling tubes Pack **£0·72**

Filling tubes, thin wall glass with internal copper spiral. For use with cuprous chloride absorbent. In pack sufficient to fill one absorption vessel.

GAS-350-070C Filling tubes Pack **£3·20**

Gas pipette. Harden slow combustion, spare for GAS-330-X only. Comprises vessel with rubber stoppers holding platinum wire element leads and glass tube for levelling bulb connection.

GAS-350-090T Gas pipette **£6·64**

GAS-350-110Q Stopcock manifold for GAS-280-K **£8·44**

GAS-350-120N Stopcock manifold for GAS-310-F **£10·74**

GAS-350-130K Stopcock manifold for GAS-330-X **£16·00**

Levelling bottle *See ASP-300*

Mercury reservoir for use with GAS-330-X *See MGH-480*

Mercury *See MGH-550-C*

Bellows *See BOR-340-P*

ACCESSORIES

Burette, 75ml bulb and tube graduated 25 × 0·2ml.

GAS-350-502W Burette **£5·76**

Burette, as GAS-350-502W but fitted with water jacket using rubber stoppers.

GAS-350-506X Burette **£10·24**

Burette, cylindrical, graduated 100 × 0·5ml over whole length.

GAS-350-514P Burette **£5·00**

Burette, as GAS-350-514P but fitted with water jacket using rubber stoppers.

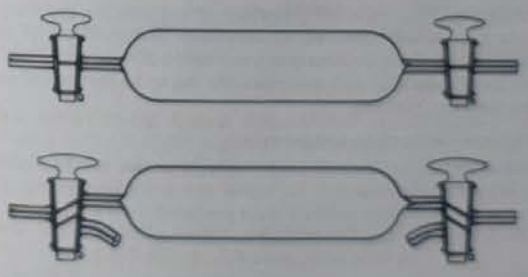
GAS-350-518H Burette **£9·34**

Burette jacket, spare *See GAS-350-030X*

Absorption vessel, Shepherd bubbler, with sintered glass distributor for rapid absorption of O_2 and CO_2. Can be used in place of normal glass tube filled absorption vessel.

GAS-350-528E Absorption vessel **£9·42**

GAS SAMPLING TUBES



Straight bore stopcock, BS 2069 Type 1

Capacity 250ml *See GFH-200-G*

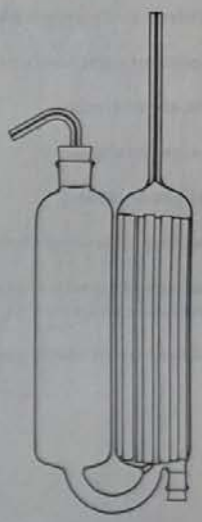
Oblique bore stopcock, BS 2069 Type 2

Capacity 250ml *See GFH-230-010F*

500ml *See GFH-230-030W*



GAS-350-010



GAS-350-050 with GAS-350-060



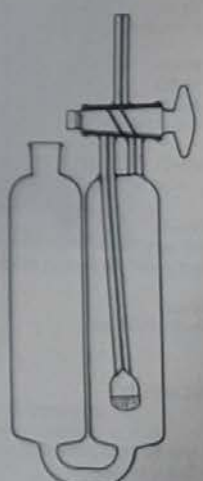
GAS-350-090



GAS-350-120



GAS-350-514



GAS-350-528

Gallenkamp

Gallenkamp LLOYD GAS ANALYSER

(Patented)

For high accuracy determinations of O_2, CO_2, CO, CH_4, H_2 and other gases such as C_2H_2

APPLICATIONS

Research and applied physiology

Respiratory gas analysis

Mine air analysis

Flue gas analysis

Fuel gas analysis

Teaching of laws of chemical combination

Analysis of standard gas mixtures for calibration of automatic analysers

Calibration of blood gas electrodes

- Rapid – complete O_2/CO_2 analysis in 6 minutes
- Suitable for BS 1756 'Sampling and analysis of flue gases'
- Accurate to 0·02% total volume
- Single stopcock operation
- Temperature and pressure compensated
- Fully portable – easily cleaned and recharged



GAS-560-A

The Lloyd Gas Analyser is at least as accurate as traditional absorption apparatus and incorporates the following improvements:

Burette. The gas burette is calibrated from 7 to 10·1 ml in 0·01 ml by ring and half-ring graduations.

Single stopcock. A complete CO_2, O_2 determination may be carried out with four movements of a single large-surface stopcock. This stopcock also permits rapid washing-in of successive samples for analysis without spillage of mercury.

Leakage. The whole main working assembly is composed of a single blown glass structure without joints.

Temperature and pressure compensation. The main glass part is totally immersed in a single water-jacket to keep it at a uniform temperature. A fixed mass of air is enclosed above the reagents in the reservoirs, and all readings are made with this mass of gas at constant volume. Corrections for sudden or long-term changes in ambient temperature and pressure are, therefore, not required.

Portable design. Even when charged with reagents, the analyser is convenient and safe to carry or transport.

Rapid analyses. As a result of the proximity of the reservoirs to the burette, dead space is reduced to a minimum and absorption is rapid and efficient.

Cleaning. In the event of a manipulative error, washing out of displaced reagents and, if necessary, cleaning and refilling are simple and rapid.

Levelling. This is a major drawback of the Haldane gas analysis apparatus, which involved simultaneous manipulation of two reservoirs, and the simultaneous observation of two meniscuses. In the Lloyd apparatus only one reservoir has to be moved and only one meniscus watched.

High concentration components:

The Lloyd Gas Analyser directly measures sample components up to 30% of total gas volume. For higher concentrations, gas samples may easily be diluted with inert gas prepared from air.

REFERENCES

(1) Haldane, J. S. and Graham, J. I. (1935). *Methods of air analysis* 4th ed. London: Griffin.
(2) Lloyd, B. B. (1958). 'Development of Haldane's Gas Analysis Apparatus'. *J. Physiol.*, 143, 5-6 p.
(3) Lloyd, B. B. (1960). British Patent Specification No. 844905 'Gas Analysis Apparatus'.
(4) Hill, D. W. (1963). *Bull. Inst. Phys.*, 14, 2.
(5) Dorrin and Passmore. *Energy, Work and Leisure*, pp. 19-20. (1967). Pub. Heinemann, London.
(6) Cormack, R. S. (1972). 'Eliminating two sources of error in the Lloyd-Haldane Apparatus'. *Resp. Physiol.*, 14, 382.

Gallenkamp LLOYD GAS ANALYSER

(continued)

ACCESSORY PIPETTES

The Lloyd Gas Analyser is supplied either with or without accessory pipettes, depending upon whether or not combustible or other gases are to be analysed in addition to oxygen and carbon dioxide. All pipettes are supplied with interchangeable ground sockets to fit the cones on the outlet tube of the main burette assembly.

The single and double absorption pipettes GAS-610-050M and GAS-610-060J are for analyses in which absorbents in addition to KOH and pyrogallol are required for component gases such as carbon monoxide and unsaturated hydrocarbons.

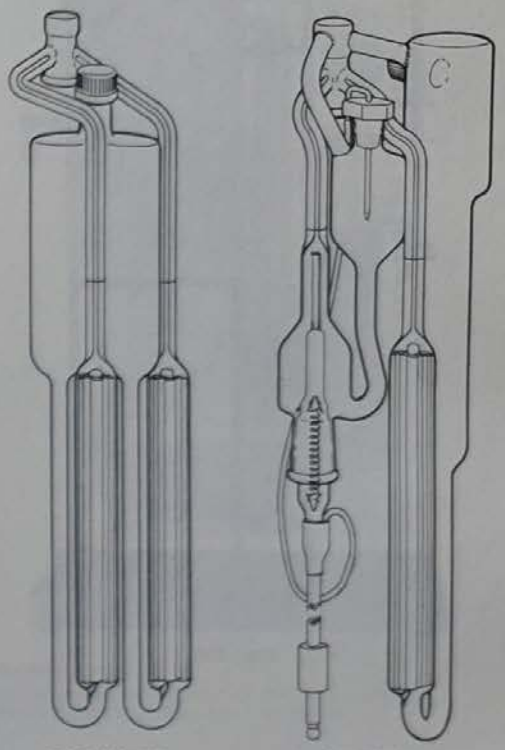
The combustion pipette GAS-610-070G is for analyses of gas mixtures containing combustible components such as CO, H_2 and CH_4. Rapid combustion is effected by the carefully constructed and positioned detachable platinum filament which is electrically heated via a mercury switch. A step-down mains transformer is built in to the control box but, in the absence of a mains supply an external battery may be used. In this case a battery of 4·5V to deliver 2A is required. Filament temperature is controlled by a built-in ammeter and rheostat, so that low and high temperature combustion components may be determined separately.

The combined combustion/absorption pipette GAS-610-090A is for analyses where some gases other than O_2 and CO_2 are to be determined by absorption and others by combustion. It is particularly applicable to estimation of unsaturated hydrocarbons in fuel gas analysis.

The analyser is contained in a case (with carrying handle) which acts as a stand in use. Also supplied are a sample transfer tube, a small tubular reservoir for the outlet, a magnifier-reader and a polythene cannula for the addition and removal of reagents.

Detailed operating procedure is carefully explained in the instructions manual supplied.

GALLENKAMP hold the exclusive licence to manufacture and sell, as well as use the name Lloyd in connection with the Lloyd Gas Analyser. The apparatus is covered by the following patents: Great Britain 844905, U.S.A. 2972523, Canada 629500, Japan 283681.



GAS-610-060 GAS-610-090

GAS ANALYSER, Lloyd, *GALLENKAMP*, as specified for O_2 and CO_2 determinations. Complete in carrying case, but **without** mercury or reagents. Requires approximately 350g mercury. Overall dimensions 700 × 250 × 160mm, mass 7kg.

GAS-500-T Gas analyser **£194-63**

GAS ANALYSER, Lloyd, *GALLENKAMP*, as GAS-500-T but including GAS-610-050M single absorption pipette.

GAS-520-F Gas analyser **£215-04**

GAS ANALYSER, Lloyd, *GALLENKAMP*, as GAS-500-T but including GAS-610-060J double absorption pipette.

GAS-540-X Gas analyser **£243-00**

GAS ANALYSER, Lloyd, *GALLENKAMP*, as GAS-500-T but including GAS-610-070G combustion pipette and electrical controls. Requires approximately 500g mercury.

GAS-560-A Gas analyser **£276-75**

GAS ANALYSER, Lloyd, *GALLENKAMP*, as GAS-560-A but with GAS-610-090A combined combustion/absorption pipette in place of combustion pipette.

GAS-580-J Gas analyser **£315-11**

SPARE PARTS

Burette assembly, comprising a borosilicate glass burette with five-way stopcock and absorption vessels in one unit, assembled complete with rubber stopper in water jacket.

GAS-610-030S Burette assembly **£65-48**

GAS-610-050M Absorption pipette, single **£22-87**

GAS-610-060J Absorption pipette, double **£51-69**

Combustion pipette, with filament assembly GAS-610-110U.

GAS-610-070G Combustion pipette **£24-58**

Combustion/absorption pipette, with ground socket and filament assembly GAS-610-110U.

GAS-610-090A Pipette **£64-89**

Filament assembly, with ground cone mounting, for GAS-610-070G or GAS-610-090A (also GAS-560-A and GAS-580-J).

GAS-610-110U Filament assembly **£8-63**

Magnifier *See MAH-200-M*

ACCESSORIES

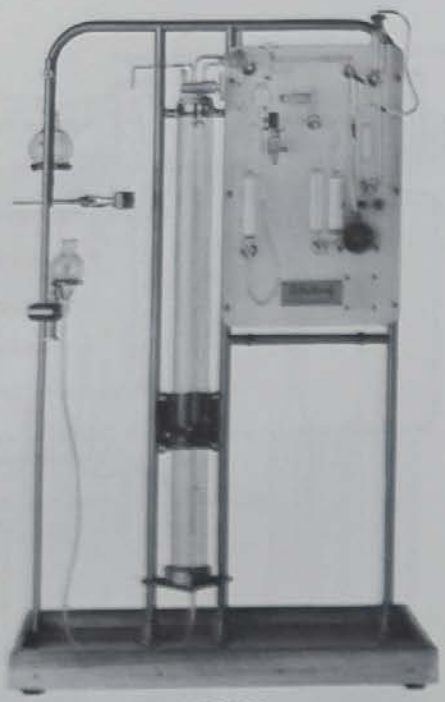
Gas sampling tubes *See GFH-230*

Rubber grease, Apiezon grease } alternative lubricants for five-way stopcock *See LUB-420-S and LUB-540-T*

Mercury, triple distilled *See MGH-550-C*

Syringe, all glass, 20ml, for introducing reagents into analyser *See SZR-260-110W*

Gallenkamp HALDANE GAS ANALYSERS



GAS-730

GAS ANALYSER, Haldane, *GALLENKAMP*, **laboratory model,** to BS 1756 Part 3, for the determination of O_2, CO_2, CO, H_2, and CH_4. All glass parts are retained by metal clips on a white plastics panel mounted on a tubular steel framework which is supported by a mercury tray. A control rheostat and mains transformer are also mounted on the panel. The burette jacket is fitted with a movable illuminated screen and reader. Screw operated adjustment to 0·05mm is provided for the reservoirs which control the levels in the burette and potash pipette. Requires approx. 1·3kg mercury excluding sampling tube assembly.

Complete with a copy of British Standard 1756 Part 3 which describes the use of the analyser but **without** mercury or reagents. For 200–250V 50Hz single phase supplies.

GAS-730-F Gas analyser **£492·75**

SPARE PARTS

Burette, Class A, graduated 15 to 21ml in 0·01ml with 2·5ml mark on the bulb.

GAS-750-010L Burette **£47·36**

GAS-750-030F Compensating bulb, capacity 20ml **£3·41**

GAS-750-040C Water jacket, for burette GAS-750-010L **£5·63**

GAS-750-050W Mercury reservoir, 100ml **£0·89**

Absorption vessel, for absorbing CO_2 in KOH, packed with glass tubes.

GAS-750-070Q Absorption vessel **£7·83**

Absorption vessel, for absorbing O_2 in pyrogallol, packed with glass tubes.

GAS-750-080N Absorption vessel **£11·52**

Combustion pipette, with Pt element for combustion of H_2 and CH_4.

GAS-750-090K Combustion pipette **£21·44**

GAS-750-110H Potash reservoir **£1·82**

GAS-750-120E Connecting piece with stopcock **£4·82**

Connecting piece, between burette, absorption vessels and combination pipette, with two oblique bore stopcocks.

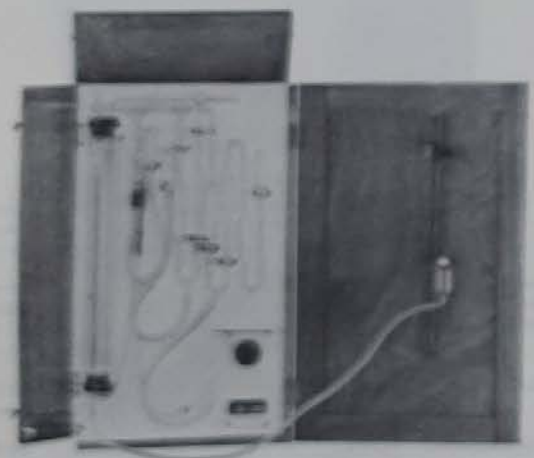
GAS-750-130B Connecting piece **£8·49**

Mercury reservoir *See MGH-480*

ACCESSORIES

Gas sampling tubes *See GFH-230*

Mercury, triple distilled *See MGH-550-C*



GAS-790

GAS ANALYSER, Haldane, *GALLENKAMP*, **portable model,** comprising 10ml burette with 3ml in graduated portion, and compensating vessel in water jacket, with combustion vessel, two absorption vessels, three mercury reservoirs and a guard tube. Requires approx. 1kg mercury. With rheostat and filling tubes, in portable wood case, dimensions 560 × 380 × 90mm. **Without** mercury, reagents or battery.

GAS-790-J Gas analyser **£218·03**

ACCESSORY

Battery *See CKL-720-110N*

Gallenkamp – C.E.R.L. SULPHUR OXIDES ANALYSER

TO BS 1756 Part 4

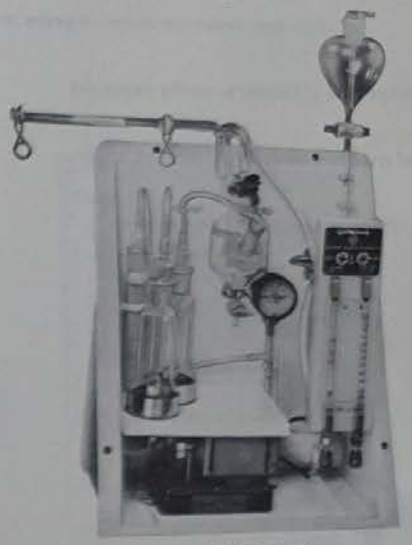
For determinations of sulphur dioxide and sulphur trioxide in flue gases

Developed in collaboration with the Central Electricity Research Laboratories, Leatherhead, Surrey.

METHOD

Flue gas is aspirated through the apparatus by means of a diaphragm pump which is fitted with a vacuum gauge and a rheostat in the motor circuit to control the pump speed. The rate of flow of gas is controlled by a needle valve and is measured by a flowmeter calibrated 0·5 to 1·3 litres/min.

The gas is sampled through a stainless steel probe which may be heated by accessory heating tapes. After passing through a filter to remove dust, the gas is mixed with a stream of isopropanol which is controlled by a needle valve and is measured by a flowmeter. The combined flow then proceeds to a filter which separates off the isopropanol and sulphur trioxide for titration at the end of the sampling period. The remaining gas passes into an iodine solution for colorimetric estimation of sulphur dioxide. The final gas is washed and passed through a Soxazorb absorber before being pumped out of the apparatus.



GAS-850-G

SULPHUR OXIDES APPARATUS, *GALLENKAMP–C.E.R.L.*, with pump, rheostat, needle valves, pressure gauge, thermometer, all glass parts and flowmeters mounted on illuminated panel. Contained in glass fibre carrying case. With 1·5m stainless steel probe and one charge of *SOXAZORB*. **Without** heating tape, reagents or titration equipment. For 220–240V a.c. single phase supplies.

GAS-850-G Sulphur oxides apparatus **£401·96**

SPARE PARTS

Soxazorb, to absorb sulphur dioxide. Made to C.E.R.L. specification.

GAS-870-030G Soxazorb Pack of 1 kg **£10·40**

Quartz wool See *FDK-960-E*

Thermometer, water jacket, scale span 10 to 40°C See *THR-930-T*

ACCESSORIES

Heating tape, 1·25m long, 13mm wide. Three required for 1·5m probe See *HEF-410-030Q*

Bottle, polypropylene, for receiving isopropanol from absorber for titration See *BTK-390*

Asbestos tape, 25 x 1·5mm See *ASB-530-T*

References

Fielder, Jackson and Raask, *J. Inst. Fuel*, 1960, 33, No. 229, 85.
Fielder and Morgan, *Anal. Chim. Acta.*, 1960, 23, 538.

SULPHUR CONTENT

of steels, coal and petroleum products

High temperature combustion can be carried out using:

Horizontal tube furnace, *GALLENKAMP*, **maximum temperature 1400°C.**

See *FTH-500*

SULPHUR DIOXIDE ELECTRODE

For determination of dissolved sulphur dioxide, sulphite and bisulphite in aqueous solutions

Applications include determinations of dissolved sulphur dioxide in food, beverages and effluents

See *PHR-560-J*



Suitable pH meter for use with sulphur dioxide electrode

See *PHK-550*

Gallenkamp VAN SLYKE APPARATUS

MANOMETRIC APPARATUS WITH MAGNETIC AGITATION

For the determination of gases in blood, plasma and urine, and other applications

- **Interchangeable glassware, easily replaced**
- **Optional macro and micro reaction pipettes**
- **Built-in illuminator, timer and buzzer**

The original apparatus was devised by Dr. Donald D. Van Slyke and is fully described, together with detailed methods of use, in *Quantitative Clinical Chemistry*, Vol. 2 by Peters and Van Slyke. The GALLENKAMP apparatus incorporates magnetic agitation and many other carefully tested refinements.



GAV-350

DESCRIPTION

The apparatus stands on a mercury tray fitted with a drain plug. All glassware mounting clamps are adjustable and quickly removed for dismantling and cleaning the glassware. A lamp is fitted behind the reaction pipette for improved observation.

A motor driven magnet rotates a follower in the reaction pipette. The motor speed and position are adjustable to give optimum stirring conditions so that complete reaction normally occurs within 3 minutes.

The stout glass manifold, which connects with both manometer and reaction pipette by interchangeable spherical joints, has side tubes shaped to prevent gas bubbles being trapped at the bends. Large surface stopcocks provide good mercury control without the need for frequent regreasing.

The apparatus is fitted with a clockwork driven time switch, range up to 8 minutes, and a warning buzzer which sounds at the end of the timed period.

REACTION PIPETTES

The standard reaction pipette is graduated at 50, 2 and 0·5 ml. It is mounted in a water jacket fitted with a thermometer. The funnel is graduated to 10 ml with 1 ml subdivisions.

The Rappaport pipette for determinations of CO_2 in 0·1 ml blood samples, is interchangeable with the standard pipette. It is useful where normal quantities of sample are unobtainable (for example in paediatric cases) and comprises a reaction vessel with a 7 ml bulb containing a magnetic follower and a stem with a capacity of 0·4 ml, subdivided in 0·01 ml. It is mounted in a water jacket fitted with a thermometer. The funnel is calibrated to 1·5 ml in 0·1 ml.

References

Rappaport, Eichorn and Nutman, *J. Clin. Path.*, **9**, 1956, 166; *Clin. Chim. Acta*, 1, 1956, 305.

VAN SLYKE MANOMETRIC APPARATUS, *GALLENKAMP*, as specified, fitted with standard reaction pipette assembly GAV-390-L. Requires but **does not include** 3kg mercury. For single phase a.c. supplies.

GAV-350-010N Van Slyke apparatus, 200–250V 50Hz **£311·63**
GAV-350-030H Van Slyke apparatus, 110–120V 60Hz **£334·13**

VAN SLYKE MANOMETRIC APPARATUS, *GALLENKAMP*, as GAV-350 but fitted with Rappaport micro reaction pipette assembly. For single phase a.c. supplies.

GAV-370-010W Van Slyke apparatus, 200–250V 50Hz **£311·91**
GAV-370-030Q Van Slyke apparatus, 110–120V 60Hz **£334·41**

Gallenkamp VAN SLYKE APPARATUS

CONVERSION ACCESSORIES

STANDARD REACTION PIPETTE ASSEMBLY, to convert GAV-370 into GAV-350, comprising standard reaction pipette GAV-430-050H, water jacket, thermometer, range 10 to 40°C, THR-930-T, rubber stoppers and supporting bracket, supplied with three magnetic followers.

GAV-390-L Standard pipette assembly **£22·22**

MICRO REACTION PIPETTE ASSEMBLY, Rappaport, to convert GAV-350 into GAV-370, comprising Rappaport reaction pipette, water jacket, thermometer, range 10 to 40°C, rubber stoppers, supporting bracket and thermometer clip, supplied with three magnetic followers.

GAV-410-N Micropipette assembly **£22·78**

SPARE PARTS for GAV-350 and GAV-370

GAV-430-030N	Manometer tube	**£10·58**
GAV-430-040K	Manifold	**£24·95**
	Reaction pipette, standard, with 50ml bulb and 2ml stem.	
GAV-430-050H	Reaction pipette	**£16·97**
	Lamp, 15 W	*See MFB-610*
	Tubing, PVC, 6·35mm (1·25m reqd.)	*See TWR-710-W*
	Thermometer, 10 to 40°C for water jacket	*See THR-930-T*
	Mercury reservoir	*See MGH-480*

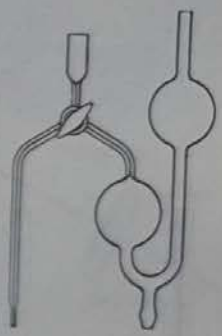
ACCESSORIES

Gas pipette, Hempel-Van Slyke, borosilicate glass, capacity 50ml, for introduction of gaseous samples into Van Slyke gas analysis apparatus.

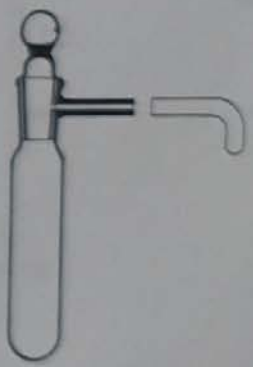
GAV-430-502V	Gas pipette	**£11·78**
	Ninhydrin reaction vessel, for the gasometric determination of free amino acids in blood filtrates by the ninhydrin – CO_2 method (Hamilton and Van Slyke, *J. Biol. Chem.*, **150**, 1943: 231). For use with GAV-350 only.	
GAV-430-508J	Reaction vessel	**£4·82**
	Mercury, triple distilled	*See MGH-550-C*
	Lubricant, suitable for stirrer motor	*See LUB-230-E*
	Washbottle, polythene	*See WBS-450*
	Lubricating grease, Apiezon-M, for stopcocks	*See LUB-540-T*
	Reader, for manometer, x 5 magnification	*See THM-890-M*



GAV-410



GAV-430-502



GAV-430-508



GAV-480

VOLUMETRIC APPARATUS

BLOOD GAS APPARATUS, VAN SLYKE, volumetric, a simple apparatus for the determination of CO_2, CO_2 and O_2 in blood or blood plasma. **Without** reagents.

GAV-480-K Blood gas apparatus **£18·68**

ACCESSORIES

Pipette, Hempel-Van Slyke, for use with GAV-480-K for the admission of gas samples to the top of the manometer bulb *See GAV-430-502V*



GAV-700



GAV-790



GAV-850-030

CARBON DIOXIDE ALKALIMETER, Schrotter, for the determination of carbon dioxide in carbonates. Comprises reaction vessel, absorption tube, tap funnel, one closed and one open stopper.

GAV-700-T Alkalimeter **£22·50**

CARBON DIOXIDE GAS BURETTE, Martin. For the estimation of carbon dioxide in worts, beers, etc. The burette permits estimation in less than 10 minutes without the need for calculations involving pressure, temperature, etc. (Reference: *Journal of the Institute of Brewing*, February 1936, p. 79.) **Without** stand or accessories.

GAV-790-C Gas burette, Martin **£14·63**

CARBON DIOXIDE INCUBATION

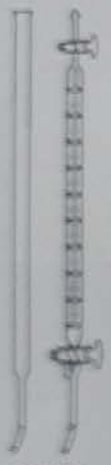
See INF-820 to INL-350

GAS MEASURING TUBE, graduated, closed one end, capacity 50ml subdivided in 0·1ml.

GAV-850-030N Gas measuring tube, 50ml **£2·19**



GAV-880



GAV-920



GAV-950

EUDIOMETER, Bunsen, capacity 50ml subdivided in 0·1ml. With electrodes sealed in at the closed end.

GAV-880-B Eudiometer **£4·19**

GAS BURETTE, Hempel, with straight bore stopcock at top and 2-way stopcock at bottom. Capacity 100ml subdivided in 0·2ml. With levelling tube but **without** rubber tubing.

GAV-920-M Gas burette, Hempel **£15·19**

GAS BURETTE, Tutweiler, for the determination of H_2S in gas samples. Upper cylinder graduated 0 to 10 × 0·1ml and main bulb has marks at 100ml and 110ml.

GAV-950-X Gas burette, Tutweiler **£15·12**

GAS COLLECTION

GAS JARS, glass, with base and ground top flange. Without cover. Dimensions given are height × internal diameter.

GFD-200-010U Gas jar, 150 × 50mm **£1·53**
GFD-200-030X Gas jar, 200 × 50mm **£1·91**
GFD-200-050Y Gas jar, 250 × 50mm **£2·30**
GFD-200-070C Gas jar, 300 × 75mm **£3·06**



GFD-200

ACCESSORIES

	Covers, glass, circular, ground one side		
	Diameter, mm	75	115
	For jar dia., mm	50	75
GFD-220-502Y	Covers, 75mm		Pack of 12 £2·32
GFD-220-512F	Covers, 115mm		Pack of 12 £2·61



GFD-270

PNEUMATIC TROUGHS, glass, circular, for collection of gases over water. Also suitable for storage of specimens. Dimensions given are diameter × height.

GFD-270-030L Trough, 200 × 100mm **£3·68**
GFD-270-050F Trough, 250 × 125mm **£5·66**
GFD-270-070W Trough, 300 × 125mm **£7·13**
GFD-270-090Q Trough, 350 × 150mm **£13·75**

BEEHIVE SHELVES, earthenware, for use with jars and troughs for gas collection.

GFD-310-030W	Beehive shelf, 75mm dia.	Pack of 6 £3·66
GFD-310-050Q	Beehive shelf, 100mm dia.	Pack of 6 £5·51

TROUGH, polythene, approximately 300 × 150 × 75mm high, with rim to facilitate lifting and pouring.

GFD-350-D	Trough, 300 × 150 × 75mm	£3·67

BOWL, polypropylene, circular, 350mm external diameter × 130mm high, with rim to facilitate lifting and pouring. (F)

GFD-410-A	Bowl, 350 × 130mm	£0·79

WOOD SPLINTS, thin, in bundles of approximately 120.

GFD-450-S	Wood splints	Pack of 5 bundles £0·87

DEFLAGRATING SPOONS, steel, with brass flange.

GFD-490-N	Deflagrating spoons	Pack of 6 £1·77

COMBUSTION SPOONS, Nuffield pattern, heavy gauge stainless steel wire, 200mm long, fitted with a cork for use in test tubes 150mm long × 25mm diameter. Stem shaped to prevent contact with test tube walls.

GFD-520-Y	Combustion spoons	Pack of 6 £2·59


GFD-520


GFD-310


GFD-350


GFD-410


GFD-450


GFD-490

SintaGlass GAS DISTRIBUTION TUBES

GAS DISTRIBUTION TUBES, *SINTAGLASS,* with domed sintered glass bulb having an effective area equivalent to a 20mm diameter flat plate to give increased absorption. Can be inserted through a 19/26 socket. Stem length 300mm.

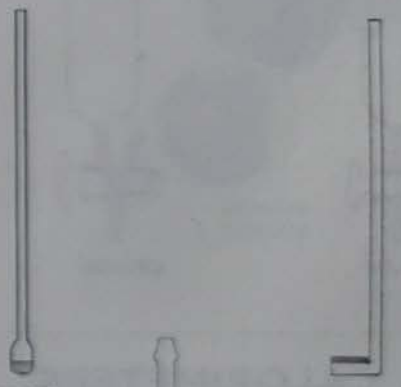
GFD-750-010X	Gas tube, porosity 0	£1·43
GFD-750-030Y	Gas tube, porosity 1	£1·43
GFD-750-050C	Gas tube, porosity 2	£1·43

GAS DISTRIBUTION TUBES, *SINTAGLASS,* with flat sintered glass plate. Stem length 150mm. Dimension given is the plate diameter.

GFD-790-010J	Gas tube, 15mm, porosity 0	£1·59
GFD-790-030D	Gas tube, 20mm, porosity 0	£1·91
GFD-790-110F	Gas tube, 15mm, porosity 1	£1·59
GFD-790-130W	Gas tube, 20mm, porosity 1	£1·91
GFD-790-210B	Gas tube, 15mm, porosity 2	£1·59
GFD-790-230S	Gas tube, 20mm, porosity 2	£1·91
GFD-790-310U	Gas tube, 20mm, porosity 3	£1·91
GFD-790-410Q	Gas tube, 20mm, porosity 4	£1·91

GAS DISTRIBUTION TUBES, *SINTAGLASS,* with sintered glass thimble, size 80 × 22mm, providing a large surface area for rapid flow rates. Suitable also for use as immersion filters for removing large volumes of supernatant liquid from solid sediment. Available with short nipple connection or long suction tube. Dimension given is the stem length.
Coarse is approximately equivalent to porosity 1.
Fine is approximately equivalent to porosity 3.

GFD-830-010U	Gas tube, 30mm, coarse	£6·72
GFD-830-050Y	Gas tube, 300mm, coarse	£6·83
GFD-830-110Q	Gas tube, 30mm, fine	£6·72
GFD-830-150E	Gas tube, 300mm, fine	£6·83


GFD-750

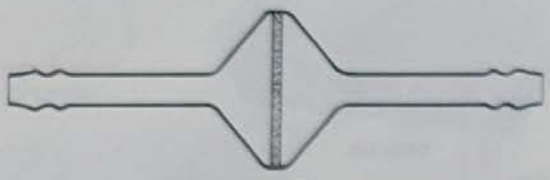
GFD-790


GFD-830-050
GFD-830-150


GFD-830-010
GFD-830-110



GFD-870
30mm plate diameter



GFD-870
65 to 120mm plate diameter

GAS FILTER TUBES, *SINTAGLASS*, with flat sintered glass plate.

Plate dia., mm	30	65	90	120
Overall length, mm	150	230	260	350

GFD-870-110L	Filter tube, 30mm, porosity 1	£2·53
GFD-870-130F	Filter tube, 65mm, porosity 1	£5·06
GFD-870-150W	Filter tube, 90mm, porosity 1	£7·84
GFD-870-170Q	Filter tube, 120mm, porosity 1	£11·89
GFD-870-210H	Filter tube, 30mm, porosity 2	£2·53
GFD-870-230B	Filter tube, 65mm, porosity 2	£5·06
GFD-870-250S	Filter tube, 90mm, porosity 2	£7·84
GFD-870-270M	Filter tube, 120mm, porosity 2	£11·89
GFD-870-310D	Filter tube, 30mm, porosity 3	£2·53
GFD-870-330U	Filter tube, 65mm, porosity 3	£5·06
GFD-870-350X	Filter tube, 90mm, porosity 3	£7·84
GFD-870-370Y	Filter tube, 120mm, porosity 3	£11·89
GFD-870-410W	Filter tube, 30mm, porosity 4	£2·53
GFD-870-430Q	Filter tube, 65mm, porosity 4	£5·06
GFD-870-450K	Filter tube, 90mm, porosity 4	£7·84
GFD-870-470E	Filter tube, 120mm, porosity 4	£11·89
GFD-870-510S	Filter tube, 65mm, porosity 5	£6·07
GFD-870-530M	Filter tube, 90mm, porosity 5	£14·54

GAS SAMPLING TUBE, borosilicate glass, BS 2069 Type 1, with two straight bore stopcocks. Capacity 250ml.

GFH-200-G	Sampling tube	£8·42



GFH-200



GFH-230

GAS SAMPLING TUBES, borosilicate glass, BS 2069 Type 2, with two double oblique bore stopcocks.

GFH-230-010F	Sampling tube, 100ml	£5·96
GFH-230-030W	Sampling tube, 250ml	£6·19

GAS SAMPLING ASPIRATOR, comprising a rubber bellows with hard plastics end covers, leather strap handles and plastics nozzle. Capacity approximately 2·8 litres.

GFH-310-X	Gas aspirator	£26·61



GFH-310

GAS CALORIMETERS

- Non-recording Boys pattern
- Alternative models for coal gas and natural gas
- Measurements in SI units or Btu/ft³

See GB-600-5 at 600



GAS CYLINDER ACCESSORIES

PRESSURE AND FLOW REGULATORS IMPORTANT NOTES

1. Pressure regulators are designed to give reasonably steady outlet pressures over a range of flowrates; flow regulators are designed to give reasonably constant flow against fluctuations in back pressure.
2. It is not good practice to include needle valves downstream of components (e.g. flowmeters and low pressure gauges) not intended for high pressure operations unless a safety valve is fitted. Otherwise, with the needle valve screwed shut, leakage past the high pressure valve could slowly cause a sufficient build up to pressure to cause the low pressure component to explode.
3. Some regulators are listed as being suitable for more than one gas. Such regulators must not be interchanged in use between cylinders containing different gases as this can lead to an explosive condition.



GGM-250

TOOL SET, comprising spanner for cylinder gland nuts and key to fit cylinder valve.

GGM-250-C Tool set **£2·87**

PRESSURE REGULATORS



GGM-300 with GGM-480-510
GGM-350 with GGM-480-510



GGM-390
GGM-410

PRESSURE REGULATOR for carbon dioxide only, threaded 0·860 × 14 TPI BSW right hand to BS 341 Part 1 Outlet 8, with 55mm diaphragm, for direct connection to cylinder. With cylinder contents gauge dual scaled 0 to 150kgf/cm² and 0 to 2300lbf/in². The outlet pressure is adjustable from 0 to 8kgf/cm² (0 to 120lbf/in²) and is indicated by the position of the adjusting screw. With safety valve in low pressure side and outlet nozzle for 6·5mm bore flexible tubing.

GGM-300-G Pressure regulator **£27·00**

PRESSURE REGULATOR, single stage, for air, nitrogen and argon, threaded ¾in. BSP right hand to BS 341 Part 1 Outlet 3. With cylinder contents gauge dual scaled 0 to 280kgf/cm² and 0 to 4000lbf/in². The outlet pressure is adjustable from 0 to 8kgf/cm² (0 to 120lbf/in²) and is indicated by the position of the adjusting screw. With outlet nozzle for 6·5mm bore flexible tubing.

GGM-350-R Pressure regulator **£14·68**

PRESSURE REGULATOR, laboratory pattern, two stage, for air, nitrogen and argon, threaded ¾in. BSP right hand to BS 341 Part 1 Outlet 3. With cylinder contents gauge dual scaled 0 to 280kgf/cm² and 0 to 4000lbf/in² and outlet pressure gauge dual scaled 0 to 0·7kgf/cm² and 0 to 10lbf/in². With fine pressure control knob, low pressure safety vent set to operate at 1·1kgf/cm², sintered metal gas filter, outlet nozzle for 6·5mm bore flexible tubing and inlet connection to cylinder which can be hand tightened **without** the use of a spanner.

GGM-390-M Pressure regulator **£63·51**

PRESSURE REGULATOR, laboratory pattern, two stage as GGM-390-M but for oxygen.

GGM-410-X Pressure regulator **£63·51**



GGM-440
GGM-460
GGM-520

PRESSURE REGULATOR, two stage, for air, nitrogen and argon, threaded ⅜in. BSP right hand to BS 341 Part 1 Outlet 3. With cylinder contents gauge dual scaled 0 to 280kgf/cm² and 0 to 4 000lbf/in² and outlet pressure gauge dual scaled 0 to 2kgf/cm² and 0 to 30lbf/in². With outlet nozzle for 6·5mm bore flexible tubing.

GGM-440-Q	Pressure regulator	**£35·57**

PRESSURE REGULATOR, two stage, as GGM-440-Q but for oxygen.

GGM-460-C	Pressure regulator	**£35·57**

ACCESSORY for GGM-300-G to GGM-460-C

Needle valve, right hand thread, for insertion between regulator and outlet nozzle for fine adjustment of gas flow.

GGM-480-510L	Needle valve	**£4·96**

PRESSURE REGULATOR, two stage, as GGM-440-Q but for hydrogen, propane and coal gas, and threaded ⅜in. BSP left hand to BS 341 Part 1 Outlet 4.

GGM-520-W	Pressure regulator	**£44·18**

ACCESSORY

Needle valve, left hand thread, for insertion between regulator and outlet nozzle for fine adjustment of gas flow.

GGM-540-510Y	Needle valve	**£4·97**



GGM-600

FLOWMETER, float and precision bore glass tube pattern, range 40 to 600ml/min calibrated for oxygen. Clip on scales are provided covering similar ranges for carbon dioxide, hydrogen and nitrogen. The glass tube is protected by a push on plastics cover. With inlet and outlet nozzles for flexible tubing from 8 to 12mm bore. Fitted with two *LABLOX* connectors for mounting on a vertical rod of 6 to 13mm diameter.

GGM-600-F	Flowmeter	**£20·87**



GGM-760

GGM-700

GAS CYLINDER TROLLEYS AND STANDS

GAS CYLINDER TROLLEYS, constructed in heavy gauge steel. With stoved enamel finish. With cylinder retaining straps and rubber tyred antistatic wheels. The dimension given is the maximum diameter of cylinder accommodated.

GGM-700-050F	Gas cylinder trolley, 146mm	**£29·03**
GGM-700-070W	Gas cylinder trolley, 230mm	**£43·54**

GAS CYLINDER STANDS, strongly constructed in nylon coated steel. The dimension given is the maximum diameter of cylinder accommodated.

GGM-760-050J	Gas cylinder stand, 146mm	**£9·07**
GGM-760-070D	Gas cylinder stand, 178mm	**£11·25**



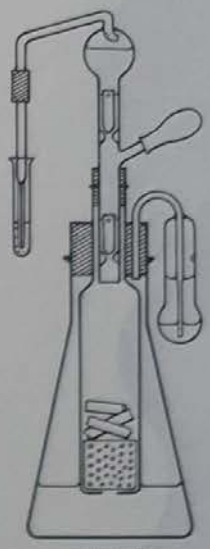
GGM-810

GAS CYLINDER SUPPORT, comprising bench clamp and heavy duty webbing strap to hold a cylinder firmly in the vertical position. Suitable for use with cylinders up to 230mm diameter.

GGM-810-F	Gas cylinder support	**£6·56**

Griffin HYDROGEN SULPHIDE GENERATOR

- **Dispenses only quantity of gas required; gas flow always under control**
- **Uses fine capillary to produce small bubbles – hence quick reaction**
- **Quick and easy rinsing of delivery tube without disconnection**
- **No sintered filters to clog**
- **No internal pressure build-up**



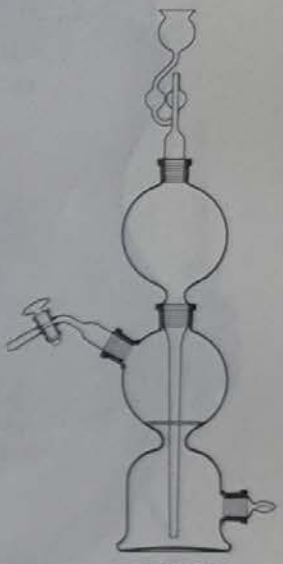
GHD-300

Comprises a 1000ml conical flask, into which is fitted a gas generating chamber and bubbler-liquid seal. In the lower end of the gas generator is a plastics sponge filter, selected for its porosity and resistance to the highly oxidising acid solution.

In the top of the generating chamber are housed two non-return valves, operating teat, splash head and gas delivery capillary tube. The pressure in the chamber never exceeds 20mm water pressure which is insufficient to operate the non-return valve. On operating the teat, about 2ml of gas is sucked from the generating chamber and delivered through the capillary delivery tube.

HYDROGEN SULPHIDE GENERATOR, *GRIFFIN*, as specified, overall height 420mm. With instructions but **without** chemical reactants.

GHD-300-Q	Gas generator	**£19·09**



GHD-350

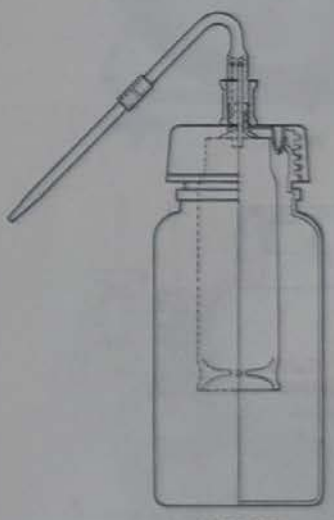
KIPP GAS GENERATOR

GAS GENERATOR, Kipp, borosilicate glass, central bulb 1000ml capacity with ground-in stopcock and rubber separator to prevent solid material falling into lower acid reservoir. Lower acid reservoir has stoppered ground tubulure and upper bulb has ground-in safety funnel. **Without** chemical reactants. (F)

GHD-350-E	Gas generator, Kipp	**£16·83**

SPARE PARTS

GHD-370-010K	Safety funnel (F)	**£2·41**
GHD-370-030E	Stopcock (F)	**£2·80**
GHD-370-050V	Rubber separators (F)	Pack of 5 **£1·24**



GHD-400

QUICKFIT GAS GENERATOR

GAS GENERATORS, *QUICKFIT* **5G,** comprising a borosilicate glass reaction chamber mounted inside a polythene bottle capacity 500ml and connected by a screw thread adapter through a valve to a glass delivery tube. **Without** chemical reactants.

GHD-400-Y	Gas generators	Pack of 2 **£10·98**

Gallenkamp

Griffin GAS GENERATOR

- **Large capacity – over 400 litres of hydrogen sulphide from one charge of acid**
- **Robust glazed stoneware construction**
- **All joints rubber sealed**



GHD-440

Based on the Kipp design, the generator comprises two parts, a waisted outer vessel which holds about 8 litres of acid and an inner reaction vessel which beds on a rubber washer. The outer vessel has a filling port closed by a loosely fitting screw stopper and a drain plug. The inner vessel has an integral perforated plate for supporting up to 3kg of solid reactant, a gas outlet with glass stopcock and a SUBA-SEAL top closure. Gas is produced at 180mm water pressure.

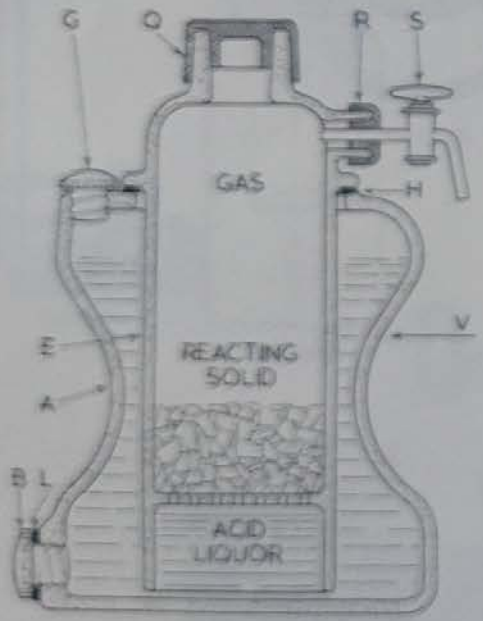
Overall dimensions 250mm diameter × 400mm high.

GAS GENERATOR, *GRIFFIN*, as specified, with instructions but **without** chemical reactants.

GHD-440-D	Gas generator	**£29·25**

SPARE PARTS (see diagram for code letters)

	Outer vessel A with filling port stopper G, drain plug stopper B and washer L.	
GHD-460-010J	Outer vessel	**£12·99**
GHD-460-030D	Drain plug washer L	**£0·12**
GHD-460-050U	Seating washer H	**£0·87**
GHD-460-070X	Top closure stopper Q	**£0·42**
GHD-460-090Y	Gas outlet stopper R	**£3·38**
GHD-460-110F	Gas outlet stopcock S	**£1·88**



GHD-440
diagram of construction

GAS LIGHTERS

GAS LIGHTER, comprising spring steel holder with easily adjusted shielded flint and striking plate. Supplied with one flint.

GHL-300-F	Gas lighter	**£0·48**

SPARE PARTS

GHL-320-010L	Flints (F)	Pack of 50 **£0·47**

GAS LIGHTER, piezo-electric, multispark type, suitable for ignition of all common fuel gases. Supplied with combined wall bracket and protector. (F)

GHL-400-U	Gas lighter	**£3·82**
	Wood splints	See GFD-450-S



GHL-300



GHL-400

GAS METERS

GAS METERS, WET TYPE

For measurement of the total gas volume used and, by timed observation, the rate of gas flow. Suitable for inlet pressures up to 400mm water gauge maximum.

GAS METER, wet type, portable, 0·5dm³, operates on the Hyde principle with a sheet metal drum and 150mm diameter dial. With three feet, two of which are adjustable, and a fitted spirit level. With indicating pointer, synchronised totaliser with maximum registration 99999·9dm³, thermometer range 0 to 50°C and nozzles for 12·5mm bore flexible tubing.

Technical data

Drum capacity	0·5dm³
Dial capacity/revolution	0·25dm³
Maximum capacity/hour for	
accuracy ±0·25%	60dm³
accuracy ±0·5%	150dm³
Overall dimensions	230 × 150 × 230mm high
Mass, empty	2kg

GJF-300-U Gas meter, wet, 0·5dm³ **£330·48**
NOTE: Not suitable for use with corrosive gases.



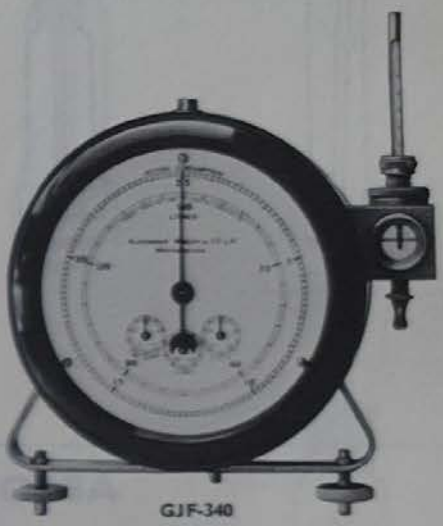
GJF-300

GAS METER, wet type, 2dm³. With sheet metal drum and 185mm diameter dial. With three levelling feet and a fitted spirit level. With indicating pointer, three cumulative index dials registering 10dm³, 100dm³ and 1m³ maximum respectively, thermometer range 0 to 50°C and nozzles for 12·5mm bore flexible tubing.

Technical data

Drum capacity	2dm³
Dial capacity/revolution	1dm³
Maximum capacity/hour for	
accuracy ±0·25%	240dm³
accuracy ±0·5%	360dm³
Overall dimensions	310 × 190 × 310mm high
Mass, empty	5kg

GJF-340-P Gas meter, wet, 2dm³ **£301·41**
NOTE: Not suitable for use with corrosive gases.



GJF-340

GAS METER, DRY TYPE

GAS METER, DRY TYPE

With a central 150mm diameter dial. For long period tests, a revolution counter reading up to 99999dm³ is fitted. Must not be used at inlet pressures of more than 250mm water gauge. With 1in. BS 746 inlet and outlet connections.

Technical data

Capacity/revolution	20dm³
Maximum capacity/hour for	
accuracy ±1%	6000dm³
Overall dimensions	280 × 220 × 200mm
Mass, net	6kg

GJF-450-A Gas meter, dry, 20dm³ **£196·99**



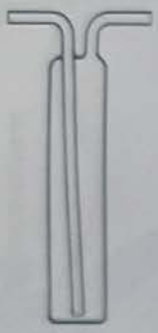
GJF-450



GJR-200



GJR-240



GJR-300



GJR-330

GAS WASHBOTTLES

BOTTLES, Woulff, glass, with two ground socket necks.

GJR-200-030X	Bottle, 250ml, 14/23	**£3·45**
GJR-200-050Y	Bottle, 500ml, 14/23	**£3·51**
GJR-200-070C	Bottle, 1000ml, 19/26	**£4·95**

BOTTLES, Woulff, glass, with three ground socket necks.

GJR-240-050D	Bottle, 500ml, 14/23	**£3·66**
GJR-240-070U	Bottle, 1000ml, 19/26	**£5·15**

GAS WASHBOTTLE, capacity 40ml, 125mm overall height × 25mm diameter.

GJR-300-P	Gas washbottle	**£1·46**

GAS WASHBOTTLES, Drechsel, BS 2461, fitted with interchangeable head by 24/29 joint.

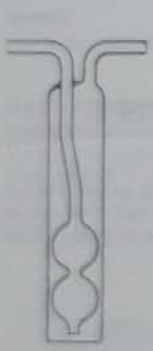
GJR-330-010X	Gas washbottle, 125ml	**£5·22**
GJR-330-030Y	Gas washbottle, 250ml	**£5·66**
GJR-330-050C	Gas washbottle, 500ml	**£6·24**

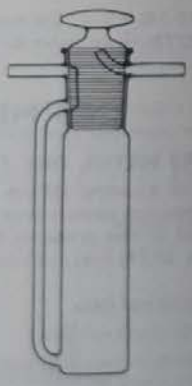
SPARE PARTS

GJR-350-010A	Bottle, 125ml	**£1·94**
GJR-350-030R	Bottle, 250ml	**£1·94**
GJR-350-050L	Bottle, 500ml	**£2·37**
	Head, with 24/29 cone. As supplied, will fit the 500ml bottle. Can be cut to length by the user to fit smaller bottles.	
GJR-350-110T	Head, 24/29 cone	**£2·53**

ABSORPTION TUBES









Straight — See ABL-730

U-form — See ABL-40

Arnold — See ABL-500-M

Midvale — See ABL-540-H

Nesbitt — See ABL-580-N

SintAGlass GAS WASHBOTTLES

- Close tolerance porosity ranges
- Colour code indication of porosity
- Non-friable borosilicate glass sintered plates

Porosity	Colour code	Sintaglass range of maximum pore diameters, μm
0	White	200 to 250
1	Yellow	100 to 120
2	Green	40 to 50

GAS WASHBOTTLES, *SINTAGLASS,* **Drechsel,** with domed sintered glass bulb on the distribution tube for efficient dispersion and washing. Comprises bottle fitted with interchangeable head by 24/29 joint.

GJR-450-010P	Gas washbottle, 125ml, porosity 0	£4·95
GJR-450-030J	Gas washbottle, 250ml, porosity 0	£5·06
GJR-450-050D	Gas washbottle, 500ml, porosity 0	£5·57
GJR-450-110L	Gas washbottle, 125ml, porosity 1	£4·95
GJR-450-130F	Gas washbottle, 250ml, porosity 1	£5·06
GJR-450-150W	Gas washbottle, 500ml, porosity 1	£5·57
GJR-450-210H	Gas washbottle, 125ml, porosity 2	£4·95
GJR-450-230B	Gas washbottle, 250ml, porosity 2	£5·06
GJR-450-250S	Gas washbottle, 500ml, porosity 2	£5·57



GJR-450

SPARE PARTS

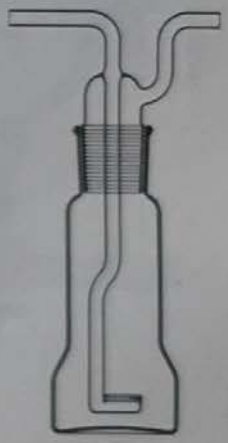
Heads with distribution tube. For bottle capacities given.

GJR-470-010B	Head, 125ml, porosity 0	£2·92
GJR-470-030S	Head, 250ml, porosity 0	£3·04
GJR-470-050M	Head, 500ml, porosity 0	£3·04
GJR-470-110U	Head, 125ml, porosity 1	£2·92
GJR-470-130X	Head, 250ml, porosity 1	£3·04
GJR-470-150Y	Head, 500ml, porosity 1	£3·04
GJR-470-210Q	Head, 125ml, porosity 2	£2·92
GJR-470-230K	Head, 250ml, porosity 2	£3·04
GJR-470-250E	Head, 500ml, porosity 2	£3·04
	Bottles	*See GJR-350*

GAS WASHBOTTLES, *SINTAGLASS,* **Drechsel,** with flat sintered glass plate on the distribution tube. Comprises bottle fitted with interchangeable head.

Capacity, ml	125	250
Joint size	29/32	40/38

GJR-510-010M	Gas washbottle, 125ml, porosity 0	£6·07
GJR-510-030G	Gas washbottle, 250ml, porosity 0	£8·35
GJR-510-110Y	Gas washbottle, 125ml, porosity 1	£6·07
GJR-510-130C	Gas washbottle, 250ml, porosity 1	£8·35
GJR-510-210E	Gas washbottle, 125ml, porosity 2	£6·07
GJR-510-230V	Gas washbottle, 250ml, porosity 2	£8·35



GJR-510

SPARE PARTS

GJR-530-010V	Bottle, 125ml	£2·92
GJR-530-030P	Bottle, 250ml	£3·68
	Head with distribution tube. For bottle capacities given.	
GJR-540-010X	Head, 125ml, porosity 0	£3·17
GJR-540-030Y	Head, 250ml, porosity 0	£4·69
GJR-540-110K	Head, 125ml, porosity 1	£3·17
GJR-540-130E	Head, 250ml, porosity 1	£4·69
GJR-540-210G	Head, 125ml, porosity 2	£3·17
GJR-540-230A	Head, 250ml, porosity 2	£4·69

GAS WASHBOTTLES, *SINTAGLASS,* with flat large diameter sintered glass plate giving excellent absorption at very high flow rates. Comprises bottle with integral sintered plate and interchangeable head.

Capacity, ml	100	500
Plate dia, mm	40	65
Joint size	19/26	29/32

GJR-590-110V	Gas washbottle, 100ml, porosity 1	£7·22
GJR-590-150J	Gas washbottle, 500ml, porosity 1	£10·12



GJR-590

GAUGES


GMH-300

CALLIPERS, steel, for internal and external gauging. Dimensions given are length × maximum diameter.

GMH-300-050V Callipers, 100 × 50mm **£0·38**
GMH-300-070P Callipers, 150 × 90mm **£0·47**


GMH-330

CALLIPER GAUGE, direct reading, brass, with dual scale 0 to 8cm × 1mm and 0 to 3 × $\frac{1}{32}$in.

GMH-330-P Calliper gauge **£3·34**

CALLIPER GAUGE, direct reading, vernier, nickel plated steel. With dual scale 0 to 12cm × 0·1mm and 0 to 5 × $\frac{1}{128}$in., bevelled cross horns for internal measurements, sliding jaw, fine adjustment thumbwheel and depth gauge. Depth of jaws 32mm, depth of cross horns 16mm. Overall length 180mm, maximum reading 110mm. (F)

GMH-390-T Calliper gauge **£3·51**


GMH-390

CALLIPER GAUGE, direct reading, precision vernier, stainless steel. With dual scale 0 to 16cm × 0·1mm and 0 to 6 × 0·001in., precision ground jaws and cross horns with chamfered and relieved ends for measuring small objects, thumb release lock and depth gauge. Depth of jaws 43mm, depth of cross horns 16mm. Overall length 220mm, maximum reading 140mm. With case. (F)

GMH-420-X Calliper gauge **£16·99**


GMH-420

MICROMETER SCREW GAUGE, precision, steel, scaled 0 to 25 × 0·01mm. With hardened and ground micrometer screw, thimble with ratchet and lever lock, and heat-insulating frame cover. In case complete with reading magnifier and setting key. (F)

GMH-500-U Micrometer screw gauge **£9·06**

MICROMETER DIAL GAUGE, BS 907, arbitrarily scaled 0 to 100 on a 56mm diameter dial, corresponding to range 0 to 25 × 0·01mm. With alloy case, precision-ground stainless steel stem, and spindle fitted with ball anvil. The dial, which can be rotated through 360° and clamped in any position, includes a subsidiary revolution counter and a fixing hole in the back.

GMH-540-P Micrometer dial gauge **£16·22**


GMH-500



GMH-540

STANDARD WIRE GAUGE, circular, range 1 to 36 swg.

GMH-760-Y Standard wire gauge **£8·46**



GMH-760

PRESSURE GAUGES, Bourdon tube, BS 1780, dual scaled. With 50mm diameter dial and shank threaded ⅛in. BSP. Scales commence at zero.

GMJ-300-030H Pressure gauge, 1kgf/cm², 15lbf/in² **£5·68**
GMJ-300-050B Pressure gauge, 2kgf/cm², 30lbf/in² **£5·68**
GMJ-300-070S Pressure gauge, 4kgf/cm², 60lbf/in² **£5·68**
GMJ-300-090M Pressure gauge, 7kgf/cm², 100lbf/in² **£5·68**

VACUUM GAUGE, Bourdon tube, BS 1780, dual scaled 0 to 760mm and 0 to 30in. of mercury below atmospheric pressure. With 50mm diameter dial and shank threaded ⅛in. BSP.

GMJ-330-S Vacuum gauge **£5·68**

ACCESSORY for GMJ-300 and GMJ-330-S

Stand, threaded ⅛in. BSP. With horizontal connectors for 8mm bore heavy wall flexible tubing.

GMJ-350-502D Stand **£1·35**

OTHER GAUGES will be found in this catalogue under the following headings.

Air pump gauges	*See Pumps*
Bomb calorimeter gauges	*See Calorimeters*
Filter pump gauge	*See Pumps*
Gas cylinder gauges	*See Gas cylinder acc.*
Coating thickness gauges	*See Thickness*



GMJ-300

MANOMETER, *GRIFFIN*, plastics, U-tube, mounted on rigid white PVC backplate and with clear PVC front cover. The scale is adjustable and calibrated 13–0–13cm × 1mm. The top of the backplate is formed into a clip for attachment to the edge of any vertical sheet or to a horizontal rod of up to 8mm diameter. A light lubricating oil is a suitable manometer liquid.

GML-200-E Manometer **£4·48**



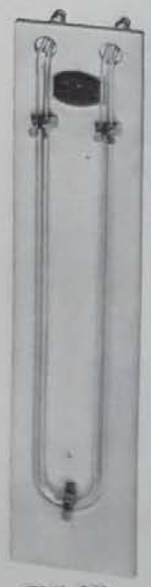
GML-200



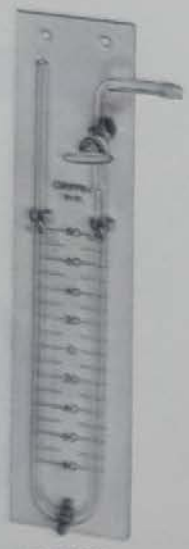
GMJ-330 with GMJ-350-502

Gallenkamp

Griffin GLASS MANOMETERS



GML-260



GML-290



GML-450-050



GML-590

GRIFFIN glass manometers are for pressure or vacuum measurement. The glass manometer tubes are clipped to white back plates. Calibrated models have black scales. They are also drilled for wall mounting by means of countersunk screws. For stand mounting they are drilled and screws are supplied to fit *LABLOX* connectors STH-640-Q which are suitable for retort stands or for scaffold rods of 6 to 13 mm diameter.

The uncalibrated model is intended for calibration and mounting by the user.

MANOMETER, *GRIFFIN*, **uncalibrated,** as specified. Manometer limbs are 285 × 5 mm bore and the ends are riffled and bent at 90° to the plane of the manometer for rear connection to 6·5 mm bore flexible tubing. Back plate is 350 × 80 × 5 mm.

GML-260-Y	Manometer, uncalibrated	**£3·53**

MANOMETER, *GRIFFIN*, **with stopcock, calibrated** 80–0–80 × 2 mm, as specified. Manometer limbs are 305 × 5 mm bore and are suitable for connection to 6·5 mm bore flexible tubing. Back plate is 350 × 80 × 5 mm. For stand fitting one connector STH-640-Q is required.

GML-290-K	Manometer, stopcock, 80–0–80 mm	**£7·99**

SPARE PART

GML-310-050U	U-tube with stopcock	**£5·23**

MANOMETERS, *GRIFFIN*, **calibrated,** as specified. Smallest scale subdivision is 2 mm. For stand fitting two connectors STH-640-Q are required.

Scale, mm	250–0–250	500–0–500
Limb length × bore, mm	590 × 5	1100 × 5
Fits flexible tubing bore, mm	6·5	6·5

GML-450-050H	Manometer 250–0–250 mm	**£17·21**
GML-450-070B	Manometer 500–0–500 mm	**£20·25**

SPARE PARTS

GML-470-050Q	U-tube for GML-450-050H	**£3·22**
GML-470-070K	U-tube for GML-450-070B	**£3·51**
	Mercury	See *MGH-550-C*

MANOMETERS, *GRIFFIN*, **calibrated,** for use as water gauges, as specified. Manometer limbs are suitable for connection to 6·5 mm bore flexible tubing. Smallest scale subdivision is 0·1 in. For stand fitting, one connector STH-640-Q is required for GML-510-050E and two for GML-510-070V.

Scale, in.	5–0–5	10–0–10
Limb length × bore, mm	330 × 5	590 × 5

GML-510-050E	Manometer 5–0–5 in.	**£10·35**
GML-510-070V	Manometer 10–0–10 in.	**£12·71**

SPARE PARTS

GML-530-050N	U-tube for GML-510-050E	**£0·84**
GML-530-070H	U-tube for GML-510-070V	**£1·04**

MANOMETERS, *GRIFFIN*, **calibrated** 0 to 960 × 2 mm, as specified. The manometer has one limb 1120 × 6 mm bore and a reservoir with connections suitable for stand fitting. Two connectors STH-640-Q are required. Manometer limb suitable for connection to 8 mm bore flexible tubing.

GML-590-J	Manometer 0–960 mm	**£19·26**

SPARE PART

GML-610-030T	Tube	**£3·61**
	Mercury	See *MGH-550-C*
	Connector	See *STH-640-Q*

ANSCHUTZ MANOMETERS
for negative pressure measurements

MANOMETER, Anschutz, glass, U-tube with stopcock, mounted on hardwood stand. The centre zero anodised aluminium scale is adjustable and calibrated 10–0–10cm × 1mm. Supplied evacuated and filled with mercury to the stopcock and therefore requires adjustment of the charge before use. The horizontal connecting tubes are suitable for 8mm bore heavy wall tubing. With instructions.

GML-700-K	Manometer	£21·38

SPARE PARTS

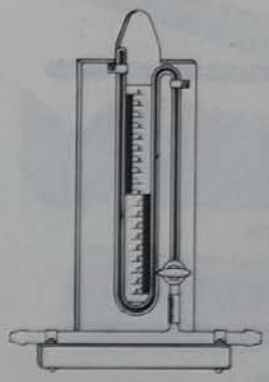
GML-720-050E	U-tube, with stopcock unfilled.	£4·31
GML-720-090P	U-tube, with stopcock, filled with mercury.	£7·40

MANOMETER, Anschutz, as GML-700-K but with sintered glass seal instead of a closed end to the U-tube. Filled by adding a few millilitres of mercury to funnel to produce a seal, and then by applying gentle suction to the funnel nozzle, mercury is introduced through the stopcock to fill the capillary. Air displaced from the capillary passes through the sintered plate. **Without** mercury.

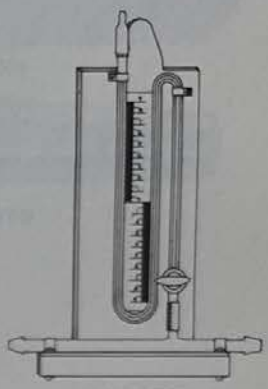
GML-730-M	Manometer	£19·94

SPARE PART

	U-tube with stopcock and sintered plate.	
GML-750-050G	U-tube	£6·17
	Mercury	See MGH-550-C



GML-700



GML-730

GAUZES



GMX-300



GMX-330

GAUZES, iron wire, for use on tripod stands.

GMX-300-010L	Gauzes, 125 × 125mm	Pack of 10 £1·26
GMX-300-030F	Gauzes, 150 × 150mm	Pack of 10 £1·81

GAUZES, iron with asbestos centre, for use on tripod stands.

GMX-330-010N	Gauze, 125 × 125mm	Pack of 10 £2·81
GMX-330-030H	Gauze, 150 × 150mm	Pack of 10 £3·26

GAUZES, copper wire, approximately 600 × 300mm.

GMX-370-030C	Gauze, 30 mesh	£5·52
GMX-370-050T	Gauze, 80 mesh	£6·02

GAUZES, nickel wire, 30 mesh, 150 × 150mm, for use on tripod stands.

GMX-410-W	Gauzes, 30 mesh	Pack of 3 £3·06

GAUZE, nylon, 1·2m wide × 0·5m long. Mesh size approximately 4 holes/mm, aperture size approximately 25μm.

GMX-500-V	Gauze, nylon	0·5m length £3·51

TRIPOD STANDS
Triangular and circular tops

See STK-880-L et seq.

BUNSEN BURNERS
For coal, natural and LPG gases

See BYB-200-J et seq.

Gallenkamp

GLASSBLOWING TOOLS



GTB-200

GLASSBLOWING CONES, *GALLENKAMP*, light metal alloy, for spinning and flanging tubes. Dimension given is the diameter of the cone.

GTB-200-030S	Glassblowing cone, 25mm	**£1·40**
GTB-200-050M	Glassblowing cone, 50mm	**£1·97**



GTB-240

GLASSBLOWING TAPERS, *GALLENKAMP*, hexagonal section light metal alloy, approximately 150mm long, with a standard 1 in 10 taper, for opening out and flanging tubes. Dimensions given are large end × small end.

GTB-240-030N	Glassblowing taper, 13 × 1·3mm	**£1·19**
GTB-240-050H	Glassblowing taper, 20 × 10mm	**£1·69**
GTB-240-070B	Glassblowing taper, 30 × 17mm	**£2·48**

GLASSBLOWING TOOLS, *GALLENKAMP*, with brass blades except No. 1 which has a nickel-chromium spike.

GTB-280-030Y	Glassblowing tool, No. 1	**£1·23**
GTB-280-050C	Glassblowing tool, No. 2	**£1·43**
GTB-280-070T	Glassblowing tool, No. 3	**£1·64**
GTB-280-090N	Glassblowing tool, No. 4	**£1·64**
GTB-280-110K	Glassblowing tool, No. 5	**£1·74**
GTB-280-130E	Glassblowing tool, No. 6	**£1·74**



GTB-280

GLASSBLOWING TOOLS SET, comprising:
Triangular reamer with blade 37mm long × 12mm wide
Curved edge reamer with blade 75mm long × 15mm wide
Spear point, length of point 40mm
Taper, 150mm long tapering from 13mm to 1·3mm
Glass cutting knife with replaceable blade
Blunt end forceps
Carbon plate, 125 × 35 × 10mm

GTB-330-V	Glassblowing tools set	**£12·21**

SAFETY GRIP, an essential device for every safety conscious laboratory worker for manipulating glass tubing, thermometers, etc. It is used for inserting glass tubing into rubber stoppers or corks, and protects the hand and wrist from splinters in the event of accidental breakage of the glass. Can also be used for breaking glass tubing after marking with a glass cutting knife.

GTB-400-L	Safety grip	**£1·35**



GTB-400

GLASS-CUTTING KNIFE, *GALLENKAMP*, for the laboratory worker as well as for the professional glassblower. The need for sharpening is eliminated by the use of expendable blades. Supplied with 12 spare blades.

GTB-450-W	Glass-cutting knife	**£1·06**

SPARE PARTS

GTB-454-010G	Blades	Pack of 25 **£0.16**



GTB-450



GTB-490

GLASS-CUTTING KNIFE, *GRIFFIN* **SUPER-HARD,** non-ferrous alloy, suitable for the heaviest service on all types of glass. Vickers diamond hardness upwards of 875. Blade approximately 65 × 13 × 1·6mm thick, reversibly mounted in wood holder with brass clamping jaw. Cutting edges may be resharpened on fine carborundum hone.

GTB-490-R Glass-cutting knife **£3·84**

SHARPENING STONE, silicon carbide.

GTB-520-M Sharpening stone **£1·13**

GLASS TUBING CUTTER, *GRIFFIN*, with diamond scribing point on a spring arm and aluminium alloy body with vee groove. Suitable for use with borosilicate and soda-lime glass tubing up to 40mm diameter.

GTB-580-Q Glass tubing cutter **£8·33**

GLASS-CUTTING DIAMOND, in metal mount, with wood handle.

GTB-630-U Glass-cutting diamond **£3·99**

GLASS-CUTTING TOOL, bench mounting, for cutting glass tubing up to 32mm diameter. A diamond is brought into contact with the tubing by operation of a lever and a true ring is cut as the tube is rotated.

GTB-700-K Glass-cutting tool **£24·68**

SPARE PART

GTB-708-010F Rod, with diamond tip **£5·09**


GTB-580


GTB-630


GTB-700

The following items will be found useful for glassblowing purposes:

BELLOWS	See *BOR-600-T*
BLOWPIPES	See *BYG-500-E*
CALLIPERS	See *GMH-300 et seq.*
CORKS	See *CSD-460 et seq.*
FORCEPS	See *DKC-510-G et seq.*
GAS REGULATORS	See *GGM-350-R et seq.*
GLASS ROD	See *RND-300 et seq.*
GLASS TUBING	See *TWL-300 et seq.*
GLOVES	See *SAR-550-L et seq.*
PENCILS	See *LAC-430-X et seq.*

Gallenkamp MANIPULATOR GLOVE BOX

For applications where user and sample must be mutually isolated

- **Incorporates automatic air-lock loading hatch**
- **Easily cleaned interior**
- **Rapid glove replacement**
- **Constructed for use with internal pressures slightly above or below ambient pressure**



GXH-350

CONSTRUCTION

The box and loading hatch are steel sheet, with stove enamelled corners radiused to permit easy cleaning. Rubber feet are fitted to the base. A transparent acrylic plastics window is sealed in place by an air-tight gasket. Two glove ports at the front are fitted with ambidextrous rubber gauntlets with beaded sleeve ends which are stretched over the openings of the ports. Gloves are thus replaced easily and quickly but a double groove on each glove port prevents the gloves from being detached accidentally.

The loading hatch is in the form of an automatic air-lock with two air-tight doors interconnected by a neat interlocking mechanism to prevent either being opened until the other is correctly shut. Both the box and loading hatch are fitted with stopcocks for connection to dry air or inert gas supply. The box is supplied with an internal polystyrene tray 460 x 350mm.

External dimensions

Manipulator box (excluding hatch)	690 x 450 x 420mm high
Loading hatch	220 x 220 x 210mm high
Loading hatch door	150 x 160mm
Glove ports	165mm diameter
Top window	610 x 370mm maximum
Maximum width	1020mm

MANIPULATOR GLOVE BOX, *GALLENKAMP*, as specified, with two GXH-370-150Y latex gloves.

GXH-350-S	Manipulator glove box	**£212·06**

ACCESSORIES

	Sleeve, rubber, open ended, beaded at both ends to fit glove port and to seal on wrist, allowing surgical gloves to be worn.	
GXH-370-030S	Sleeve	**£4·55**
	Gloves, natural latex, ambidextrous gauntlet type, with beaded edge.	
GXH-370-110U	Glove, size 7	Each **£2·78**
GXH-370-130X	Glove, size 8	Each **£2·78**
GXH-370-150Y	Glove, size 9	Each **£2·78**
GXH-370-170C	Glove, size 10	Each **£2·78**
	Gloves, as sizes 7 to 10 above but of Neoprene.	
GXH-370-210Q	Glove, size 7	Each **£3·83**
GXH-370-230K	Glove, size 8	Each **£3·83**
GXH-370-250E	Glove, size 9	Each **£3·83**
GXH-370-270V	Glove, size 10	Each **£3·83**

PROTECTIVE EYESHIELDS AND GOGGLES

- **Polycarbonate clear lenses**
- **Meet BS 2092 requirements**

See SAF-290-E to SAF-450-Q

IMMERSION HEATERS

HEATER, immersion, with plated copper sheathed, helical element 50mm external diameter, thermally and electrically insulated handle and 3-core cable. Heater length, 230mm, rating 1000 W. For 220–240 V supplies. (F)

HCT-300-X Heater **£6-90**

HEATERS, immersion, *ELECTROTHERMAL* **RED-ROD,** with silica sheathed element, 14mm diameter, and 2-core cable. Overall length is approximately twice the heated length. For 220–240 V supplies.

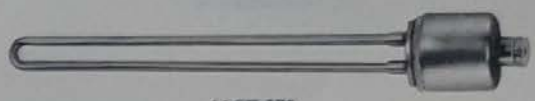
Rating, W	300	400	500	
Heated length, mm	130	150	200	
HCT-330-030H	Heater, 300 W			**£13-75**
HCT-330-050B	Heater, 400 W			**£14-30**
HCT-330-070S	Heater, 500 W			**£16-50**



HCT-300 HCT-330

HEATERS, immersion, with nickel plated sheathed hairpin element mounted under a flanged head threaded 1·55in. diameter × 26t.p.i. Suitable for horizontal or vertical mounting in water baths, etc. With terminals and gland entry for cable connection and supplied with joint rings and threaded locking ring. For 220–240 V supplies.

Rating, W	250	500	1000	
Heated length, mm	250	310	370	
Hairpin length, mm	300	370	450	
HCT-370-030C	Heater, 250 W			**£11-00**
HCT-370-050T	Heater, 500 W			**£11-42**
HCT-370-070N	Heater, 1000 W			**£11-88**



HCT-370

RADIANT HEATER

Enables heating to be carried out from above thus ensuring rapid evaporation without loss by spattering or can be used inverted as a conventional hotplate.

HEATER, radiant, *VITREOSIL,* with element enclosed in fused silica. Heating surface 125mm diameter. With horizontal mounting rod but **without** stand, clamp and bosshead. Rating 400 W. For 220–240 V supplies.

HCT-460-K Heater, radiant **£58-73**



HCT-460 with stand

TEMPERATURE CONTROLLERS

CONTACT THERMOMETERS

Direct reading, adjustable, for temperatures up to 350°C

See TEH-240 et seq.

THERMOSTATS

Hydraulic in kit form, calibrated scale, for temperature up to 250°C

See TEH-380 et seq.

Bimetal, arbitary scale, for temperatures up to 300°C

See TEH-560 et seq.

ELECTRONIC

Thermistor probe, meter readout, for temperatures up to 100°C

See TEH-630-P



INFRARED HEATER LAMP



HCT-540 on stand

For the rapid drying of small quantities of material, for evaporation where splashing must be avoided, as in isotope work, or for the application of local heat to an assembly such as a fractional distillation column. The sample temperature may be controlled by adjusting the distance from the lamp to the material.

HEATER, infrared, with lamp having a built-in silvered reflector and fitted in an ES lampholder carried on a tube, 200mm long × 12·5mm diameter, through which the 3-core connecting cable passes. The tube may be mounted at any angle except with the lamp facing vertically upwards using a bosshead. **Without** stand and bosshead. Rating 275 W.

HCT-540-010N	Heater, 200–250V	**£7·65**
HCT-540-030H	Heater, 110–120V	**£7·65**

SPARE PARTS

HCT-550-010G	Lamp, 200–250V	**£2·59**
HCT-550-030A	Lamp, 110–120V	**£2·59**

Gallenkamp INFRARED HEATER

- **Solid state heat intensity control**
- **Integral 0 to 20 minute timer with continuous run position**
- **Position and angle of lamp adjustable**



HCT-600

The lamp, which has an integral silvered reflector is fitted by means of a bosshead to a 13mm diameter rod mounted on the base section, through which the 3-core connecting cable passes.

The bosshead fixing allows the lamp to be positioned at any angle between horizontal and vertically downwards. The heater must not be operated with the lamp facing vertically upwards.

Controls, comprising an arbitrarily scaled solid state heat intensity control and a spring timer scaled 0 to 20 minutes with continuous run and off positions, are housed with a mains indicator lamp in a base.

The base has white polyurethane coated upper section and stoved enamel grey lower section.

HEATER, infrared, GALLENKAMP, as specified with solid state heat intensity control and timer. Overall dimensions including rod 265 × 260 × 615mm high. Mass 3·5kg. Heater rating 275 W. With mains cable and instructions. For a.c. single phase supplies.

HCT-600-010K	Heater, 200–250V	**£51·75**
HCT-600-030E	Heater, 110–120V	**£52·88**

SPARE PARTS

Lamps — See HCT-550

HEATING MANTLES

Mantles are mounted in metal containers and are sufficiently flexible to fit snugly around flasks of the stated nominal capacity but with various diameters. The heaters run at relatively low temperatures and so reduce fire risk. Normal maximum working temperature is 450°C.

Many of the mantles listed have integral energy regulators to provide temperature control but for other mantles, an external controller such as EFP-400-D can be used.



HEA-300

HEATING MANTLE, *ELECTROTHERMAL* **Series MR,** semi-micro, for pear shape and round bottom flasks capacity 10 to 50 ml. In metal container with energy regulator, mains and heater indicator lamps, mains cable and detachable vertical support rod at rear. Rating 60 W. For 200–250 V a.c. single phase supplies.

HEA-300-V	Heating mantle	*£24-75*

HEATING MANTLES, *ELECTROTHERMAL,* **Series MY,** economy pattern, for round and flat bottom flasks. In metal container without rim. With integral boss to accommodate a 13 mm diameter support rod. With mains cable but **without** support rod. For 200–250 V a.c. single phase supplies.

Flask capacity, ml	50	100	250	500
Rating, W	60	60	150	200
Flask capacity, litres	1	2	5	
Rating, W	300	500	800	

HEA-360-030Q	Heating mantle, 50 ml	**£12-10**
HEA-360-050K	Heating mantle, 100 ml	**£13-20**
HEA-360-070E	Heating mantle, 250 ml	**£15-40**
HEA-360-090V	Heating mantle, 500 ml	**£17-60**
HEA-360-110S	Heating mantle, 1 litre	**£19-80**
HEA-360-130M	Heating mantle, 2 litres	**£24-20**
HEA-360-170A	Heating mantle, 5 litres	**£38-50**
	Temperature controller	*See EFP-400-D*
	Support rod	*See STH-710*



HEA-360

HEATING MANTLES, *ELECTROTHERMAL,* **Series M,** for round and flat bottom flasks. In metal container with wide rim. A thermocouple for use with pyrometer HEA-420-510W is fitted to mantles of 1 litre capacity and above and mantles of 5 litre capacity and above have more than one heater circuit. Each circuit can be controlled separately and incorporates an indicator lamp. The 20 litre mantle is fitted with a terminal box and all sizes are supplied with mains cable. For 200–250 V a.c. single phase supplies.

Flask capacity, ml		50	100	250	500
Rating, W		60	60	150	200
No. of circuits		1	1	1	1
Flask capacity, litres	1	2	5	10	20
Rating, W	300	500	800	1000	1500
No. of circuits	1	1	2	2	3

HEA-400-030E	Heating mantle, 50 ml	**£17-05**
HEA-400-050V	Heating mantle, 100 ml	**£18-70**
HEA-400-070P	Heating mantle, 250 ml	**£22-00**
HEA-400-090J	Heating mantle, 500 ml	**£24-20**
HEA-400-110G	Heating mantle, 1 litre	**£29-70**
HEA-400-130A	Heating mantle, 2 litres	**£35-20**
HEA-400-170L	Heating mantle, 5 litres	**£55-00**
HEA-400-190F	Heating mantle, 10 litres	**£86-00**
HEA-400-210C	Heating mantle, 20 litres	**£93-50**



HEA-400

SPARE PARTS

HEA-420-030N	Heating element, 50 ml	£9-90
HEA-420-050H	Heating element, 100 ml	£11-00
HEA-420-070B	Heating element, 250 ml	£13-20
HEA-420-090S	Heating element, 500 ml	£15-40
HEA-420-110P	Heating element, 1 litre	£17-60
HEA-420-130J	Heating element, 2 litres	£20-90
HEA-420-170U	Heating element, 5 litres	£33-00
HEA-420-190X	Heating element, 10 litres	£39-60
HEA-420-210L	Heating element, 20 litres	£56-10

ACCESSORY

Pyrometer, bench standing, scale 0 to 500°C, with compensating leads. For use with HEA-400 1 litre capacity and above.

HEA-420-510W	Pyrometer	*£39-60*
	Temperature controller	*See EFP-400-D*

Gallenkamp



HEA-470 with rod and flask

HEATING MANTLES, *ELECTROTHERMAL,* **Series MS,** for round and flat bottom flasks. In metal container without rim but with integral energy regulator. With indicator lamp, mains cable and boss to accommodate 13mm diameter support rod. **Without** support rod. For 200–250V a.c. single phase supplies.

Flask capacity, ml	250	500	1000	2000
Rating, W	150	200	300	500

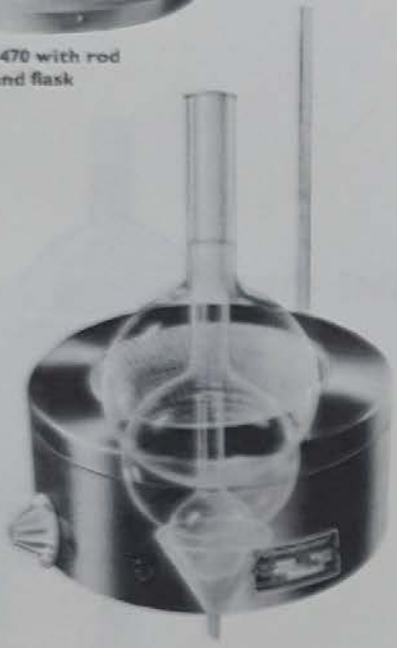
HEA-470-070M	Heating mantle, 250ml	**£23·10**
HEA-470-090G	Heating mantle, 500ml	**£25·30**
HEA-470-110D	Heating mantle, 1000ml	**£28·60**
HEA-470-130U	Heating mantle, 2000ml	**£30·80**

SPARE PARTS

HEA-490-070V	Heating element, 250ml	**£13·20**
HEA-490-090P	Heating element, 500ml	**£15·40**
HEA-490-110M	Heating element, 1000ml	**£17·60**
HEA-490-130G	Heating element, 2000ml	**£20·90**

ACCESSORY

Support rod	*See STH-710*



HEA-580

MULTI-MANTLES, *ELECTROTHERMAL* **Series MV,** for a large range of different shapes and sizes of flasks and funnels. An opening in the base permits funnels to be inserted and heated. Fitted with energy regulator (except HEA-580-090X) and boss for 13mm diameter support rod. With indicator lamp and mains cable but **without** support rod. For 200–250V a.c. single phase supplies.

Flask capacity, ml	50 to 500	50 to 2000	500 to 6000
Rating, W	300	450	800

HEA-580-090X	Multi-mantle, 50 to 500ml	**£22·00**
HEA-580-130F	Multi-mantle, 50 to 2000ml	**£38·50**
HEA-580-190K	Multi-mantle, 500 to 6000ml	**£66·00**

SPARE PARTS

HEA-600-090Q	Heating element, 50 to 500ml	**£13·20**
HEA-600-130H	Heating element, 50 to 2000ml	**£23·10**
HEA-600-190M	Heating element, 500 to 6000ml	**£39·60**

ACCESSORIES

Temperature controller for HEA-580	*See EFP-400-D*
Support rod	*See STH-710*



HEA-640

HEATING/STIRRING MANTLES

HEATING/STIRRING MANTLES, *ELECTROTHERMAL,* with flexible heating element and magnetic drive mounted in a metal housing. With built-in energy regulator for temperature control up to 450°C and stirring speed controller. With PTFE covered stirring follower. For 220–250V 50Hz single phase supplies.

Flask capacity, ml	250	500	1000	2000
Rating, W	150	200	300	500

HEA-640-070R	Heating/stirring mantle, 250ml	**£61·60**
HEA-640-090L	Heating/stirring mantle, 500ml	**£61·60**
HEA-640-110Y	Heating/stirring mantle, 1000ml	**£65·45**
HEA-640-130C	Heating/stirring mantle, 2000ml	**£68·75**

RADIANT HEATER

RADIANT HEATER, 'ELECTRIC BUNSEN', *ELECTROTHERMAL*, for heating test tubes, crucibles, beakers, etc. The exterior remains sufficiently cool for the heater to be held in the hand by the base. Rating 400 W. Maximum temperature 800°C. Height 180mm. Must be used with a controller. For 230–250V supplies.

HEF-200-C	Radiant heater	**£24·20**
	SPARE PART	
HEF-210-030J	Heating element	**£9·90**
	ACCESSORY	
	Controller	*See EFP-400-D*



HEF-200 with crucible

HEATING TAPES AND CORDS

Woven tapes and cords for applying heat to pipes, tubes and vessels. Must be used with suitable controller

HEATING TAPES (Heat-by-the-yard), *ELECTROTHERMAL*, **Series HT,** for user to cut to required length and fit insulated terminals. Normal working voltage is approximately 33V/m. Maximum temperature 450°C, surface loading 1 W/cm². With voltage/temperature nomogram but **without** end connectors. Dimensions given are length × width.

HEF-350-030T	Heating tape, 7·65m × 13mm	**£41·80**
HEF-350-050N	Heating tape, 7·65m × 25mm	**£53·90**
	ACCESSORY	
HEF-360-502U	End connectors	Pack of 12 **£9·90**



HEF-350

HEATING TAPES, *ELECTROTHERMAL*, **Series HT 3,** maximum temperature 450°C, surface loading 0·5 W/cm². Supplied with glass laces for securing and mains lead-in wires. For 200–250V supplies.

Length × width	1·25m × 13mm	0·9m × 25mm	1·8m × 25mm
Rating, W	70	100	210
HEF-410-030Q	Heating tape, 1·25m × 13mm		**£13·20**
HEF-410-070E	Heating tape, 0·9m × 25mm		**£12·10**
HEF-410-090V	Heating tape, 1·8m × 25mm		**£18·70**



HEF-410

HEATING CORDS, *ELECTROTHERMAL*, **Series HC,** maximum temperature 450°C, surface loading 4 W/cm². Approximately 5mm diameter, with mains lead-in wires 0·6m long. For 200–250V supplies. The rating at 230V is approximately 200 W/m length.

HEF-480-030N	Heating cord, length 0·3m	**£6·60**
HEF-480-050H	Heating cord, length 0·6m	**£7·70**
HEF-480-070B	Heating cord, length 1·2m	**£9·90**
HEF-480-090S	Heating cord, length 2·4m	**£15·40**
HEF-480-110P	Heating cord, length 4·8m	**£22·00**
HEF-480-130J	Heating cord, length 9·6m	**£34·10**

Controller for heating tapes and cords *See EFP-400-D*



HEF-480

HISTOLOGY

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Gallenkamp WAX EMBEDDING BATH, 100°C

Suitable for most routine specimen preparations

- **Maximum temperature 100°C**
- **Temperature control to ±0·2°C**
- **Supplied with:**
  wax storage vessel approximately 1200ml capacity
  six specimen pots each approximately 200ml capacity
  four specimen tubes each approximately 30ml capacity



HJC-200

A stainless steel bath is mounted in a rust-inhibited steel outer case. A stainless steel cover is recessed into the bath so that any spilt wax is prevented from running over the bench. The cover has 11 holes, six to accommodate plated copper pots, approximately 63mm diameter × 63mm deep, one for a pot 120mm diameter × 110mm deep for wax storage and four for glass tubes 25mm diameter × 50mm deep for small specimens. Overall dimensions 500 × 350 × 200mm. The bath is uniformly heated by a 500W sheathed immersion element controlled by a direct reading COMPENSTAT solid state thermostat to within ±0·2°C. The thermostat is mounted in a separate compartment at one end of the bath together with a mains switch and indicator lamp.

BATH, WAX EMBEDDING, *GALLENKAMP*, maximum temperature 100°C, as specified. Comprises water bath and stainless steel cover complete with one large and six small pots with lids and four glass tubes. With instructions. For a.c. single phase supplies.

HJC-200-030X Bath, 220–240V £240·75
HJC-200-050Y Bath, 110–120V £240·75

SPARE PARTS

Tubes, 30 × 25mm ... TUB-602-0700

Gallenkamp WAX EMBEDDING OVEN, 100°C

Suitable for routine large scale preparations

- **Maximum temperature 100°C**
- **Temperature control to ±1°C**
- **Air bath with 12 large embedding pots**
- **Large, heated storage space**
- **Drain cock fitted to remove spilt wax from embedding bath**



HJC-280

EMBEDDING BATH

An air bath with 12 embedding pots is protected from dust, etc., by a lift-up cover. The pots are plated copper, 75mm diameter × 44mm deep for large specimens, and have handles and loose covers. A draining tray extends beneath the pots to catch any spilt wax which may be removed periodically via a drain cock at the lowest point of the tray.

STORAGE COMPARTMENT

A storage compartment is fitted with a door and a perforated shelf for drying slides.

The large storage space, 330 × 460 × 430mm high, can be used to store melted paraffin wax and may also be used for embedding very large specimens.

HEATING AND TEMPERATURE CONTROL

Heating elements, total load 500 W, are fitted outside the oven liner. The temperature is controlled to ±1°C by a bimetal thermostat. Embedding bath temperature is indicated by a built-in solid stem angle thermometer range 0 to 110 × 1°C. A thermometer may also be inserted in the storage compartment.

CONSTRUCTION

The external construction is of welded steel and finished in grey duotone stoved enamel. The storage compartment liner and perforated shelf are aluminium.

DIMENSIONS

	Height	Width	Depth
Storage compartment, mm	330	450	420
Overall, mm	670	640	580
Overall, lid open, mm	1250	640	580

OVEN, WAX EMBEDDING, *GALLENKAMP*, maximum temperature 100°C, as specified. Comprises embedding bath with hinged cover, 12 embedding pots with covers, fitted angle thermometer and storage compartment with shelf. For a.c. single phase supplies.

HJC-280-030E	Oven, 220–240V	**£744·75**
HJC-280-050V	Oven, 110–120V	**£744·75**

SPARE PARTS

HJC-290-050X	Embedding pot, with loose cover	**£5·06**
HJC-290-070Y	Angle thermometer	**£6·19**

ACCESSORIES

Thermometer, range −5 to 105 × 1°C, for storage compartment — *See THM-780-0305*
Funnels, stainless steel, for paraffin wax — *See FPH-550*
Jugs, stainless steel, for paraffin wax — *See MEB-850*

Gallenkamp WAX DISPENSER

For storing and dispensing molten wax



HJC-500



HJC-520-512

- **Capacity approximately 4·5 litres**
- **Thermostatically controlled to 100°C maximum**
- **Preset safety thermostat**

WAX DISPENSER, *GALLENKAMP*, comprising anodised aluminium tank 205mm diameter × 160mm deep, approximate capacity 4·5 litres, fitted with a lever operated dispensing tap and removable gauze filter. A lid with thermometer hole is supplied. Temperature is controlled by an hydraulic thermostat range 40 to 100°C with direct reading scale. A preset safety thermostat is incorporated to protect the apparatus in case of failure of the control thermostat. Indicator lamps show operation of control and safety thermostats. Overall dimensions 260mm diameter × 320mm high. Power rating 500 W maximum. With instructions. For a.c. single phase supplies.

HJC-500-030N	Wax dispenser, 220–240 V	**£78·75**
HJC-500-050H	Wax dispenser, 110–120 V	**£82·73**

ACCESSORIES

Embedding trays, polystyrene, with 10 recesses each 20 × 20 × 13mm. Overall dimensions 190 × 80 × 20mm.

HJC-520-512E	Embedding trays	Pack of 100 **£10·89**
	Thermometer, range −10 to 110°C	*See THL-290-050J*

Gallenkamp FLOATING-OUT BATH

For preparing microscope slides after wax embedding and microtome slicing



HJC-600

- **Bath interior stained black to facilitate viewing of sections**
- **Thermostatically controlled to 80°C maximum**
- **Preset safety thermostat**

FLOATING-OUT BATH, *GALLENKAMP*, comprising an anodised aluminium bath 200mm diameter × 60mm deep, stained black to facilitate viewing of sections. The rim of the bath slopes gently towards the centre so that wax from slides rested on the rim drains into the bath. A black anodised aluminium lid is supplied to protect bath contents from dust and to reduce evaporation. Fitted with a 500 W heater. Temperature is controlled by an hydraulic thermostat range 30 to 80°C with direct reading scale. A preset safety thermostat is incorporated. Indicator lamps show operation of control and safety thermostats. Overall dimensions 350mm diameter × 150mm high with lid. With instructions. For a.c. single phase supplies.

HJC-600-030F	Floating-out bath, 220–240 V	**£65·25**
HJC-600-050W	Floating-out bath, 110–120 V	**£68·63**

VACUUM EMBEDDING BATHS

The single pan model comprises a removable copper pan 190mm diameter suspended in an electrically heated water bath. A plate glass cover with rubber washer seals the top of the pan, and a vacuum connection and release valve are fitted. An hydraulic thermostat controls the water bath temperature up to 70°C, and a mercury in glass thermometer is provided.

The double pan model is similar but has two pans mounted side by side in the water bath.

BATH, VACUUM EMBEDDING, single pan, as specified. Overall dimensions 360 × 280 × 300mm, mass 12kg. Loading 250 W. For 230–250 V 50 Hz single phase supplies.

HJC-850-J	Bath	**£191·25**

BATH, VACUUM EMBEDDING, double pan, as specified. Overall dimensions 360 × 480 × 280mm, mass 22kg. Loading 250 W. For 230–250 V 50 Hz single phase supplies.

HJC-870-S	Bath	**£244·80**

SPARE PARTS

HJC-890-050M	Sealing washer	**£2·45**
HJC-890-070G	Glass cover, without needle valve	**£6·89**



HJC-850

SLIDES

MICROSCOPE SLIDES, for routine and student use, 76 × 26mm, thickness 1 to 1·2mm, uniform with ground edges. (F)

HJE-220-M	Microscope slides	Pack of 100 **£1·37**

MICROSCOPE SLIDES, *CHANCE PROPPER*, 76 × 26mm, with finely ground edges. Washed and cleaned ready for use. Dimension given is the thickness.

HJE-280-050B	Microscope slides, 0·8 to 1mm	Pack of 50 **£0·62**
HJE-280-070S	Microscope slides, 1 to 1·2mm	Pack of 50 **£0·61**
HJE-280-090M	Microscope slides, 1·2 to 1·5mm	Pack of 50 **£0·61**

MICROSCOPE SLIDES, *CHANCE PROPPER*, 76 × 26mm, as HJE-280 but with 20mm frosted end for writing. Dimension given is the thickness.

HJE-310-050T	Microscope slides, 0·8 to 1mm	Pack of 50 **£0·73**
HJE-310-070N	Microscope slides, 1 to 1·2mm	Pack of 50 **£0·69**

SLIDE DISPENSER, for 76 × 26mm microscope slides. Comprises a moulded plastics base and slide container with a close fitting, moulded transparent cover. The container has capacity for about sixty 1mm thick slides. These rest on a roller which may be turned, by means of knurled knobs on either side of the dispenser, to deliver one slide at a time through a slot. Until each slide has been removed, the next slide cannot be dispensed. Dimensions 100 × 120 × 140mm high. (F)

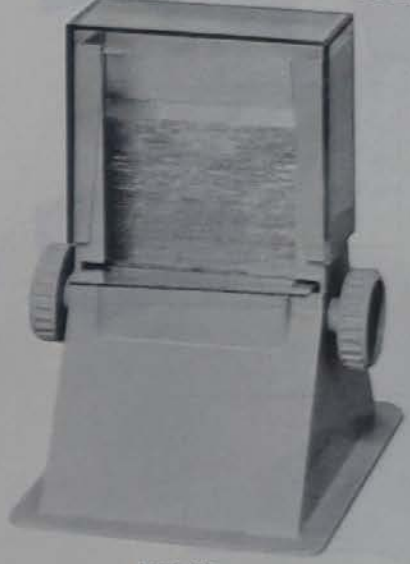
HJE-400-K	Slide dispenser	**£5·45**

MICROSCOPE SLIDES, for large sections. Thickness 1·2 to 1·5mm, with finely ground edges. (F)

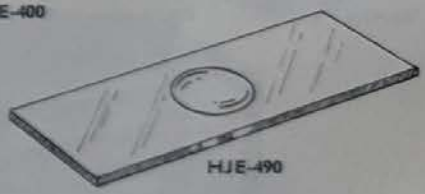
HJE-450-050G	Microscope slides, 76 × 38mm	Pack of 50 **£2·31**
HJE-450-070A	Microscope slides, 76 × 50mm	Pack of 50 **£2·57**

MICROSCOPE SLIDES, cavity, 76 × 26mm, thickness approximately 1·25mm, with round polished cavity 15mm diameter for hanging drop cultures. (F)

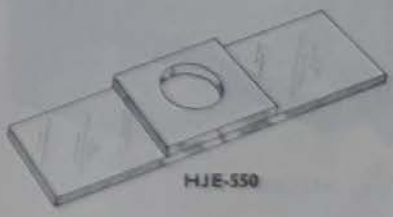
HJE-490-Q	Microscope slides	Pack of 12 **£1·86**



HJE-400



HJE-490



HJE-550

MICROSCOPE SLIDE, 76 × 26mm, thickness approximately 1·75mm with fused-on cell 10mm diameter, approximately 2mm deep.

HJE-550-N	Microscope slide	**£0·81**

MICROSCOPE SLIDE, 76 × 26mm, thickness approximately 1·75mm with fused-on glass ring 15mm diameter, approximately 3mm high.

HJE-570-W	Microscope slide	**£0·81**

GLASS RING CELLS, for mounting thick specimens such as foraminifera, insect wings, etc. on microscope slides. May also be used for observing Brownian movement. Dimensions given are diameter × depth.

HJE-610-050S	Glass ring cells, 15 × 3mm	Pack of 10 **£0·84**
HJE-610-070M	Glass ring cells, 18 × 5mm	Pack of 10 **£0·90**

FORCEPS, stainless steel, with spatulate ends, for manipulating slides and cover glasses. (F)

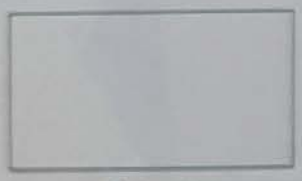
HJE-660-V	Forceps	**£0·97**



Circles



Squares



Rectangles



HJF-350



HJF-390

COVER GLASSES

COVER GLASSES, *CHANCE PROPPER* **No. 0,** resistance glass, 0·09 to 0·13mm thick.

HJE-800-050J	Cover glasses, 16mm dia.	Pack of 100 **£0·68**
HJE-800-070D	Cover glasses, 19mm dia.	Pack of 100 **£0·86**
HJE-800-090U	Cover glasses, 22mm dia.	Pack of 100 **£1·08**
HJE-800-250B	Cover glasses, 18 × 18mm	Pack of 100 **£0·41**
HJE-800-270S	Cover glasses, 22 × 22mm	Pack of 100 **£0·58**

COVER GLASSES, *CHANCE PROPPER* **No. 1,** resistance glass, 0·13 to 0·16mm thick.

HJE-820-050S	Cover glasses, 16mm dia.	Pack of 100 **£0·62**
HJE-820-070M	Cover glasses, 19mm dia.	Pack of 100 **£0·76**
HJE-820-090G	Cover glasses, 22mm dia.	Pack of 100 **£0·94**
HJE-820-130U	Cover glasses, 18 × 18mm	Pack of 100 **£0·35**
HJE-820-170Y	Cover glasses, 22 × 22mm	Pack of 100 **£0·52**

COVER GLASSES, *CHANCE PROPPER* **No. 1½,** resistance glass, 0·16 to 0·19mm thick.

HJE-840-050E	Cover glasses, 16mm dia.	Pack of 100 **£0·62**
HJE-840-070V	Cover glasses, 19mm dia.	Pack of 100 **£0·76**
HJE-840-090P	Cover glasses, 22mm dia.	Pack of 100 **£0·94**
HJE-840-130G	Cover glasses, 18 × 18mm	Pack of 100 **£0·39**
HJE-840-150A	Cover glasses, 20 × 20mm	Pack of 100 **£0·45**
HJE-840-170R	Cover glasses, 22 × 22mm	Pack of 100 **£0·57**
HJE-840-190L	Cover glasses, 24 × 24mm	Pack of 100 **£0·70**
HJE-840-230C	Cover glasses, 22 × 26mm	Pack of 100 **£0·70**
HJE-840-250T	Cover glasses, 22 × 32mm	Pack of 100 **£0·85**
HJE-840-270N	Cover glasses, 22 × 40mm	Pack of 100 **£1·08**
HJE-840-290H	Cover glasses, 22 × 50mm	Pack of 100 **£1·36**

COVER GLASSES, *CHANCE PROPPER* **No. 2,** resistance glass, 0·19 to 0·25mm thick.

HJE-860-130P	Cover glasses, 18 × 18mm	Pack of 100 **£0·45**
HJE-860-170D	Cover glasses, 22 × 22mm	Pack of 100 **£0·70**

COVER GLASSES, *CHANCE PROPPER* **No. 3,** resistance glass, 0·25 to 0·35mm thick.

HJE-880-050W	Cover glasses, 16mm dia.	Pack of 100 **£0·75**
HJE-880-070Q	Cover glasses, 19mm dia.	Pack of 100 **£0·94**
HJE-880-090K	Cover glasses, 22mm dia.	Pack of 100 **£1·08**
HJE-880-130B	Cover glasses, 18 × 18mm	Pack of 100 **£0·48**
HJE-880-170M	Cover glasses, 22 × 22mm	Pack of 100 **£0·76**

SPRAY-ON COVER SLIP, a water resistant liquid spray developed to replace cover glasses on microscope slides. Especially useful in the fields of haematology, microbiology and histology. Applied easily, drying in 4 to 9 minutes to a tough non-sticky finish which does not affect tissue stains and which is xylol soluble.

The finished coating has a refractive index similar to that of glass and good resolution can be obtained with a spray thickness of up to 75 μm and high power magnification of very thick sections to ×400. In Aerosol can sufficient to coat approximately 400 microscope slides twice. With instructions for use, on can label.

HJE-960-U	Spray-on cover slip	**£3·32**

This item is not offered for export.

SLIDE DRYING PLATE, electrically heated, with a smooth enamelled steel top, dimensions 395 × 265mm. With thermostat giving temperature control up to approximately 50°C, accurate to ±1°C, indicator lamp and length of 3-core cable. Power rating 150 W. For 220–250V a.c. supplies.

HJF-350-T	Slide drying plate	**£11·12**

RINGING TURNTABLE, for making microscope slide preparations with asphaltum varnish. Comprises brass table, with clips to hold a slide, rotatable on a ball bearing fitting, with hand rests on both sides and an adjustable arm for steadying the brush.

HJF-390-K	Ringing turntable	**£16·61**

SLIDE STORAGE

For 76 × 26 mm slides



HJF-500

MICROSCOPE SLIDE HOLDERS, *GALLENKAMP*, aluminium, to take four slides 76 × 26 mm. Designed for storing microscope slides in cabinet HJF-530-R.

HJF-500-P	Microscope slide holders	Pack of 25 **£4·95**

MICROSCOPE SLIDE CABINET, metal, with two drawers side-by-side, sliding on polythene runners, each drawer taking 100 slide holders HJF-500-P. Total accommodation 800 slides. Designed to stack one on another, each cabinet is fitted with rubber feet and a set of nuts and bolts for fixing. Dimensions 140 × 350 × 400 mm. With 200 slide holders HJF-500-P.

HJF-530-R	Microscope slide cabinet	**£53·64**

MICROSCOPE SLIDE FOLDER to hold 20 slides 76 × 26 mm. With hinged flaps and numbered positions.

HJF-580-F	Microscope slide folder	**£0·82**

MICROSCOPE SLIDE CABINET, cardboard, covered imitation leather. With drop front and 12 loose trays each able to accommodate 9 slides 76 × 26 mm.

HJF-610-A	Microscope slide cabinet	**£3·24**

MICROSCOPE SLIDE BOX, pasteboard, able to accommodate 12 slides 76 × 26 mm.

HJF-640-C	Microscope slide box	**£0·51**

MICROSCOPE SLIDE BOX, rack form, stackable, to accommodate 76 × 26 mm slides. High-impact polypropylene with moulded snap fastener and strong integral hinge. Base, cork cushioned, with slide positions numbered to correspond with index in lid. Overall height 35 mm.

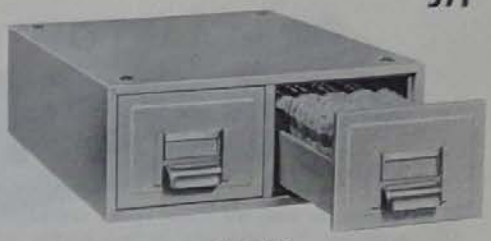
No. of slides accommodated	25	100
Dimensions, mm	120 × 90	220 × 180
HJF-680-050F	Microscope slide box, 25-slide	**£1·91**
HJF-680-090Q	Microscope slide box, 100-slide	**£2·90**

SLIDE CABINET, polished wood with glass-fronted door and magnetic catch. Locating points on base and lid enable several cabinets to be stacked securely. Interchangeable plastics trays cushion the slides and accept 76 × 26, 76 × 38 mm or palaeo-slides. Details of contents can be written directly on to front of trays and washed off when not required. Capacity 1008 slides 76 × 26 mm.

HJF-710-P	Slide cabinet	**£74·25**

MICROSCOPE SLIDE CABINETS, metal, with drawers 420 × 290 × 50 mm high, divided into three compartments by fixed slotted divisions. Each drawer accommodates 300 slides.

No. of slides accommodated	1500	3000	4500
No. of drawers	5	10	15
Overall height, mm	310	610	900
HJF-770-050E	Microscope slide cabinet, 1500-slide		**£34·14**
HJF-770-090P	Microscope slide cabinet, 3000-slide		**£63·77**
HJF-770-130G	Microscope slide cabinet, 4500-slide		**£85·68**



HJF-530



HJF-580



HJF-610



HJF-640



HJF-680



HJF-710



HJF-770-050

Gallenkamp

STAINING ACCESSORIES



HJL-200

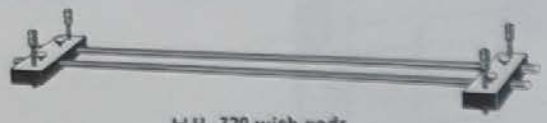
STAINING BOTTLE STAND, polished hardwood, for twelve 30ml dropping bottles.

HJL-200-C Staining bottle stand **£2·31**

ACCESSORIES

Dropping bottles for stains See BTR-500

Trays for protecting bench tops from spilt stains See BTS-910



HJL-320 with rods

STAINING RACK, for slides, GALLENKAMP, for use over laboratory sinks. Comprises two plated brass blocks each with two 7·5mm diameter holes to take glass rods to span sink and support microscope slides. Each block has milled head screws for clamping glass rods and levelling screws for gently rocking staining fluid or sections. **Without** glass rods.

HJL-320-D Staining rack Pair **£4·39**



HJL-390

STAINING TROUGH, (Coplin jar), heavy glass with drop-on lid. To hold 10 microscope slides 76 × 26mm back to back.

HJL-390-A Staining trough **£0·91**



HJL-430

STAINING JAR, Wilson, polypropylene, with screw-on lid giving liquid tight seal. To hold 10 microscope slides 76 × 26mm back to back. Particularly suitable when staining blood smears and for use with stains in volatile solvents.

HJL-430-L Staining jar **£0·44**

STAINING TROUGH, borosilicate glass, with loose fitting cover, to hold 20 microscope slides 76 × 26mm back to back.

HJL-480-W Staining trough **£0·97**



HJL-480

STAINING TROUGH, glass, with loose fitting cover. To take tray HJL-550-M. Dimensions 83 × 103 × 72mm high. (F)

HJL-520-K Staining trough **£2·61**

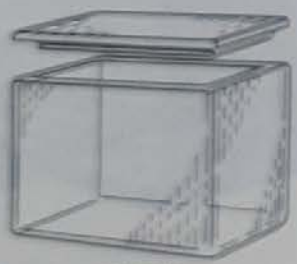
STAINING TRAY, glass, with 10 grooves to accommodate 20 microscope slides 76 × 26mm back to back. Fits into staining trough HJL-520-K. Suitable for batch staining procedure, where sections can be immersed in successive reagents without slides being handled. (F)

HJL-550-M Staining tray **£2·06**

ACCESSORY

Wire handle, for lifting tray HJL-550-M into and out of trough HJL-520-K.

HJL-560-502E Wire handle **£0·34**



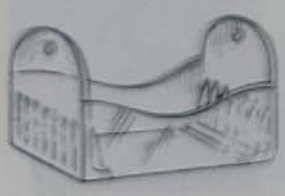
HJL-520

STAINING BLOCK, clear polished glass, with cavity 30mm diameter × 6mm deep. Complete with flat glass cover 37mm square to minimise evaporation. (F)

HJL-630-S Staining block **£0·34**

STAINING BLOCK, as HJL-630-S but in black polished glass. (F)

HJL-660-U Staining block **£0·38**



HJL-550



HJL-630
HJL-660

Gallenkamp LABORATORY HOTPLATES

- **Models available to provide surface temperatures up to 550°C**
- **Built-in thermostat or energy regulator on bench standing models**

Controls

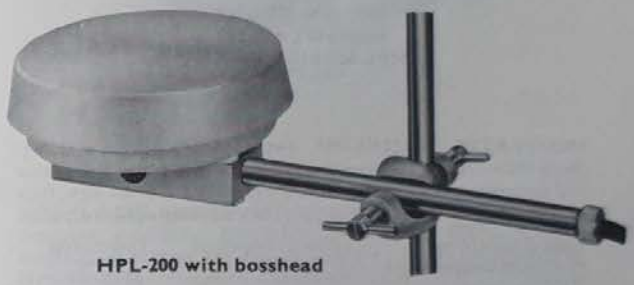
Energy regulators have arbitrary scales and control power input and consequently the hotplate temperature by periodically switching the electricity supply on and off.

Thermostats are hydraulic with direct reading scales. Surface temperature fluctuation of the plate is maintained at about 5°C.

Surface temperature

The maximum surface temperature obtained on a hotplate is dependent on sample loading and siting of the plate. The temperature figures quoted are nominal and are intended to serve as a guide only.

RETORT STAND MOUNTING



HPL-200 with bosshead



HPL-300

HOTPLATE, *GALLENKAMP,* **circular,** retort stand mounting. With 125mm diameter aluminium alloy plate and a support tube through which the mains cable passes. Without controller. Maximum temperature 350°C. Mass 1·3kg. Heater rating 350 W. For 220–240V supplies.

HPL-200-F Hotplate **£30·94**

SPARE PART

HPL-210-010S Heating element, 350 W, 220–240 V **£5·29**

HOTPLATE, *GALLENKAMP,* **circular,** retort stand mounting. With 150mm diameter cast iron aluminium sprayed plate and mains cable but **without** controller. Has an integral fixed length mounting clamp giving a centre to centre distance of approximately 100mm. Maximum temperature 550°C. Mass 2kg. Heater rating 750 W. For 220–240V supplies.

HPL-300-U Hotplate **£31·50**

SPARE PART

HPL-310-010K Heating element, 750 W, 220–240 V **£5·96**

ACCESSORIES for HPL-200-F and HPL-300-U

Power controller	*See EFP-400-D*
Retort rods and stands	*See STA-440 et seq.*
Bosshead, for use with HPL-200-F	*See STE-330*

SURFACE TEMPERATURE MEASUREMENT



Indicating strips	*See THT-500*
Dial thermometers	*See THT-730*
Electrical thermometers	*See THV-220 and THV-450*

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Gallenkamp LABORATORY HOTPLATES

BENCH STANDING



HPL-500-010
(HPL-500-050 is similar)



HPL-600-050 with
hobs HPL-610-502
(HPL-600-010 is similar)

HOTPLATES, *GALLENKAMP,* **circular,** bench standing. With 150mm diameter cast iron aluminium sprayed plate, mains cable and controller. The case has provision for a retort rod screwed M10 x 1·5 and diameter up to 13mm. Overall dimensions 210 x 190 x 130mm high. Mass 2·4kg. Heater rating 750 W. With instructions. For 220–240 V a.c. single phase supplies.

Type of controller	Energy regulator	Thermostat
Maximum temperature	550°C	275°C
HPL-500-010B Hotplate, energy regulator, 550°C		**£36·00**
HPL-500-050M Hotplate, thermostat, 275°C		**£39·38**

SPARE PART

HPL-510-010R	Heating element, 750 W, 220–240 V a.c.	**£7·03**

HOTPLATES, *GALLENKAMP,* **rectangular,** bench standing. With 490 x 270mm cast iron aluminium sprayed plate, mains cable and controller. Overall dimensions 490 x 300 x 170mm high, Mass 18kg. Heater rating 2k W. For 220–240 V a.c. single phase supplies.

Type of controller	Energy regulator	Thermostat
Maximum temperature	400°C	275°C
HPL-600-010Q Hotplate, energy regulator, 400°C		**£88·88**
HPL-600-050E Hotplate, thermostat, 275°C		**£92·25**

SPARE PART

HPL-610-010J	Heating element, 2000 W, 220–240 V a.c.	**£15·30**

ACCESSORY

Hob, stainless steel, 490 x 100mm. Provides a useful extension to the working surface for simmering. One or two may be fitted.

HPL-610-502L	Hob	**£8·55**

Gallenkamp MAGNETIC STIRRER HOTPLATES

- Single and 3-test models
- Thermostat or energy regulator control of temperature
- Variable speed stirring
- Complete with PTFE followers



HOTPLATES

All dimensions and maximum temperatures quoted are nominal



HPS-340



HPS-390

HOTPLATES, circular, with plate, ventilated case and energy regulator controller. Maximum temperature 500°C. Overall height 170mm, Mass 5kg. For 220–240V a.c. single phase supplies.

HPS-340-010L	Hotplate, 150mm dia., 1kW	**£17-44**
HPS-340-050W	Hotplate, 200mm dia., 2kW	**£19-54**



HPS-460

HOTPLATE, rectangular, with 220 × 150mm plate set in metal top, ventilated case and energy regulator controller. Maximum temperature 500°C. Overall dimensions 400 × 210 × 150mm high, Mass 7kg. Heater rating 2kW. For 220–240V a.c. single phase supplies.

HPS-390-C	Hotplate	**£25-31**

HOTPLATES, rectangular, with cast iron plate, stainless steel case, energy regulator controller and mains indicator lamp. Maximum temperature 350°C. For 220–240V a.c. single phase supplies.

Dimensions of plate, mm	305 × 230	457 × 305	686 × 305
Rating, kW	1	2	3
No. of elements	1	2	3
Mass, kg	10	21	29

HPS-460-010M	Hotplate, 305 × 230mm	**£80-30**
HPS-460-050A	Hotplate, 457 × 305mm	**£94-60**
HPS-460-090L	Hotplate, 686 × 305mm	**£150-70**



HPS-600

SPARE PART

HPS-470-010F	Heating element, 1kW, 220–240V	**£7-71**

HOTPLATE, radiant, single ring, with metal sheathed 180mm diameter spiral element mounted in stoved enamel ventilated case with three-heat switch controller. Overall dimensions 250 × 250 × 110mm high, Mass 2·7kg. Heater rating 1·2kW. For 220–240V a.c. single phase supplies. (F)

HPS-600-S	Hotplate	**£11-34**

HOTPLATE, radiant, double ring, with metal sheathed 140mm diameter spiral elements mounted in vitreous enamel top plate, ventilated case and energy regulator controller for each ring. Overall dimensions 410 × 230 × 160mm high, Mass 4·5kg. Heater rating 2·4kW. For 220–240V a.c. single phase supplies.

HPS-650-G	Hotplate	**£28-19**



HPS-650

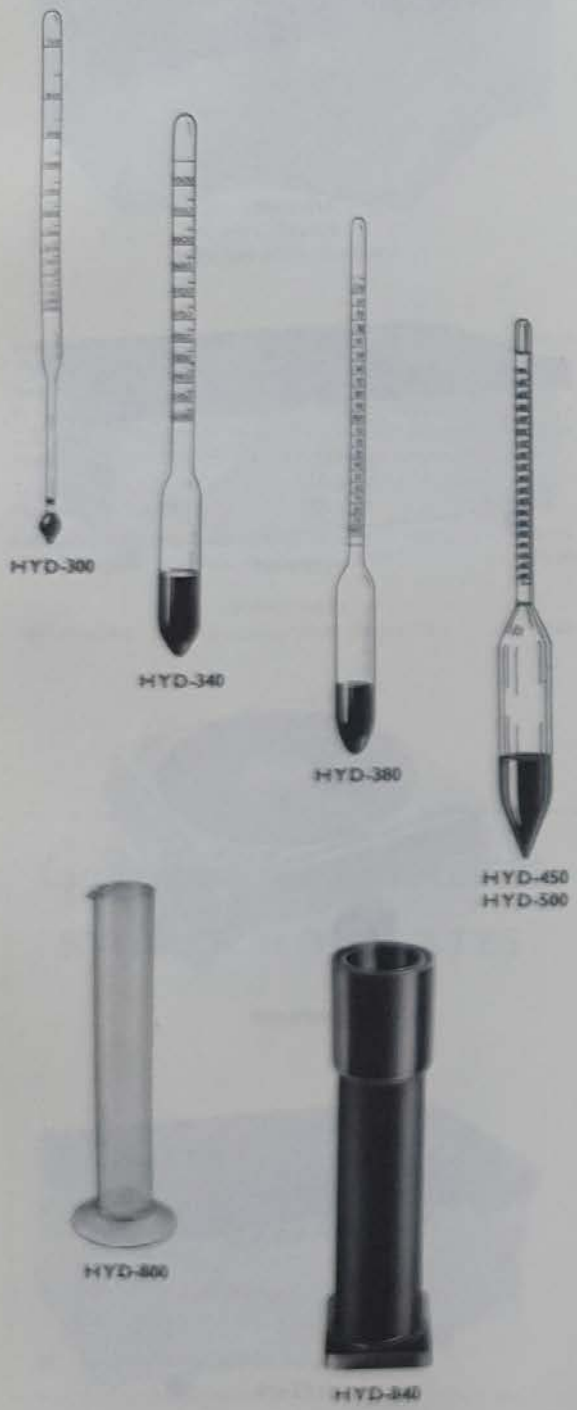
SPECIFIC GRAVITY HYDROMETERS

HYDROMETER, shot loaded, range 0·70 to 2·00, subdivided in 0·01. Overall length approximately 380mm.

HYD-300-B	Hydrometer	£2·87

HYDROMETERS, shot loaded, subdivided in 0·005. Overall length approximately 250mm.

HYD-340-050E	Hydrometer, 0·70 to 1·00	£1·52
HYD-340-070V	Hydrometer, 1·00 to 1·50	£1·52
HYD-340-090P	Hydrometer, 1·50 to 2·00	£1·52



HYDROMETERS, two hundred degree series, shot loaded, subdivided in 0·002. Overall length approximately 250mm. Range 0·80 to 1·00 adjusted for low surface tension, others adjusted for medium surface tension.

HYD-380-050W	Hydrometer, 0·80 to 1·00	£1·41
HYD-380-070Q	Hydrometer, 1·00 to 1·20	£1·41
HYD-380-090K	Hydrometer, 1·20 to 1·40	£1·41
HYD-380-110H	Hydrometer, 1·40 to 1·60	£1·41
HYD-380-130B	Hydrometer, 1·60 to 1·80	£1·41
HYD-380-150S	Hydrometer, 1·80 to 2·00	£1·41

HYDROMETERS, BS 718 Series M100, shot loaded, subdivided in 0·002. Overall length approximately 250mm. Ranges 0·60 to 1·00 adjusted for low surface tension. Ranges 1·00 to 1·30 adjusted for medium surface tension.

HYD-450-030S	Hydrometer, 0·60 to 0·70	£1·35
HYD-450-050M	Hydrometer, 0·70 to 0·80	£1·35
HYD-450-070G	Hydrometer, 0·80 to 0·90	£1·35
HYD-450-090A	Hydrometer, 0·90 to 1·00	£1·35
HYD-450-110U	Hydrometer, 1·00 to 1·10	£1·35
HYD-450-130X	Hydrometer, 1·10 to 1·20	£1·35
HYD-450-150Y	Hydrometer, 1·20 to 1·30	£1·35

HYDROMETERS, BS 718 Series S50, shot loaded, subdivided in 0·002. Overall length approximately 190mm. Ranges 0·60 to 1·00 adjusted for low surface tension. Ranges 1·00 to 1·65 adjusted for medium surface tension.

HYD-500-010F	Hydrometer, 0·60 to 0·65	£1·29
HYD-500-030W	Hydrometer, 0·65 to 0·70	£1·29
HYD-500-050Q	Hydrometer, 0·70 to 0·75	£1·29
HYD-500-070K	Hydrometer, 0·75 to 0·80	£1·29
HYD-500-090E	Hydrometer, 0·80 to 0·85	£1·29
HYD-500-110B	Hydrometer, 0·85 to 0·90	£1·29
HYD-500-130S	Hydrometer, 0·90 to 0·95	£1·29
HYD-500-150M	Hydrometer, 0·95 to 1·00	£1·29
HYD-500-170G	Hydrometer, 1·00 to 1·05	£1·29
HYD-500-190A	Hydrometer, 1·05 to 1·10	£1·29
HYD-500-210U	Hydrometer, 1·10 to 1·15	£1·29
HYD-500-230X	Hydrometer, 1·15 to 1·20	£1·29
HYD-500-250Y	Hydrometer, 1·20 to 1·25	£1·29
HYD-500-270C	Hydrometer, 1·25 to 1·30	£1·29
HYD-500-290T	Hydrometer, 1·30 to 1·35	£1·29
HYD-500-310Q	Hydrometer, 1·35 to 1·40	£1·29
HYD-500-330K	Hydrometer, 1·40 to 1·45	£1·29
HYD-500-350E	Hydrometer, 1·45 to 1·50	£1·29
HYD-500-370V	Hydrometer, 1·50 to 1·55	£1·29
HYD-500-390P	Hydrometer, 1·55 to 1·60	£1·29
HYD-500-410M	Hydrometer, 1·60 to 1·65	£1·29

HYDROMETERS, Twaddell, shot loaded, overall length approximately 160mm. Conversion: specific gravity = (°Tw x 0·005) + 1·000.

HYD-550-030K	Hydrometer, 0 to 24°Tw	£1·13
HYD-550-050E	Hydrometer, 24 to 48°Tw	£1·13
HYD-550-070V	Hydrometer, 48 to 74°Tw	£1·13
HYD-550-090P	Hydrometer, 74 to 102°Tw	£1·13
HYD-550-110M	Hydrometer, 102 to 138°Tw	£1·13

HYDROMETER TRIAL JARS

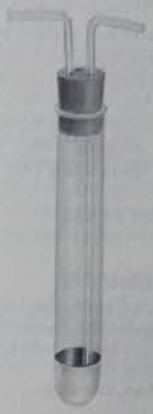
HYDROMETER TRIAL JARS, glass, with spout. Dimensions given are height x diameter.

HYD-800-030V	Jar, 200 x 50mm	£1·33
HYD-800-050P	Jar, 250 x 50mm	£1·45
HYD-800-070J	Jar, 300 x 50mm	£1·58
HYD-800-090D	Jar, 350 x 50mm	£2·04
HYD-800-110A	Jar, 400 x 75mm	£2·30

HYDROMETER TRIAL JAR, polythene, with overflow well at the top. 300mm overall height x 55mm diameter.

HYD-840-C	Jar, 300 x 55mm	£2·78

HYGROMETERS



HYT-200



HYT-230



HYT-280

HYGROMETER, Regnault, single type, for determination of the dew point temperature. Glass tube, 140mm long × 24mm diameter with chromium plated copper thimble cemented to base, is fitted with a rubber bung carrying two right-angled glass tubes for air inlet and outlet and a thermometer. With instructions.

HYT-200-K Hygrometer **£5·37**

SPARE PART

Thermometer *See HYT-240-010C*

HYGROMETER, Regnault, double type, for determination of the dew point temperature. Two glass tubes, 145mm long × 20mm diameter each with side arm and silver thimble cemented to base, are each fitted with a rubber bung carrying a thermometer 0 to 50 × 0·5°C. One tube also has a right-angled glass tube for air inlet. Tubes mounted on a stand with tripod base, height approximately 200mm. With instructions.

HYT-230-M Hygrometer **£19·69**

SPARE PART

HYT-240-010C Thermometer 0 to 50 × 0·5°C **£1·12**



HYT-340



HYT-370

THERMOMETER, Kata, for measuring the efficiency of ventilation and cooling effect of air (Reference: Med. Res. Council: Special Reports, 73, 100; 11; 26; Min. Labour, Welfare Pamphlets, 5, 1953). Red spirit filled thermometer, overall length approximately 225mm, with marks at 35 and 38°C, and bulb surrounded by gauze.

In use, the bulb is heated in water and dried. The time of fall of the meniscus between the two marks indicates the rate of heat loss and hence the cooling power. With instructions.

HYT-280-A Thermometer, Kata **£17·21**



HYT-410

PAPER AND HAIR HYGROMETERS

HYGROMETER, paper, with anodised scale 20 to 100 × 5% r.h., in plastics case 75mm diameter.

HYT-340-U Hygrometer, paper **£6·77**

HYGROMETER, hair, with anodised scale 0 to 100 × 1% r.h., in metal case 100mm diameter. (F)

HYT-370-W Hygrometer, hair **£5·60**

THERMOHYGROMETER, hair, with silvered metal scale 0 to 100 × 1% r.h. Accurate to ±3% in the range 30 to 90% at temperatures up to 45°C. With bimetallic thermometer having dual scales −5°C to +50°C and 20 to 120°F. In chromium plated case 125mm diameter.

HYT-410-K Thermohygrometer **£20·79**

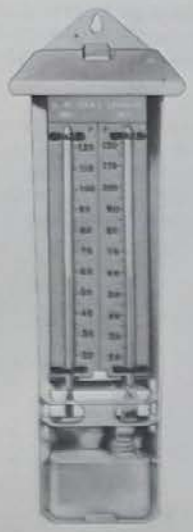
MAXIMUM AND MINIMUM THERMOMETERS

- **Wall mounting**
- **Readings in °C and °F**

See THR-600-S and THR-630-U

Gallenkamp

WET AND DRY BULB HYGROMETERS



HYT-470

HYGROMETERS, Mason, with wet and dry bulb thermometers on polished zinc scale in polypropylene frame with polythene reservoir and spare wicks. HYT-470-030F and HYT-470-070Q are to BS 2841.

HYT-470-030F	Hygrometer, −5 to 50 × 0·5°C	**£4·84**
HYT-470-050W	Hygrometer, 0 to 100 × 1°C	**£11·97**
HYT-470-070Q	Hygrometer, 20 to 120 × 1°F	**£4·84**

SPARE PARTS

HYT-490-030X	Wicks	Pack of 10 **£0·36**

ACCESSORIES

Conversion tables, for computation of relative humidity, vapour pressure and dew point from the readings of non-aspirated wet and dry bulb screen hygrometers.

HYT-490-506X	Conversion tables, Celsius	**£0·73**
HYT-490-508K	Conversion tables, Fahrenheit	**£0·73**

ASPIRATED HYGROMETERS



HYT-540

HYGROMETERS, Assman, British Meteorological Office pattern, with spring driven fan to draw air past wet and dry bulb thermometers to provide accurate readings which may be used as standard to calibrate readings from other humidity measuring instruments. The thermometers are held in a metal frame on which the fan is mounted and the bulbs are screened from radiation by plated and polished tubes, enabling the instrument to be used even in bright sunlight. In case, with wick, wick moistener, suspension rod and simple plastics conversion slide.

HYT-540-030S	Hygrometer, −5 to 50 × 0·5°C	**£115·50**
HYT-540-050M	Hygrometer, 20 to 120 × 1°F	**£115·50**

SPARE PARTS

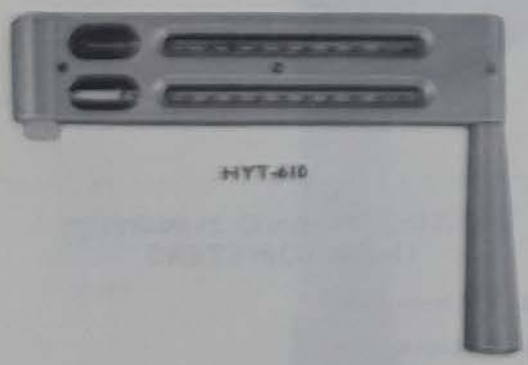
HYT-560-030E	Thermometer, −5 to 50 × 0·5°C	**£5·50**
HYT-560-050V	Thermometer, 20 to 120 × 1°F	**£5·50**
HYT-560-110G	Wicks	Pack of 100 **£1·10**

ACCESSORIES

Conversion tables, for computation of relative humidity, vapour pressure and dew point from the readings of aspirated and whirling hygrometers.

HYT-560-502M	Conversion tables, Celsius	**£1·21**
HYT-560-504Y	Conversion tables, Fahrenheit	**£1·10**

WHIRLING HYGROMETERS



HYT-610

HYGROMETERS, whirling, with wet and dry bulb thermometers, scale length 85 mm, having lens front stems and mounted in plastics frame fitted with a handle which enables the frame to be rotated. With simple plastics slide rule.

HYT-610-030Y	Hygrometer, −5 to 50 × 0·5°C	**£8·35**
HYT-610-050C	Hygrometer, 20 to 120 × 1°F	**£8·35**

SPARE PARTS

HYT-630-030R	Thermometer, −5 to 50 × 0·5°C	**£1·35**
HYT-630-050L	Thermometer, 20 to 120 × 1°F	**£1·35**
HYT-630-090W	Wicks	Pack of 25 **£0·34**

ACCESSORIES

HYT630-502C	Carrying case	**£1·46**
	Conversion tables, simple pattern, for computation of relative humidity from the readings of whirling hygrometers	
HYT-630-512W	Conversion tables, Celsius	**£0·19**
HYT-630-516K	Conversion tables, Fahrenheit	**£0·19**
	Conversion tables	See HYT-560

THERMOHYGROGRAPHS

THERMOHYGROGRAPHS, bimetallic and hair elements, giving continuous records in two colours of temperatures and relative humidities on a single chart attached to a drum driven by a clockwork movement. Temperature accuracy ±1% of full scale; relative humidity range 0 to 100% r.h., accuracy ±3% from 20 to 80% r.h. Housed in white stove enamelled case. With two bottles of ink, 100 charts and instructions.

HYT-800-030W	Thermohygrograph, 24 hour, 0 to 50°C	**£88·00**
HYT-800-070K	Thermohygrograph, 24 hour, 10 to 60°C	**£88·00**
HYT-800-110B	Thermohygrograph, 7 day, 0 to 50°C	**£88·00**
HYT-800-150M	Thermohygrograph, 7 day, 10 to 60°C	**£88·00**



HYT-800

SPARE PARTS

HYT-820-030Y	Charts, 24 hour, 0 to 50°C	Pack of 200 **£5·91**
HYT-820-070T	Charts, 24 hour, 10 to 60°C	Pack of 200 **£5·91**
HYT-820-110K	Charts, 7 day, 0 to 50°C	Pack of 200 **£5·91**
HYT-820-150V	Charts, 7 day, 10 to 60°C	Pack of 200 **£5·91**
HYT-820-290F	Ink, green	Pack of 5 bottles **£2·44**
HYT-820-310C	Ink, violet	Pack of 5 bottles **£2·44**
HYT-820-370H	Pens, short, temperature trace	Pack of 5 **£3·00**
HYT-820-390B	Pens, long, relative humidity trace	Pack of 5 **£3·00**

ACCESSORIES

Change wheels to convert from 24 hour to 7 day recording.

HYT-820-504M	Change wheels	Set **£2·73**

Change wheels to convert from 7 day to 24 hour recording.

HYT-820-506Y	Change wheels	Set **£2·73**

THERMOHYGROGRAPH, *RUSTRAK*, ranges 15 to 35°C and 10 to 90% r.h. for recording atmospheres in ovens and rooms. A combined thermistor and electrohumidity probe is connected by 2m of cable to a galvanometer movement housed in a compact, robust case. The deflection of the galvanometer is recorded by the pointer being pressed on to a pressure sensitive paper chart roll 60mm wide. The recordings occur at frequent intervals so that the trace appears as a continuous line. The chart drive mechanism is mounted on a swing down front panel for easy removal and replacement of the chart roll.

The chart speed is 125mm/h which enables each roll to run continuously for approximately two months. Temperature can be read directly to an accuracy of better than ±1°C and relative humidity to ±4% between 20 and 80% r.h. Changes of temperature and relative humidity are readable to even smaller values. With one chart roll. For single phase supplies.

HYT-890-010L	Thermohygrograph, 220–260V 50Hz	**£217·80**
HYT-890-030F	Thermohygrograph, 105–125V 60Hz	**£217·80**



HYT-890

SPARE PART

HYT-910-010N	Chart roll	**£3·26**

THERMOGRAPHS

- **7-day clockwork movement**
- **Ranges −10 to +40°C and 0 to 50°C**
- **Provides ink trace on scaled chart**



See THV-820

ICE



ICE-300

ICE SHAVING MACHINE, hand operated, for reducing ice lumps to a fine powder. Comprises 100mm diameter aluminium alloy hopper, with stainless steel rotating cutting blades, mounted on a base 230 × 130mm. Capacity 7kg, throughout 1·4kg/min.

ICE-300-X Ice shaving machine **£123·75**

ICE CUBE MAKER, with six ice trays to produce 84 ice cubes every 3·5 hours. Total capacity approximately 20 litres. The interior is fitted with three refrigerated shelves each able to accommodate two ice trays and there is space at the bottom for an ice storage container. The refrigeration unit has a hermetically sealed system with a low consumption compressor. Overall dimensions 640mm high × 350mm wide × 440mm deep, mass 33kg. For 220–240V 50Hz single phase supplies.

ICE-350-C Ice cube maker **£112·73**



ICE-350

ICE TRAY, capacity 21 cones of ice each approximately 6g and measuring 24mm diameter × 24mm high. Constructed of polythene, overall dimensions 260 × 90 × 26mm high.

ICE-390-U Ice tray **£0·33**

ICE STORAGE CONTAINER, polystyrene, with smooth white moulded lid and interior 180mm deep × 150mm diameter. With tough exterior and rigid plastics foam insulation. Overall dimensions 230mm high × 190mm diameter.

ICE-440-B Ice storage container **£4·35**

ICE FLAKE MAKERS

For production and storage of ice flakes. Storage bins have stainless steel liners. the quoted ice production rates are maxima and occur with a water supply temperature of 10°C and an ambient temperature of 15°C. At higher temperatures the production is less.



ICE-390

ICE FLAKE MAKER, as specified, with front opening storage bin and air cooled compressor. Ice production 70kg/24 hours, storage bin capacity 40kg. Overall dimensions 1120mm high × 610mm wide × 620mm deep. Mass 98kg. For 220–240V 50Hz single phase supplies. (F)

ICE-600-N Ice flake maker **£745·80**

ICE FLAKE MAKER, as specified, with top opening storage bin and air cooled compressor. Ice production 160kg/24 hours, storage bin capacity 50kg. Overall dimensions 1120mm high × 850mm wide × 620mm deep. Mass 120kg. For 220–240V 50Hz single phase supplies. (F)

ICE-650-B Ice flake maker **£866·80**



ICE-440



ICE-650

Gallenkamp INCUBATORS

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Griffin INCUBATOR

A simply designed and ruggedly constructed incubator, ideal for school and technical college use

- **Temperature range 5°C above ambient to 100°C**
- **Direct reading thermostat**
- **All-steel basic construction**
- **Easily cleaned vitreous enamelled interior**
- **Large window in door for observation of specimens**

Construction

The exterior has a smooth, enamelled finish with radiused corners for easy cleaning. The door, which opens downwards to act as a temporary shelf when transferring specimens, has a recessed handle and a window which permits examination of contents during incubation without disturbance. Insulation is of glass fibre and reflective foil. Two plated wire grid shelves are supplied having offset guide rails which enable each shelf to be reversed giving six alternative positions. A thermometer port, lined with a tube of 17mm internal diameter, is fitted to the top of the incubator. This can also be used as a ventilator or for entry of tubing or wires, or may be closed with a stopper.

Heating and temperature control

A sheathed heater is mounted beneath a fixed shelf in the base of the interior. A single calibrated control, incorporating an ON-OFF switch and thermostat setting control, is mounted on the front panel together with mains and heater indicator lamps.



IN A-200

Technical data

Temperature range	5°C above ambient to 100°C
Temperature fluctuation	±0·5°C
Power rating, maximum, W	400
No. of shelves supplied	2
Internal dimensions, height × width × depth, mm	265 × 403 × 288
Overall dimensions, height × width × depth, mm	393 × 472 × 415

INCUBATOR, *GRIFFIN*, as specified, with instructions but without thermometer. For 220-240V a.c. single phase supplies.

IN A-200-K Incubator, 220-240V **£90·00**

Gallenkamp ECONOMY INCUBATORS

Economically priced incubators for use in schools and technical colleges

- **Temperature range 5°C above ambient to 80°C**
- **Aluminium interior**
- **Inner glass door**
- **Direct reading thermostat**
- **Gravity convection**



INA-300

Technical data

For definition of terms, see page 466.

Size No.	1	2
Temperature range	5°C above ambient to 80°C	
Temperature fluctuation at 38°C	0·5°C	0·5°C
Temperature variation at 38°C	±2°C	±3°C
Power rating, maximum, W	150	250
Shelf size, mm	480 × 300	480 × 400
No. of shelves supplied	2	3
No. of shelf positions	4	6
Interval between positions, mm	65	65
Working volume, litres	50	97
Internal dimensions, height × width × depth, mm	330 × 480 × 355	470 × 480 × 460
Overall dimensions, height × width × depth, mm	575 × 590 × 490	710 × 590 × 590
Mass, kg	24	26

Construction

The outer casing is of sheet steel finished in light grey stoved enamel. The interior is of aluminium with fixed shelf positions. The walls and door are insulated with glass fibre. The outer door has a heat-break, and the inner glass door closes on to a resilient gasket.

Heating and control

The heating element is enclosed and covered by an aluminium plate and there are no electrical connections within the working space. A hydraulic thermostat with a scale calibrated in °C gives good temperature control. The control knob has an OFF position and an indicator lamp shows operation of the heater.

INCUBATORS, *GALLENKAMP* **ECONOMY**, gravity convection, as specified. With instructions. For a.c. single phase supplies.

INA-300-010W	Incubator, size No. 1, 220–240V	**£178·88**
INA-300-030G	Incubator, size No. 1, 110–120V	**£180·00**
INA-300-110S	Incubator, size No. 2, 220–240V	**£196·88**
INA-300-130M	Incubator, size No. 2, 110–120V	**£198·00**

ACCESSORIES

Shelves	*See OX6-320*
Thermometer, −10 to 110°C	*See THK-210-050T*
Temperature recorder, −10 to 110°C	*See THX-600*
Floor stand	*See OXH-720-C*

Gallenkamp MODULAR INCUBATORS

- Three sizes designed for free standing or building into space saving stacks
- Door mounted controls, to save space by eliminating side or bottom control compartments
- Transparent plastics protective cover for controls
- Door opening button concealed in underside of control box for security
- Inner glass door
- Choice of hydraulic or solid state thermostat



ANNOUNCEMENT

These products are under development and are expected to become available late 1977

STACKING FACILITY

Three sizes – one bench model, one bench and/or floor model and one floor model are available. The three are designed so that they can be formed into multiple stacks of similar or mixed models and sizes. With this feature, many different laboratory requirements may be accommodated, with the optimum utilisation of laboratory space. Equally composite stacks can be made using our range of modular ovens. For details see page 469.

ALTERNATIVE SERIES

Hydraulic thermostat series

Provides general purpose temperature control accuracy and reliable performance at an economic price.

* Hydraulic thermostat
* Aluminium interior
* Gravity convection

Solid state thermostat series

For applications requiring close temperature control and the extra security in operation provided by a safety thermostat.

* COMPENSTAT solid state thermostat
* Stainless steel interior
* Fan convection
* Safety thermostat

DESIGN

Exterior

The cases of these incubators are constructed of steel and finished in smooth, easily cleaned stoved enamel. Coloured in two tones of grey with the lighter shade on the door, the incubators present an attractive appearance. The door, held shut by a positive action latch, is opened by operating the button which is concealed in the underside of the control box. This avoids accidental opening of the door.

Interior

The interiors of the hydraulic thermostat series are of aluminium. Those of the solid state thermostat series are of stainless steel to BS 971, EN 58B. Both series have fixed, non-tilt runners for the heavily chromium plated wire grid shelves which are supplied or for the optional basket shelves. The same size of shelf fits all three sizes of each incubator series. All incubators have an inner glass door so that specimens can be examined visually without affecting the incubator temperature.

Insulation

Efficient insulation with effective heat-breaks and a rubber magnetic outer door gasket gives a cool exterior and operating economy even at the maximum temperature.

Continued overleaf

Gallenkamp MODULAR INCUBATORS

Ventilation

Incubator air is circulated in the hydraulic thermostat series by natural convection. In the solid state COMPENSTAT thermostat series, air is circulated within the workspace by a guarded fan at the rear to provide improved temperature distribution. In both series provision is made for ventilating the working space.

Controls

All the incubator temperature controls are in a control box mounted on the door with the fascia at a convenient height and angle.

Protective cover

All models are fitted with a hinged transparent plastics cover to protect the controls from accidental alteration of the settings.

Choice of two controls

The hydraulic thermostat series of incubators has temperature control by a direct reading hydraulic thermostat scaled 20 to 100°C. An indicator lamp shows operation of the thermostat.

The solid state thermostat series of incubators is fitted with the COMPENSTAT direct reading solid state thermostat scaled 20 to 100°C. An indicator lamp lights when the incubator reaches the set temperature. In addition, a completely independent, adjustable safety thermostat is fitted and an indicator lamp lights when the setting temperature of the safety thermostat is exceeded.

Temperature measurement

All the incubators have a hole in the top for a thermometer THR-510-T. For underbench or stacking applications, a thermometer INC-320-532E can be clipped inside the inner glass door.

see availability announcement page 383

Technical data

For definition of terms, see page 466.

Series	Hydraulic Thermostat			Solid State Thermostat		
Size No.	1	2	3	1	2	3
Temperature fluctuation at 38°C	0·5°C	0·5°C	0·5°C	0·1°C	0·1°C	0·1°C
Temperature variation at 38°C	±4°C	±4°C	±4°C	±2°C	±2°C	±2°C
Power rating maximum, W	150	250	400	200	300	450
Shelf size, mm	470×330	470×330	470×330	470×330	470×330	470×330
No. of shelves supplied	2	3	4	2	3	4
No. of shelf positions	3	5	9	3	5	9
Working volume, litres	60	105	195	60	105	195
Internal dimensions, height × width × depth, mm	330×475×370	580×475×370	1080×475×370	330×475×370	580×475×370	1080×475×370
Overall dimensions, height × width × depth, mm	500×610×680	750×610×680	1250×610×680	500×610×680	750×610×680	1250×610×680
Base dimensions, mm	610×480	610×480	610×480	610×480	610×480	610×480



INC-250

INCUBATORS, modular, *GALLENKAMP*, hydraulic thermostat series, as specified. With instructions. For a.c. single phase supplies.

INC-250-010V	Incubator, size No. 1, 220–240V	**£93·38**
INC-250-030P	Incubator, size No. 1, 110–120V	**£95·63**
INC-250-110R	Incubator, size No. 2, 220–240V	**£104·63**
INC-250-130L	Incubator, size No. 2, 110–120V	**£106·88**
INC-250-210N	Incubator, size No. 3, 220–240V	**£129·38**
INC-250-230H	Incubator, size No. 3, 110–120V	**£131·63**

INCUBATORS, modular, *GALLENKAMP*, solid state COMPENSTAT thermostat series, as specified. With instructions. For a.c. single phase supplies.

INC-300-010C	Incubator, size No. 1, 220–240V 50Hz	**£122·63**
INC-300-030T	Incubator, size No. 1, 110–120V 60Hz	**£124·88**
INC-300-110V	Incubator, size No. 2, 220–240V 50Hz	**£136·13**
INC-300-130P	Incubator, size No. 2, 110–120V 60Hz	**£138·38**
INC-300-210R	Incubator, size No. 3, 220–240V 50Hz	**£164·25**
INC-300-230L	Incubator, size No. 3, 110–120V 60Hz	**£166·50**

SPARE PARTS

	Shelf	See OVE-320-150W

ACCESSORIES

	Basket shelf	See OVE-320-500R
INC-320-532E	Dial thermometer, 0 to 110 × 1°C	£11·63
	Thermometer	See THR-510-T
	Stand, for size Nos. 1 and 2	See OVE-320-540U
	Lubricant for fan motor bearings	See LUB-230-E

Gallenkamp INCUBATORS

FAN CONVECTION MODELS

A range of high quality incubators, for use in the fields of biology and microbiology, bacteriology, virology, epidemiology, pathology and biochemistry.

Models available fitted with temperature/time cycling facility which meets requirement of the membrane filter technique for the examination of water supplies.†

- **Temperature range 5°C above ambient to 100°C**
- **Direct reading COMPENSTAT solid state temperature control with safety thermostat**
- **Stainless steel interior**
- **Toughened plate glass inner door with resilient gasket**
- **Unitised control panel for easy servicing and recessed to minimise accidental alteration of control settings**



INC-700

DESIGN

Exterior

The exterior is finished in hard wearing light grey stoved enamel. The outer door has a rubber magnetic gasket and the inner glass door closes on a resilient gasket.

Interior

Constructed from chemically resistant stainless steel to BS 971, EN 58B with fixed shelf runners and a removable baffle at the rear which guards the fan and heater.

Shelves

The steel wire grid shelves are electroplated with nickel and chromium.

Basket shelves

Basket shelves with grid sides 70mm high are available as optional extras. These are of similar construction and finish to the ordinary shelves and slide directly on to the shelf runners. They are convenient for pre-loading of small articles which can then be inserted quickly into the incubator with minimum heat loss.

Heating and air circulation

Air drawn from the centre of the incubator is recirculated to the top and bottom of the workspace by a rear mounted fan. A stainless steel sheathed heater surrounds the fan and is shielded from the workspace by the baffle.

Temperature control

A direct reading COMPENSTAT solid state thermostat maintains excellent and reliable temperature control. An independent safety thermostat, with warning lamp, is fitted.

Ventilation control

An adjustable ventilator in the top of the incubator can be closed to shut off the flow of outside air. This ventilator can also be lifted out to provide a 28mm diameter port through which tubes may be fitted to feed gases other than air (e.g. CO_2, N_2, etc.) into the working space.

Temperature measurement

The ventilator incorporates a clip to retain a mercury in glass thermometer. Alternatively, accessory dial thermometer INC-320-532E can be fitted inside the inner glass door.

Time cycling

A version of the incubator INC-750 incorporates a time switch and a COMPENSTAT solid state thermostat with two temperature setting controls, to give automatic switching between any two temperatures within the range of the incubator in addition to the usual constant temperature operation. The shortest time between switchings is 75minutes. Cycles of 12 or 24 hours duration are readily obtainable and non-repetitive cycles can also be obtained.

† **References:**
Bacteriological Examination of Water Supplies, HMSO Report 71, 1969.
Water Treatment and Examination, W. S. Holden, 1970.

Continued overleaf

Gallenkamp INCUBATORS

Technical data

Data when tested according to British Standard 2648 methods. Although BS 2648 is intended for testing unloaded drying ovens, the test methods form an excellent basis for comparing incubators.

For definition of terms, see page 466.

Size No.		1	2	3
Temperature range		5°C above ambient to 100°C		
Temperature fluctuation	at 38°C	0·1°C	0·1°C	0·1°C
	at 60°C	0·1°C	0·1°C	0·1°C
Temperature variation	at 38°C	±0·25°C	±0·25°C	±0·5°C
	at 60°C	±0·5°C	±0·75°C	±1·0°C
Time to heat	to 38°C, min	15	25	20
	to 60°C, min	25	40	30
Recovery time after door opened one minute	at 38°C, min	6	6	6
	at 60°C, min	10	10	10
Power rating, maximum, W		250	250	500
Shelf size, mm		380 × 340	480 × 440	580 × 440
No. of shelves supplied		3	3	4
No. of shelf positions		4	5	6
Interval between positions, mm		110	115	120
Maximum shelf area, m^2		0·5	1	1·5
Working volume, litres		66	140	210
Internal dimensions, height × width × depth, mm		455 × 405 × 355	605 × 505 × 455	760 × 605 × 455
Overall dimensions, height × width × depth, mm		800 × 570 × 665	955 × 670 × 765	1105 × 770 × 765
Base dimensions, mm		550 × 530	650 × 630	750 × 630
Mass, kg		55	77	93

INCUBATORS, *GALLENKAMP,* **fan convection,** as specified, with direct reading COMPENSTAT solid state thermostat, safety thermostat, stainless steel interior, toughened glass inner door, shelves, mains and load indicator lamps. With instructions but **without** thermometer. For single phase supplies.

INC-700-010Q	Incubator, size No. 1, 220–240V 50Hz	**£301·50**
INC-700-030K	Incubator, size No. 1, 110–120V 60Hz	**£304·88**
INC-700-110M	Incubator, size No. 2, 220–240V 50Hz	**£345·38**
INC-700-130G	Incubator, size No. 2, 110–120V 60Hz	**£348·75**
INC-700-210Y	Incubator, size No. 3, 220–240V 50Hz	**£392·63**
INC-700-230C	Incubator, size No. 3, 110–120V 60Hz	**£396·00**

INCUBATORS, *GALLENKAMP,* **fan convection,** as INC-700 but incorporating a time switch and dual control COMPENSTAT solid state thermostat to give either constant temperature or cylic temperature control. For 220–240V 50Hz single phase supplies.

INC-750-010E	Incubator, size No. 1	**£343·13**
INC-750-110A	Incubator, size No. 2	**£388·13**
INC-750-210T	Incubator, size No. 3	**£436·50**

SPARE PART

Shelves — *See OVH-240*

ACCESSORIES

Dial thermometer	*See INC-320-532E*
Basket shelves	*See OVH-240*
Floor stands	*See OVH-700-Q*
Thermometer, red reflecting	*See THR-510-T*
Temperature recorder	*See THV-600*



Gallenkamp SHAKING REACTION INCUBATORS

Application include:

Shaken culture techniques

Chemical and biological reactions

Reaction kinetics studies

See BKS-300-010F et seq

Gallenkamp COOLED INCUBATORS

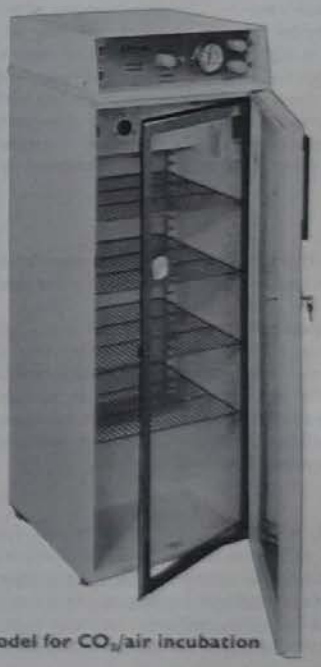
Temperature range approximately 0 to 45°C

- **BASIC MODELS**
- **MODELS WITH INTERIOR ILLUMINATION**
- **MODEL FOR INCUBATION IN CO_2/AIR MIXTURES**
- **MODELS WITH CYCLIC TEMPERATURE AND ILLUMINATION CONTROL**

- COMPENSTAT solid state thermostat controlled
- High and low temperature safety thermostats
- Transparent plastics protective cover for controls
- Efficient ducted air circulation by fan
- Integral dial thermometer in control panel
- Magnetic door gasket



Basic model



Model for CO_2/air incubation

CONSTRUCTION

The outer case is of steel, rust-inhibited and stove enamelled white. The liner is a smooth plastics moulding fitted with shelf supports allowing wide ranges of shelf positions and spacings. Four plated steel grid shelves are supplied. A door-operated interior illuminating lamp is fitted.

For full details and ordering specifications of models available see following pages.

Gallenkamp COOLED INCUBATORS

BASIC MODELS

Suitable for:

- **Biochemical Oxygen Demand (B.O.D.) testing**
- **Accommodates approximately 150 B.O.D. bottles**
- **Incubation serum studies; Enzyme testing**
- **Fruit fly cultivation; Tissue culture work**
- **Immunology; Long term sample storage**

OPERATION

Temperature is controlled by a COMPENSTAT solid state thermostat with direct reading scale. Heating is by a sheathed heating element.

Cooling is provided by a hermetically sealed refrigerator system with quiet running compressor. The evaporator coil is mounted with the fan, heater and thermostat elements, in the air duct at the top of the working space.

The refrigerator system is run continuously when operating at temperatures below or near ambient, but may be switched off when working at higher temperatures. The thermostat control head, refrigerator switch and the mains and heater indicator lamps are mounted in the control compartment on top of the incubator. High and low temperature adjustable safety thermostats are fitted. Working temperature is measured and indicated by a dial thermometer, range −10 to +50°C, mounted in the control panel.

Time cycling

Model INF-630-W is available fitted with temperature/time cycling facility for examination of water supplies by the membrane filter technique.*

This model incorporates a time switch and a COMPENSTAT solid state thermostat with two temperature setting controls to give automatic switching between any two temperatures within the range of the incubator in addition to the usual constant temperature operation. The shortest time between switching is 75 min. Cycles of 12 or 24 hours duration are readily obtainable and non-repetitive cycles can also be obtained.

INCUBATOR, COOLED, *GALLENKAMP*, as specified, with COMPENSTAT solid state thermostat, high and low temperature safety thermostats, dial thermometer, four shelves, ducted air circulation by fan, sheathed heating element and hermetically sealed refrigeration unit, suitable for operation in ambient temperatures up to 40°C. With instructions. For single phase supplies.

INF-600-010R	Incubator, 220–240 V 50 Hz	**£442·13**
INF-600-030L	Incubator, 110–120 V 60 Hz	**£459·00**

INCUBATOR, COOLED, *GALLENKAMP*, as INF-600 but incorporating time switch and dual control COMPENSTAT solid state thermostat to give either constant temperature or cyclic temperature control. With instructions. For 220–240 V 50 Hz single phase supplies.

INF-630-W	Incubator	**£475·88**

ACCESSORIES

INF-660-5188	Shelf	**£4·65**
	Lubricant for fan motor bearings	See LUB-330-E



INF-630

Technical data

Minimum temperature	0°C in 30°C ambient temperatures 5°C in 35°C ambient temperatures 10°C in 40°C ambient temperatures
Maximum temperature	45°C at ambient temperatures up to 40°C
Note: The incubator is unsuitable for use in ambient temperatures above 40°C.	
Heating from 20°C to 45°C, min†	40
Cooling from 20°C to 0°C, min†	60
Temperature fluctuation	Less than 0·1°C
Temperature variation	±1°C
Power rating, maximum, W	375
Shelf size, mm	440 × 270
No. of shelves supplied	4
Working volume, litres	180
Internal dimensions	See diagram on page 390
Overall dimensions, height × width × depth, mm	1340 × 500 × 590
Mass, kg	60

† Approximate times to stability for unloaded incubator in 20°C ambient.

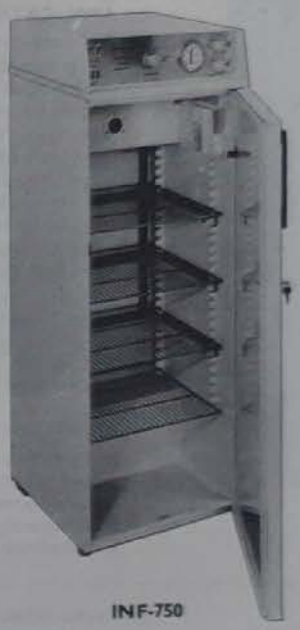
*References:

Bacteriological Examination of Water Supplies, HMSO Report 71, 1969
Water Treatment and Examination, W. S. Holden, 1970

Gallenkamp COOLED INCUBATORS

MODELS WITH INTERIOR ILLUMINATION

- Fitted with six 8W fluorescent lamps
- Model available fitted with time switch to provide conditions of cyclic temperature and cyclic illumination



INF-750

APPLICATIONS

This type of incubator is finding increasing use in many biology, botany, virology, oceanography, water pollution, sewage, agriculture and food research laboratories. It provides a wide range of conditions for studies of synthesising organisms. Temperatures are attainable within the cabinet, enabling the user to study the growth of organisms under tropical or temperate and summer or winter conditions independent of ambient temperature.

Plant growth and oceanographic studies as well as work with algae, moulds and blue-green algae are within the scope of the cabinet. With the illumination switched off, all the functions of a conventional cooled incubator are offered. For example, the incubator may be used to grow organisms for a set period and then the refrigerator can be switched on to suspend further growth for as long as required.

OPERATION

As INF-600 but fitted with six 300mm long 8 W fluorescent lamps mounted three on either side of the workspace. The lamps are controlled by switches on the control box.

Time cycling

As model INF-630-W but with switches for the internal lamps to allow these to be operated continuously or for one, two or three pairs of lamps to be switched on and off at the same times that the temperature changes are initiated.

Technical data

As INF-600 except the following:

Minimum temperature with all lamps on	10°C in 30°C ambient temperature 15°C in 35°C ambient temperature 20°C in 40°C ambient temperature
Power rating, maximum, W	425

INCUBATOR, COOLED, *GALLENKAMP*, as specified, with interior fluorescent illumination. With COMPENSTAT solid state thermostat, high and low temperature safety thermostats, dial thermometer, shelves, ducted air circulation by fan, sheathed heating element and hermetically sealed refrigeration unit. Suitable for operation in ambient temperatures up to 40°C. With instructions. For single phase supplies.

INF-750-010U	Incubator, 220–240V 50Hz	**£565·88**
INF-750-030X	Incubator, 110–120V 60Hz	**£582·75**

INCUBATOR, COOLED, *GALLENKAMP*, as INF-750 but incorporating time switch, dual control COMPENSTAT solid state thermostat and switches to give constant or cyclic temperature conditions with constant or cyclic illumination conditions. With instructions. For single phase supplies.

INF-780-C	Incubator, 220–240V 50Hz	**£601·88**

SPARE PART

Fluorescent lamp	*See VHC-240-0505*

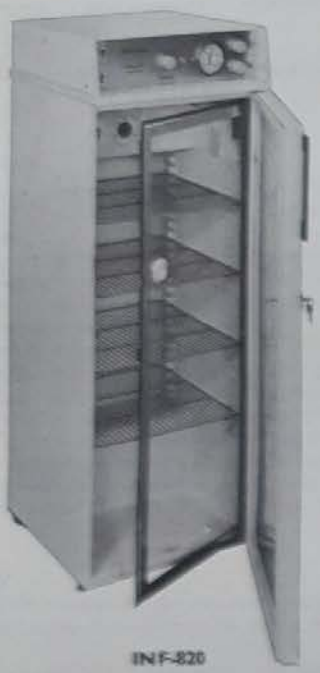
ACCESSORIES

Shelf	*See INF-660-5108*
Lubricant for fan motor	*See LUB-230-E*

Gallenkamp COOLED INCUBATORS

FOR INCUBATION IN CO_2/AIR MIXTURES

- Gas inlet and sampling nozzles
- Unsealed inner Perspex door



INF-820

APPLICATIONS

This incubator meets the needs of laboratories in which cultures are grown for physiological, immunological, radiobiological, virological and other studies, especially where the work requires reliable maintenance of sub-ambient and near-ambient temperatures. Favourable conditions for the cultivation of animal cells are provided when the culture medium is buffered with phosphate-bicarbonate mixtures and the medium is in equilibrium with carbon dioxide in the gas phase. The incubator **is not suitable for use where conditions of high humidity must be achieved and maintained in the working space such as is necessary for open dish culture of mammalian cells.** For such applications incubator INL-350 is required.

The incubator also has other applications in biological sciences. It can, for example, be used for the cultivation of bacteria that grow best in the presence of CO_2 (usually about 5%) enriched atmospheres.

CONSTRUCTION

As INF-600 but with an inlet nozzle at the rear of the control box providing a means of admitting CO_2 or air/CO_2 mixtures A similar nozzle is provided for monitoring CO_2 concentration. A 6mm thick inner rigid transparent plastics door minimises atmosphere loss when the outer door is opened to inspect samples.

Technical data

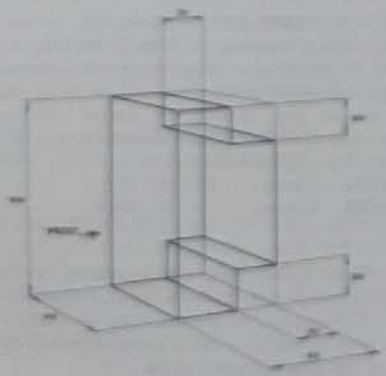
As for INF-600 on page 388.

INCUBATOR, COOLED, *GALLENKAMP*, as specified, for incubations in CO_2 enriched atmospheres. Fitted with gas inlet and sampling nozzles, dial thermometer and unsealed inner rigid transparent plastics door. With instructions. For single phase supplies.

INF-820-010K	Incubator, 220–240V 50Hz	**£510·75**
INF-820-030E	Incubator, 110–120V 60Hz	**£528·75**

ACCESSORIES

Shelf	*See INF-660-510B*
Lubricant for fan motor bearing	*See LUB-230-E*



APPROXIMATE INTERNAL SHAPE AND DIMENSIONS (mm) OF INCUBATORS INF-600 to INF-820

Gallenkamp GAS ANALYSERS

FOR CO_2 ESTIMATION

Orsat gas analysers, approximate accuracy 1%.
See GAS-210-N

Haldane gas analysers, approximate accuracy 0·05%.
See GAS-730-F

Lloyd gas analysers, approximate accuracy 0·02%.
See GAS-500-T

Gallenkamp CO_2/AIR BLENDER

FOR USE WITH CO_2 INCUBATORS

- Simple control of CO_2/air ratios
- Installed in minutes – easy to adjust
- Individual flowmeters for CO_2 and air
- Fitted with CO_2 boost valve



INL-150

BLENDER, CO_2/AIR, *GALLENKAMP*, for measuring and controlling carbon dioxide/air mixtures into incubators and environmental chambers. Incorporates needle valves, inlet nozzles and flowmeters for carbon dioxide and air and a single outlet nozzle for the gas mixture.

The flowmeters are scaled 0·05 to 0·6 litres/min CO_2 and 0·5 to 7 litres/min air respectively and a by-pass valve allows CO_2 to be injected rapidly into the chamber. In metal case for bench mounting with transparent plastics cover fitted over the control panel. All nozzles accept 6·5mm bore flexible tubing. With instructions. Overall dimensions 200 × 250 × 320mm high, mass 4kg.

INL-150-L Blender **£157·50**

ACCESSORIES

Tubing, PVC, size N6·5	*See TWR-670-150P*
Clip, maximum diameter 14mm	*See CNK-640-010L*
Pressure regulator for CO_2	*See GGM-300-G*
Pressure regulator for air	*See GGM-440-Q*

Gallenkamp

COLONY COUNTER

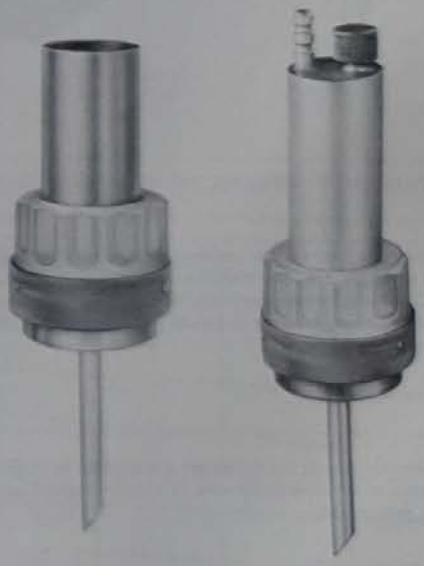


For accurate counting of bacterial and mould colonies.

See CNW-300

Gallenkamp

MEMBRANE FILTERS



Widely used to filter liquids for the separation, examination and analysis of particulate and biological matter.

See FDC-300 et seq.

Gallenkamp CO_2/HUMIDITY INCUBATOR

- 95% or above maximum relative humidity
- Automatic control of CO_2 concentration over range 0 to 25%
- Maximum temperature 60°C
- Safety thermostat for additional protection
- High level controls unaffected by spillage
- Built-in cooling coil and solenoid valve
- Stainless steel liner and shelves
- Glass inner door for observing samples
- Water tight rim seal on inner door



INL-350

This incubator is intended for techniques of open dish tissue cell culture in which the pH of the medium is maintained in equilibrium with the incubator atmosphere content of CO_2. Evaporation is minimized by the high humidity (usually >95% r.h.) attained in the incubator.

DESIGN

Exterior

The exterior surfaces of the incubator are finished in a light grey stoved enamel which is easily cleaned. The outer door is fitted with a magnetic gasket seal.

Interior

The incubator liner is of corrosion resistant stainless steel to BS 970 EN 58B. All seams are welded.

Five fixed shelf runners are fitted to the liner and, at the rear, a removable stainless steel baffle guards the heater, fan and cooling coil and provides ducted air circulation through the incubator working space.

The bottom shelf is a plain sheet of stainless steel and serves to guide the ducted air between itself and the tray containing distilled water situated beneath it. Exchange of moisture between the tray and the circulating air produces rapid equilibrium of incubator humidity.

Other shelves are of perforated stainless steel to allow a flow of air throughout the working space.

An inner glass door is fitted to permit viewing of samples under test without upsetting the humidity of the interior. The rim of this inner door has a moisture tight seal and a low power subsidiary heater to minimise condensation on and around the door. A trough with drain tube collects any drips which may fall when the glass door is opened.

Insulation

The space between the outer case and the liner is lagged with a closed cell polyurethane foam insulation, formed in situ. This insulation adds to the robustness of the overall design and forms a seal to prevent seepage of water vapour to the outer case should the liner be accidentally punctured.

Gallenkamp CO_2/HUMIDITY INCUBATOR

CONTROLS

Temperature

Temperature is controlled by a direct reading COMPENSTAT solid state thermostat and an independent safety thermostat is fitted. A stainless steel sheathed heater mounted round the motor driven fan ensures rapid temperature response and minimum fluctuation. An indicator lamp, which lights when the incubator reaches set temperature, a mains switch and a safety thermostat indicator lamp are fitted.

All controls and circuitry are housed at the top of the incubator and are therefore protected from spillage.

A cooling coil and solenoid valve are incorporated for use when tests are to be carried out at or near ambient temperature. When switched into operation, the solenoid valve shuts while the heater is at maximum power and opens when heater power reduces to a level where cooling is required. This alternating system conserves water and reduces drift in operating temperature should the temperature of the cold water supply vary. At higher operating temperatures, the solenoid valve can be switched out of operation.

Humidity

Humidity is maintained by distilled water or salt solutions contained in a tray situated in the lower air circulation duct. Water is used when maximum humidity is required and salt solutions for lower values.

CO_2

The CO_2 content of the incubator atmosphere is controlled automatically over the range 0 to 25% with the minimum consumption of gas. A meter fitted gives a direct reading of CO_2 content when the incubator is operating at 37°C and 95% r.h.

Technical data

For definition of terms, see page 466.

Humidity range	0 to 95% r.h.
CO_2 range	0 to 25%
Temperature range	Approximately ambient to 60°C
Temperature fluctuation	0·2°C
Temperature variation	±0·5°C
Recovery time at 60°C, min	30
Drift over 72 hours	Not more than 1°C
Reproducibility	±0·5°C
Power rating, maximum, kW	1
Shelf size, mm	580 × 440
No. of shelves supplied	3
No. of shelf positions	5
Interval between positions, mm	120
	The removable base can be used as a shelf
Working volume, litres	190
Internal dimensions, height × width × depth, mm	680 × 610 × 460
Overall dimensions, height × width × depth, mm	1120 × 790 × 790
Mass, kg	100

INCUBATOR, CO_2/HUMIDITY, *GALLENKAMP*, as specified, with COMPENSTAT solid state thermostat, independent safety thermostat, automatic CO_2 control, cooling coil, solenoid valve, stainless steel liner, three perforated shelves, base-shelf, polypropylene water tray and inner glass door. With instructions. For a.c. single phase supplies.

INL-350-010P Incubator, 220–240V 50Hz **£1237-50**
INL-350-030J Incubator, 110–120V 60Hz **£1260-00**

These incubators are for use with a pressurised gas cylinder which delivers **gaseous** CO_2.

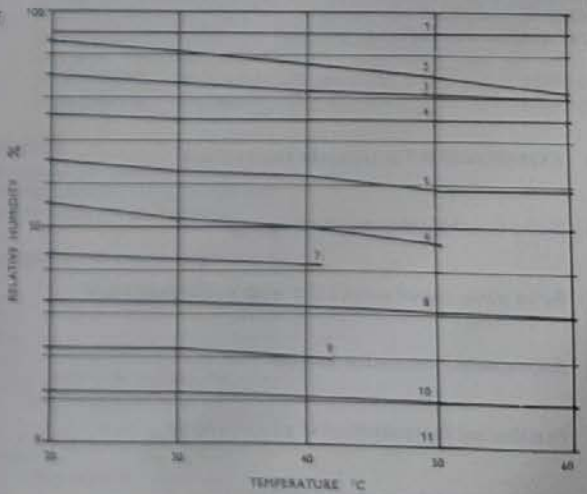
SPARE PARTS

Water tray	See *OVR-220-030C*
Shelf	See *OVR-220-070N*
Orsat gas analyser	See *GAS-210-N*

TEMPERATURES AND RELATIVE HUMIDITIES NORMALLY ATTAINABLE IN 20°C AMBIENT TEMPERATURE

Material to be placed in tray to obtain indicated values of relative humidity shown in graph on left.

Curve No.	Material
1	Distilled water
2	Potassium nitrate – saturated solution
3	Potassium chloride – saturated solution
4	Sodium chloride – saturated solution
5	Sodium nitrate – saturated solution
6	Sodium dichromate – saturated solution
7	Potassium carbonate – saturated solution
8	Magnesium chloride – saturated solution
9	Potassium acetate – saturated solution
10	Lithium chloride – saturated solution
11	Silica gel – dried



For details of salts suitable for other relative humidities see:—
Journal of Scientific Instruments, **25**, 1948, 73.
Measurement of Humidity, Notes on Applied Science No. 4, HMSO.

Gallenkamp

Gallenkamp ORBITAL INCUBATORS

For growing cultures of micro-organisms and tissue cells under controlled conditions of temperature and agitation. The orbiting motion of the sample platform minimises accretion of material on the sides of flasks, provides good transfer of gas to the culture and avoids undue buffeting of the organisms and cells

Three models available:

INR-200	Basic heated incubator
INR-250	Heated and refrigerated incubator
INR-400	Incubator with heating, refrigeration and interior illumination, with timer for programmed cycling

Applications in:

bacteriology, biochemistry,

botany, immunology,

metallurgy, microbiology,

virology and zoology



Basic model



Illuminated refrigerated model

- COMPENSTAT solid state thermostat
- Built-in safety thermostats
- Solid state speed controller with calibrated scale
- Adjustable ventilation control
- Facility for introduction of gas mixtures
- Lids fitted with magnetic gaskets
- Range of interchangeable sample platforms
- Up to 36 samples simultaneously incubated
- Adjustable counterbalancing of loads
- Conveniently placed high level controls
- Built for reliable operation over long periods
- Easily cleaned stainless steel interior

Gallenkamp ORBITAL INCUBATORS

DESIGN

The inner surfaces of the incubator are stainless steel and a drain tube is provided. A double glazed toughened glass window is sealed into the lid. The hinged, counterbalanced lid is fitted with a magnetic gasket and clips are provided on the underside so that a thermometer, when fitted, can be read through the window. The interchangeable accessory platforms are covered with a white plastics laminate for ease of cleaning and are fitted with spring clips to hold conical flasks.

OPERATION

Orbiting action

Culture vessels are mounted on a platform which is driven in a circular orbital motion at a speed closely regulated by a solid state controller. The controlled motion of the platform provides the conditions required for the efficient transfer of oxygen (or other gases) between the gaseous and liquid phases in the culture vessels.

Long term reliability and quiet running result from the platform being mounted on accurately aligned double row rigid ball journals. Culture flasks up to 2 litre capacity may be used, there being 350mm clearance between the platform and the lid.

A manually adjustable counterbalancing system is provided so that vibration can be reduced for any given load.

Temperature

Uniform temperature is maintained throughout the incubator by solid state COMPENSTAT thermostatic control of air circulated by means of a motor driven fan and associated ducting. Upper and lower temperature safety thermostats are fitted as necessary for the temperature range of the incubator.

Cooling

For operation near or just below ambient temperature a coil is available for circulation of cooling water. For operation at temperatures well below ambient the model with integral refrigeration must be used.

Atmosphere

Adjustment of the ventilator permits a wide variation in the volume of fresh air passing through the incubator. With the ventilator and drain tubes closed other atmospheres can be introduced. The magnetic gasket on the lid ensures that gas leakage is reduced to a minimum.

Technical data

Temperature range:	
Basic model	5°C above ambient to 70°C (with water cooling coil INR-270-502U the incubator will operate down to temperatures generally near or just below ambient).
Refrigerated model	20°C below ambient to 70°C
Temperature fluctuation of samples, max	0·1°c
Temperature variation between samples, max	±0·5°C
Diameter of orbit, mm	32
Orbiting speed range	40 to 400/min stepless
Capacity	36 × 250 ml conical flasks 28 × 500 ml conical flasks 18 × 1 litre conical flasks 11 × 2 litre conical flasks For efficient agitation and aeration each flask should contain not more than 25% of its nominal capacity.
Power rating, max., kW	
Basic model	1·2
Refrigerated model	1·5
Platform size, mm	680 × 480
Window size, mm	480 × 380
Internal dimensions, height × width × depth, mm	340 × 755 × 540
Overall dimensions, height × width × depth, mm	735 × 1020 × 680
Mass, kg	
Basic model	106
Refrigerated model	125

INCUBATOR, ORBITAL, *GALLENKAMP*, temperature range 5°C above ambient to 70°C, as specified, with orbital drive mechanism, solid state speed control and load counterbalancing system. Temperature control by COMPENSTAT solid state thermostat. With upper temperature limit safety thermostat, counterbalanced lid with window and thermometer clips but **without** thermometer. Orbiting speed range 40 to 400/min. Requires but **does not include** flask platform. With instructions.

INR-200-010V	Incubator, 220–240V 50Hz	**£762·75**
INR-200-030P	Incubator, 110–120V 60Hz	**£783·00**

INCUBATOR, ORBITAL, refrigerated model, *GALLENKAMP*, temperature range 20°C below ambient to 70°C, as specified, with orbital drive mechanism, solid state speed control and load counterbalancing system. With integral refrigerator mounted in the base of the cabinet. Temperature control by COMPENSTAT solid state thermostat. With upper and lower temperature safety thermostats, counterbalanced lid with window and thermometer clips but **without** thermometer. Orbiting speed range 40 to 400/min. Requires but **does not include** flask platform. With instructions.

INR-250-010J	Incubator, 220–240V 50Hz	**£1098·00**
INR-250-030D	Incubator, 110–120V 60Hz	**£1119·38**

ACCESSORIES

Cooling coil with nozzles for nominal 6·5mm bore flexible tubing and instructions for fitting. For use with INR-200 only. Requires a supply of cooling water.

INR-270-502-U	Cooling coil	**£27·00**

Platforms, interchangeable, with clips to accept conical flasks.

INR-270-514N	Platform, 36 × 250ml	**£74·25**
INR-270-519D	Platform, 28 × 500ml	**£74·25**
INR-270-523M	Platform, 18 × 1 litre	**£74·25**
INR-270-528C	Platform, 11 × 2 litre	**£78·75**

Culture flasks, conical with side indents, capacities 250ml to 2000ml — See *FHC-280-050V to FHC-280-110G*

Flasks, conical — See *FHB-370*

Thermometer, −5 to 105°C — See *THL-630-110E*

Tubing, PVC, size N8·5 — See *TWR-670-150P*

Thermo-circulator, refrigerated, for pumping liquids through cooling coil — See *TEH-830*

Gallenkamp ORBITAL INCUBATOR

Model with refrigeration, illumination and automatic temperature/illumination cycling

Applications in biological and botanical studies where photosynthesis plays a part in the growth cycle

- **Illumination from one to seven fluorescent tubes**
- **Automatic timer for temperature/illumination cycling**
- **Upper and lower limit temperature safety thermostats**



INR-400

OPERATION

Orbiting action

Culture vessels are mounted on a platform which is driven in a circular orbital motion at a speed closely regulated by a solid state controller. The controlled motion of the platform provides conditions required for the efficient transfer of oxygen (or other gases) between the gaseous and liquid phases in the culture vessels.

Long term reliability and quiet running result from the platform being mounted on accurately aligned double row rigid ball journals. Culture flasks up to 2 litre capacity may be used, there being 350mm clearance between platform and the lid.

A manually adjustable counterbalancing system is provided so that vibration can be reduced to a minimum for any given load.

Temperature

Uniform temperature is maintained throughout the incubator by solid state COMPENSTAT thermostatic control of air circulated by means of a motor driven fan and associated ducting. Upper and lower temperature safety thermostats are fitted.

Cooling

A built-in refrigerator is fitted for operation near or below ambient temperature.

Atmosphere

Adjustment of the ventilator permits a wide variation in the volume of fresh air passing through the incubator. With the ventilator and drain tubes closed, other atmospheres can be introduced. The magnetic gasket on the lid ensures that gas consumption is reduced to a minimum.

Illumination

Seven fluorescent tubes are mounted on the underside of the lid. The ON-OFF switching is arranged so that illumination from one up to seven tubes can be achieved.

Automatic cycling

A 24 hour time switch provides cycling of temperature and illumination. Conditions of constant temperature, cycled illumination with cycled temperature, and cycled illumination can be achieved, when temperature and illumination are both cycled the changes are initiated simultaneously.

DESIGN

The inner surfaces of the incubator are stainless steel. Seven 30 W fluorescent tubes are mounted on the underside of the hinged counterbalanced lid with a reflector behind and a rigid transparent plastics sheet separating them from the working space. The lid has no window. An air blower, used to reduce the heat transfer from the tubes to the working space and a dial thermometer are fitted. The interchangeable accessory platforms are covered with a white plastics laminate for ease of cleaning and fitted with spring clips to hold conical flasks.

Technical data

Temperature range	15°C below ambient to 70°C
Temperature fluctuation of samples	Less than 0·1°C
Temperature variation between samples	Less than ±0·5°C
Diameter of orbit, mm	32
Orbiting speed range	40 to 400/min stepless
Capacity	36 × 50 ml conical flasks 28 × 500 ml conical flasks 18 × 1 litre conical flasks 11 × 2 litre conical flasks For efficient agitation and aeration, each flask should contain not more than 25% of its nominal capacity.
Illumination	1 to 7 fluorescent tubes, 30 W each
Power rating, max., kW	1·85
Platform size, mm	680 × 480
Internal dimensions, height × width × depth, mm	340 × 755 × 540
Overall dimensions, height × width × depth, mm	850 × 1020 × 680
Mass, kg	130

INCUBATOR, ORBITAL, illuminated refrigerated model, *GALLENKAMP*, temperature range 15°C below ambient to 70°C, as specified, with orbital drive mechanism, solid state speed control, load counterbalancing system and integral refrigerator. Temperature control by COMPENSTAT solid state thermostat. With upper and lower temperature safety thermostats, 24 hour timer and counterbalanced lid fitted with fluorescent tubes and dial thermometer. Orbiting speed range 40 to 400/min. With instructions. Requires but **does not include** flask platform.

INR-400-010F	Incubator, 220–240 V 50 Hz	£1446-75
INR-400-030W	Incubator, 110–120 V 60 Hz	£1504-13

SPARE PARTS

INR-420-010X	Fluorescent tube, 220–240 V	£1·01
INR-420-030Y	Fluorescent tube, 110–120 V	£1·01

ACCESSORIES

Platforms, interchangeable, with clips to accept conical flasks *See INR-270-514N to INR-270-528C*

JARS

All dimensions and capacities quoted are nominal



JAR-330



JAR-360

JARS, museum (specimen), clear glass, cylindrical, with foot and grip stopper. Dimensions given are height × diameter.

JAR-330-030C	Jar, 60 × 50mm	£1·38
JAR-330-050T	Jar, 100 × 30mm	£1·38
JAR-330-070N	Jar, 100 × 50mm	£1·69
JAR-330-110E	Jar, 150 × 50mm	£1·97
JAR-330-150P	Jar, 200 × 80mm	£3·32
JAR-330-170J	Jar, 250 × 100mm	£6·21

JARS, museum (specimen), as JAR-330 but with flat stopper. Dimensions given are height × diameter.

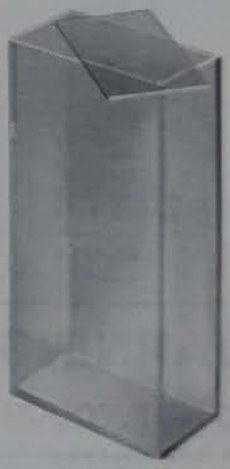
JAR-360-070P	Jar, 120 × 80mm	£2·48
JAR-360-110G	Jar, 150 × 80mm	£2·57

BINDING TAPE, black, for museum jars. Strongly adhesive and water resistant. Does not peel when dry. Width 25mm.

JAR-410-R	Binding tape	Roll of 50m £3·65

JARS, specimen, *PERSPEX*, rectangular, polished flat surfaces on all sides. With cover. Dimensions given are height × length × width.

JAR-540-050T	Jar, 100 × 75 × 50mm	£1·51
JAR-540-070N	Jar, 150 × 100 × 50mm	£2·14
JAR-540-090H	Jar, 200 × 150 × 100mm	£5·01
JAR-540-110E	Jar, 225 × 150 × 75mm	£4·78
JAR-540-130V	Jar, 300 × 200 × 100mm	£8·36



JAR-540

JARS, specimen, polystyrene, with tapered sides, extra wide mouth and close fitting polythene lid. Dimensions given are height × top diameter.

JAR-610-010V	Jars, 20ml, 25 × 40mm	Pack of 25 £1·46
JAR-610-030P	Jars, 35ml, 35 × 45mm	Pack of 25 £1·52
JAR-610-050J	Jars, 85ml, 35 × 68mm	Pack of 25 £1·86
JAR-610-090U	Jars, 180ml, 75 × 68mm	Pack of 25 £2·25
JAR-610-110R	Jars, 280ml, 85 × 82mm	Pack of 25 £2·84
JAR-610-130L	Jars, 360ml, 110 × 82mm	Pack of 25 £3·26



JAR-610

LABELS AND LABELLING

LABELS, blank, self-adhesive, white, in special pack which dispenses one label at a time. Adhere securely to most materials including plastics.

LAB-200-030G	Labels, 24 × 12·5mm	Pack of 1000 **£0·90**
LAB-200-050A	Labels, 49 × 23·5mm	Pack of 500 **£0·79**
LAB-200-070R	Labels, 63 × 25mm	Pack of 500 **£1·43**
LAB-200-090L	Labels, 75 × 25mm	Pack of 500 **£1·63**

LABELS, blank, self-adhesive, white, on backing sheet.

LAB-230-030Y	Labels, 22 × 17mm	Pack of 1000 **£1·35**
LAB-230-050C	Labels, 37 × 22mm	Pack of 1000 **£2·13**
LAB-230-070T	Labels, 51 × 25mm	Pack of 500 **£1·37**



LAB-230



LAB-320
LAB-340



LAB-500



LAB-610



LAB-660



LAB-690



LAB-720

LABELS, ruled, self-adhesive, white. Roll of 250 self-ejecting labels, 24 × 19mm, in card dispenser. Particularly suitable for labelling microscope slides.

LAB-270-M	Labels, 24 × 19mm	Roll **£0·98**

LABELS, blank, self-adhesive, white, 8mm diameter, sheet of 140.

LAB-320-Q	Labels, 8mm diameter	Pack of 25 sheets **£2·93**

LABELS, blank, self-adhesive, white, on backing sheet.

LAB-340-030Q	Labels, 12·5mm diameter	Pack of 1000 **£0·90**
LAB-340-050K	Labels, 25mm diameter	Pack of 1000 **£1·51**

LABELMAKER, for printing self-adhesive plastics tape 9mm wide, for labelling bottles, cupboards, drawers, etc. Plastics moulded body with character-selection dial giving full alphabet and numerals 1 to 9 embossed in white. Space selector allows either regular or wide spacing and built-in guillotine cuts tape to desired length, leaving a split tab for easy removal of tape backing. Accepts tape roll 3m × 9mm in snap-in cartridge. Height of embossed character 3mm. Overall length of labelmaker 200mm. Mass 150g. With one roll of tape.

LAB-500-X	Labelmaker	**£10·73**

SPARE PARTS

Tapes, 3m × 9mm self-adhesive backing and contained in snap-in cartridge.

LAB-520-030X	Tape, black	**£0·73**
LAB-520-050Y	Tape, blue	**£0·73**
LAB-520-070C	Tape, green	**£0·73**
LAB-520-090T	Tape, red	**£0·73**

ACCESSORY

Technical character wheel, interchangeable with standard wheel and giving a total of 43 useful symbols including punctuation signs, arrows, fractions, etc.

LAB-520-514P	Technical character wheel	**£1·34**

LABELS, *GRIFFIN,* **hazard warning,** self-adhesive, 30 × 30mm, in pack comprising:

50 each	Corrosive causes burns Explosive vapour air mixture Very flammable
25 each	Very harmful vapour Serious risk of poisoning Oxidising agent may cause fire Harmful by skin absorption Dangerous when wet Spontaneously combustible

LAB-610-W	Labels	Pack of 300 **£3·29**

LABELS, paper, self-adhesive, with words 'WARNING! DO NOT TOUCH' in red on white ground. The label holds firm but can be peeled easily from any article when no longer required. In roll of 250 labels each 70 × 30mm.

LAB-660-K	Labels, warning	Roll **£1·35**

LABELS, PVC, self-adhesive tape, with word 'BIOHAZARD' and international symbol printed red on yellow ground. Size 40 × 25mm, in 65m roll.

LAB-690-M	Labels, biohazard	Roll **£1·52**

LABELS, PVC, self-adhesive tape, with words 'DANGER – RADIOACTIVE MATERIAL' and international radioactivity symbol in yellow and red. Size 70 × 25mm, in 65m roll.

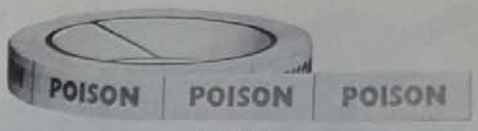
LAB-720-H	Labels, radioactive	Roll **£1·43**

LABELS, PVC, self-adhesive tape, with word 'POISON' printed in red on white ground. Size 50 × 12·5mm, in 65m roll.

LAB-750-J	Labels, poison	Roll **£0·73**

LABELS, PVC, self-adhesive tape, with word 'STERILE' printed in blue on white ground. Size 50 × 12·5mm, in 65m roll.

LAB-780-L	Labels, sterile	Roll **£0·73**



LAB-750



LAB-780

ADHESIVE TAPES

TAPE, cellulose, opaque, self-adhesive with special white surface for writing on. In roll 65m × 25mm.

LAB-890-T	Tape, cellulose, white	Roll **£1·22**

TAPE, cellulose, transparent, for masking, fastening, strengthening and sealing. In roll 30m × 25mm, on 25mm diameter core.

LAB-920-X	Tape, cellulose, transparent	Roll **£0·39**

TAPE, PVC, transparent, a thin flexible tape for masking protecting and sealing. In roll 30m × 25mm, on 25mm diameter core.

LAB-950-Q	Tape, PVC	Roll **£0.73**

TAPE, paper, a robust adhesive tape for masking, binding, wrapping and labelling. Easily removed after use. In roll 50m × 25mm.

LAB-970-C	Tape, paper	Roll **£0·79**

PENCILS AND MARKERS

GLASS WRITING DIAMOND, pocket pattern with retractable diamond point and pocket clip.

LAC-430-X	Glass writing diamond	**£2·86**

PENCILS, *CHINAGRAPH,* for writing on glass and other polished surfaces.

LAC-490-030J	Pencils, black	Pack of 12 **£2·45**
LAC-490-050D	Pencils, blue	Pack of 12 **£2·45**
LAC-490-070U	Pencils, green	Pack of 12 **£2·45**
LAC-490-090X	Pencils, red	Pack of 12 **£2·45**
LAC-490-110L	Pencils, white	Pack of 12 **£2·45**
LAC-490-130F	Pencils, yellow	Pack of 12 **£2·45**

COLLET HOLDER, will accept waxed crayon refills of 3mm diameter and up to 65mm long, for writing on glass and other polished surfaces. Economical in use as sharpening is unnecessary and wasted short ends are avoided. With pocket clip but **without** waxed crayon refills. (F)

LAC-540-W	Collet holder	**£0·84**

ACCESSORIES

LAC-560-512E	Refills, black (F)	Tube of 12 **£1·18**
LAC-560-522B	Refills, blue (F)	Tube of 12 **£1·18**
LAC-560-532V	Refills, green (F)	Tube of 12 **£1·18**
LAC-560-542S	Refills, red (F)	Tube of 12 **£1·18**
LAC-560-552P	Refills, yellow (F)	Tube of 12 **£1·18**

PENCILS, *ALL-STABILO,* for writing on all surfaces including metal, glass, plastics and glossy paper. Produces an opaque, matt black impression which is water resistant but can be removed by wiping with a damp cloth. (F)

LAC-610-M	Pencils, black	Pack of 12 **£2·31**



LAC-430



LAC-540



LAC-700

PENCILS, *ALL-STABILO,* similar to LAC-610-M but in set of six comprising one each black, blue, green, red, white and yellow in plastics wallet. (F)

LAC-630-V	Pencils, assorted	Set **£1·26**

INK MARKERS, *FLASHDRY,* for permanently writing on all types of surfaces including glass, polythene, porcelain, silica, wood, etc., dries instantly. In plastics container with felt nib, 5mm square section.

LAC-700-030C	Ink markers, black	**£0·36**
LAC-700-050T	Ink markers, blue	**£0·36**
LAC-700-070N	Ink markers, green	**£0·36**
LAC-700-090H	Ink markers, red	**£0·36**
LAC-700-110E	Ink markers, white	**£0·36**
LAC-700-130V	Ink markers, yellow	**£0·36**

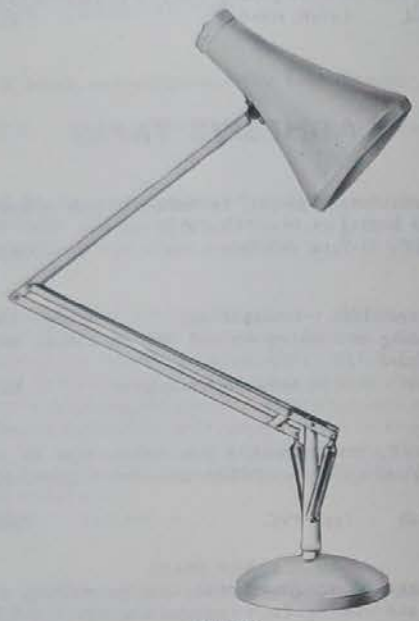
INK MARKERS, *FLASHDRY,* pack of four LAC-700 comprising one each black, blue, green and red.

LAC-720-U	Ink markers, assorted	Pack **£1·41**

LAMPS



LCF-200



LCF-250



LCF-290
and LCF-610

LAMP, bench type, comprising spun aluminium housing electrically earthed, with switched BC lampholder, fitted to flexible stem approximately 400mm long by rotatable joint. On heavy cast base 226 x 146mm with length of 3-core cable. For use with 40 or 60 W BC household lamp bulb. **Without** bulb.

LCF-200-W Lamp, bench **£9·86**

LAMP, *ANGLEPOISE*, bench type, counterpoised, giving light at any angle. With 750mm long arm, adjustable to any position, and table base. For use with 60 W BC household lamp bulb. **Without** bulb.

LCF-250-K Lamp, anglepoise **£14·82**

LAMP, FLUORESCENT, bench type, with two 300mm tubes in reflector housing adjustable to any position. Arm mounted on control unit and heavy base 180mm diameter. Consumption 20 W with light output equivalent to 75 W tungsten lamp. For 230–250V a.c. supplies.

LCF-290-F Lamp, fluorescent **£29·53**

SPARE PART

LCF-310-010E Tube **£0·79**



LCF-390

VIEWING SCREEN, illuminated, comprising a flat opal white screen 430 x 360mm, mounted on a lightweight case. Two 15 W fluorescent tubes within the case provide even illumination over the screen. A plastics strip is provided at top and bottom of the screen to hold thin sheets temporarily for viewing. Complete with carrying handle and feet for vertical mounting on a bench. The feet can be removed for horizontal working and provision is made for wall mounting. Overall dimensions including feet 180 x 380 x 490mm high. For 220–240V 50Hz single phase supplies.

LCF-390-U Viewing screen **£40·84**

ULTRAVIOLET LAMPS

LAMP, ultraviolet, bench type. With two 230mm low pressure fluorescent tubes in reflector housing with Woods glass UV filter. Peak output at 365nm. Arm mounted on control unit with heavy base 180mm diameter. Consumption 20W. For 220–250V 50Hz supplies.

LCF-610-G Lamp **£42·86**

SPARE PART

LCF-630-010M Tube (F) **£1·82**



LCF-690

LAMP, ultraviolet, designed for the investigation of fluorescence in mineral specimens and also suitable for general purpose applications. Hand-held, metal lamphouse contains starter choke with biassed-off switch and UV-emitting fluorescent tube with two filters to transmit long and short wave radiation respectively. Long wave radiation 320 to 400nm, peaking at 360nm, or short wave radiation 250 to 370nm, peaking at 290nm, selected by means of a sliding shutter. Overall dimensions 150 × 62 × 100nm high, mass 600g. With explanatory booklet *The Story of Fluorescence*. For 220–240V 50Hz supplies. (F)

LCF-690-T Lamp **£40·84**

SPARE PART

LCF-710-010S Tube (F) **£9·56**

ULTRAVIOLET LAMP FOR CHROMATOGRAPHY

LAMP, ultraviolet for chromatography. A hand lamp which emits ultraviolet radiation at 366 and 254nm. Comprises two long wavelength discharge tubes with integral filters and one short wavelength tube with external filter, mounted side by side in an aluminium reflector and housed in an enamel paint finished steel case. A handle on the case enables the lamp to be hand held and a stand supplied serves as a rest under which TLC plates may be located during examination. The required wavelength is selected using a three-position switch the centre position of which is OFF. For 220–240V a.c. single phase supplies.

LCF-750-Q Lamp **£137·70**



LCF-750

SPARE PARTS

LCF-770-030Q Tube, 366nm **£15·74**
LCF-770-050K Tube, 254nm **£20·25**

LAMPS FOR MICROSCOPY



For Köhler illumination See *MMV-600-H and MNE-550-B*

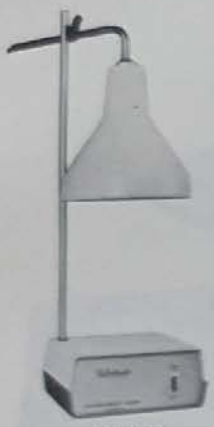
For stereoscopic microscopes See *MMV-700-W*

Gallenkamp ULTRAVIOLET LAMPS

FOR 365nm

Incorporate a 125 W mercury discharge lamp envelope of ultraviolet transmitting filter glass. Practically no visible light is emitted, 95% of the output being at the 365nm wavelength. Emissions at this wavelength are not dangerous but some people are slightly sensitive to them and excessive exposure of the skin should be avoided.

The lamps differ in general design and in the detailed design of the discharge lamp and controls. LCF-800-U is for bench use and LCF-870-R is portable and fitted with carrying handle.



LCF-800



LCF-870

BENCH MODEL

The 125 W lamp bulb is fitted in a lampholder within an aluminium reflector. This assembly is fixed to a support tube which also encloses the power supply cable and is mounted, by means of a bosshead, from a vertical support rod screwed to one corner of the control box. This means of mounting enables the lamp to be swivelled to any angle, or mounted at any height on the vertical rod. The control box has a white polyurethane enamelled alloy top plate and a grey stove enamelled steel base section with four feet. The control box encloses the power supply choke and control equipment for the lamp, a mains indicator lamp and ON-OFF switch. Complete with 1·5m power supply cable.

ULTRAVIOLET LAMP, bench model, *GALLENKAMP*, as specified, with peak output at 365nm. Comprising 125 W bulb with integral filter, reflector, support rod with bosshead and control box. For 230–250V 50Hz single phase supplies.

LCF-800-U	Ultraviolet lamp	**£61·31**

SPARE PART

LCF-820-010D	Lamp bulb, 125 W, with integral filter	**£15·19**

PORTABLE MODEL

The 125 W lamp bulb is fitted in a lampholder within a large aluminium reflector. This assembly is mounted on a pivoted arm which may be swivelled and locked in position. The arm is attached to the top of the control box top, just in front of the carrying handle. The control box encloses a multi-tapped choke to control the supply of power to the lamp. This has voltage tappings in 10V steps and the exact supply voltage must be stated when ordering so that the lamp can be supplied in correct adjustment. An ON-OFF switch and a power supply cable are also fitted.

ULTRAVIOLET LAMP, portable model, *GALLENKAMP*, as specified, with peak output at 365nm. Comprising 125 W bulb with integral filter, reflector and adjustable arm mounted on power unit. For 200–250V 50Hz supplies.

LCF-870-R	Ultraviolet lamp	**£108·00**

SPARE PART

LCF-890-010A	Lamp bulb, 125 W, with integral filter	**£13·22**

Gallenkamp SODIUM LAMP



LCH-600

SODIUM LAMP, *GALLENKAMP*, suitable for spectroscopy, polarimetry, refractometry and interferometry. Comprises a 35 W sodium discharge tube, housed in a metal shield with a 25mm diameter aperture and mounted by means of a bosshead on an alloy rod at the rear corner of the control box. The transformer and ON-OFF switch are mounted within the control box which provides a stable base for the assembly. For 200–250V a.c. supplies.

LCH-600-Q	Sodium lamp	**£65·81**

SPARE PART

LCH-620-010W	Sodium discharge tube, 35 W	**£9·34**

LUBRICANTS

LUBRICATING OILS AND GREASES

LUBRICANT, oil, SAE approximately 5W. A light grade machine oil, containing a corrosion inhibitor. In sealed 113ml can with flexible spout.
LUB-200-C Lubricant, SAE 5W **£0·46**

LUBRICANT, oil, SAE 10. A light grade oil suitable for lubricating sintered bronze bearings on small electric motors, etc. In 250ml can with spout.
LUB-230-E Lubricant, SAE 10 **£0·54**

LUBRICANT, *KILOPOISE* **medium,** having an extremely high viscosity value of 1·8kP at room temperature. May be used to give smooth and easy motion to components such as eyepieces, focusing and adjusting screws, variable condensers, potentiometers and needle valves, and has many other instrument applications. It acts as a corrosion inhibitor and sealing agent for both screw and plane contacts. In 56g tube.
LUB-280-P Lubricant, kilopoise **£1·35**

LUBRICANT, anti-scuffing. A dry lubricant consisting of a paste containing molybdenum disulphide. May be applied to metal, plastics or fabric surfaces by rubbing with the finger, pad or brush. Provides dry lubrication for all types of mechanisms. In 100g tube.
LUB-320-D Lubricant, anti-scuffing **£1·80**

LUBRICATING GREASES FOR GLASS APPARATUS

LUBRICANT, rubber grease, soft, for general lubrication of stopcocks. In 56g tin.
LUB-400-J Lubricant, soft **£0·52**

LUBRICANT, rubber grease, medium, for vacuum stopcocks, desiccators, etc. In 56g tin.
LUB-420-S Lubricant, medium **£0·52**

LUBRICANT, silicone grease. Resistant to most chemicals, particularly alkali reagents, with great stability over a wide temperature range from −40 to 200°C. Suitable for high vacuum purposes and as a stopcock lubricant. In 50g tube.
LUB-450-U Lubricant, silicone **£1·43**

NOTE: Must not be used for volumetric glassware because silicone contamination distorts the shape of the meniscus and alters drainage allowances thus reducing accuracy.

APIEZON VACUUM GREASES AND WAXES

Organic materials, highly refined for the most exacting vacuum requirements. Apiezon greases and waxes do not contain silicones and are therefore suitable for use with volumetric glassware

APIEZON GREASE L, for sealing ground glass vacuum joints, etc. The vapour pressure does not exceed 10^{-9} torr at 300°C. In 50g tube.
LUB-520-K Apiezon grease L **£11·06**

APIEZON GREASE M, similar to LUB-520-K but with a vapour pressure not exceeding 10^{-8} torr at 200°C. In 100g tube.
LUB-540-T Apiezon grease M **£8·96**

APIEZON GREASE N, a rubber grease for lubricating and sealing glass taps in vacuum apparatus. Unsuitable for use above 35°C; vapour pressure 10^{-7} torr. In 25g tube.
LUB-560-F Apiezon grease N **£11·14**

APIEZON WAX W, in stick form, for sealing joints in vacuum systems. Softening point 60°C and vapour pressure 10^{-6} torr at room temperature.
LUB-580-X Apiezon wax W Pack of 500g **£5·77**

APIEZON GREASE APIOI, a general purpose stopcock grease. Softening point 185°C. Suitable for vacuum use down to 10^{-7} torr. In 50g tube.
LUB-610-J Apiezon grease APIOI **£4·56**

LUBRICANT, PTFE aerosol. A dry film lubricant and anti-stick agent, consisting of a dispersion of PTFE to which a non-toxic film-bonding agent has been added. Suitable for ground glass joints, glass or metal stopcocks, and is a useful anti-stick agent for glass joints. Thermally stable up to 275°C. In 390g aerosol can.
LUB-660-U Lubricant, PTFE **£1·69**
This item can be exported by deck cargo Sea Freight only.

LUBRICANT, *ROCOL* **MA-1,** a suspension of molybdenum disulphide in water which bonds itself to metals and acts as a lubricant at temperatures up to 350°C. It will also lubricate rubber and prevent sticking. In 500g tin.
LUB-680-G Lubricant, Rocol **£4·19**

LUBRICANTS FOR ELECTRICAL CONTACTS

ELECTROLUBE is a chemically inert, water repellent, mechanical lubricant which has a low surface tension. It will clean and lubricate electrical contacts, switches, relays, potentiometers, sliding rheostats, motor commutators, etc.

Also acts as an arc and tarnish inhibitor and protects against atmospheric humidity. Can be used over a wide range of temperatures from −45 to 200°C.

ELECTROLUBE, electrical lubricant No. 1, for general laboratory purposes on low current, non-arcing contacts. In pocket dispenser with flexible capillary applicator.
LUB-800-A Lubricant, Electrolube No. 1 **£0·61**

ELECTROLUBE, electrical lubricant No. 2A-X for extensive application and waterproofing of high tension systems and is harmless to polystyrene, PVC, natural and synthetic rubbers. In 170g aerosol can.
LUB-820-J Lubricant, Electrolube No. 2A-X **£0·96**

Gallenkamp

MAGNETS



XJP-760

MAGNET, *ALNICO*, with keeper. Length 25mm, 22mm across poles.
XJP-760-K Magnet **£0·84**

MAGNET, *ALCOMAX*, with keeper. Length 30mm, width 29mm, 44mm across poles.
XJP-780-T Magnet **£2·62**



XJP-780

MAGNET, *ALCOMAX*, U-shape. Length 111mm, width 104mm, height 55mm. With 27mm air gap and poles 52 × 22mm.
XJP-840-Q Magnet **£31·50**



XJP-840

Gallenkamp MAGNETIC STIRRERS

Compact variable speed stirrers, available with or without hotplate, which produce from gentle to vigorous stirring action suitable for:

- **Titrations**
- **Controlled precipitations**
- **Rapid preparation of solutions**
- **Agitation during electrochemical tests**
- **Agitation of sterile liquids**
- **Agitation within vacuum systems**

See SWT-220 et seq.

MAGNIFIERS

All magnifications quoted in this section refer to linear magnification, not area



MAH-200



MAH-240-050



MAH-260-030

MAGNIFIER, watchmaker's eye glass, magnification ×18. Plastics lens and mount.
MAH-200-M Magnifier **£0·78**

MAGNIFIERS, folding, pocket type with 25mm diameter lens mounted in plastics case.
MAH-240-010E Magnifier, single **£0·99**
MAH-240-030V Magnifier, double **£1·69**
MAH-240-050P Magnifier, triple **£2·53**

MAGNIFIERS, folding, pocket type, doublet, giving tolerably flat field with minimum chromatic aberration. Lens approximately 19mm diameter, in plastics mount and case.
MAH-260-010N Magnifier, ×5 **£1·07**
MAH-260-030H Magnifier, ×8 **£1·07**
MAH-260-050B Magnifier, ×10 **£1·07**

MAGNIFIERS, folding, achromatic, pocket type. With lens 11mm diameter mounted in metal frame, complete with case. (F)

MAH-290-030J Magnifier, ×10, doublet **£8·83**
MAH-290-050D Magnifier, ×20, triplet **£7·14**



MAH-290



MAH-330

MAGNIFIERS, for examining small insects, pond life, plant life, etc. Doublet plastics lens, 25mm diameter, in cylindrical plastics mount 55mm long. Magnification ×5. Mount has removable end cap which holds the specimen at the focal point.

MAH-330-G Magnifiers, ×5 doublet Pack of 10 **£5·18**



MAH-370

MAGNIFIER, linen tester, with biconvex optically worked glass lens, magnification ×9, in folding plastics frame, with aperture 10×10mm.

MAH-370-B Magnifier, ×9 **£0·73**



MAH-410

MAGNIFIERS, (READING LENSES), in polished metal mount with plastics handle. (F)

MAH-410-030D Magnifier, 65mm dia. **£1·54**
MAH-410-050U Magnifier, 75mm dia. **£2·12**
MAH-410-070X Magnifier, 100mm dia. **£3·21**

MAGNIFIER, *GERRARD* **VARIANGLE,** 100mm diameter, in polished metal mount with plastics handle fitted to a stand having a triangular heavy cast metal base. Can be focused by parallel movement, extended or retracted, and can be folded against the stand for storage.

MAH-450-H Magnifier, Variangle **£12·44**



MAH-450

MAGNIFIER, illuminated, especially useful outdoors at night. Comprises circular white plastics head with 45mm diameter lens and transparent rotatable measuring screen with a circumferential scale 0–180×2°, a diametral scale 25–0–25×1mm, a radial scale 10–0–25×1mm perpendicular to the former and two offset Imperial scales $1\frac{1}{2}\times\frac{1}{16}$in. and $1\frac{1}{2}\times\frac{1}{10}$in. Ribbed handle fitted with ON-OFF switch accommodates two batteries. Overall dimensions 200×70×65mm. With 2·5V M.E.S. lamp but **without** HP11, 1·5V batteries (two required). (F)

MAH-500-L Magnifier, illuminated **£1·72**



MAH-500



MAH-550 with MAH-560-502

ACCESSORIES

Batteries, HP11, 1·5V (2 required) See BMT-460-070U
Map measurers See SZB-300-Q and SZB-330-S

MAGNIFIER, *FALMER,* giving wide undistorted field of view. With 27mm aperture lens in plastics mount. Magnification ×5 when used with accessory tripod stand.

MAH-550-W Magnifier, Falmer **£3·26**

ACCESSORY

MAH-560-502X Tripod stand, with screw focusing mount **£3·99**



MAH-590

MAGNIFIER, tripod, for wide field of view. Stackable type with 108mm diameter lens mounted on metal stand with telescopic legs. Magnification ×3.

MAH-590-R Magnifier, tripod **£17·21**



MAH-620

MAGNIFIER, aspheric, in plastics stand. Plastics lens 70 × 55 mm, magnification × 1·7 with head at a distance of 250 mm from lens. The small field curvature enables comfortable binocular vision over a wide field.

MAH-620-M Magnifier, aspheric **£10·64**



MAH-650

MAGNIFIER, *GERRARD,* **sliding type,** × 2, approximately 100 × 75 mm, in plastics mount. Can be positioned at any point along two parallel rods 400 mm long. Fitted with folding legs which enable objects up to 90 mm high to be viewed.

MAH-650-X Magnifier, sliding **£14·23**



MAH-690

MAGNIFIER, illuminated, with viewing head comprising a 125 mm diameter biconvex glass lens, magnification × 0·7, and a circular, cool 22 W fluorescent tube mounted on a spring balanced arm which has an extension of 1·1 m. Magnification can be increased by fitting an auxiliary lens. With interchangeable brackets for wall or bench fixing. For 220–240 V a.c. single phase supplies.

MAH-690-J Magnifier, illuminated **£42·19**

SPARE PART

Fluorescent tube *See CNW-320-050J*

ACCESSORIES

Auxiliary lens, 100 mm diameter. Increases magnification to × 1·7.

MAH-710-502K Auxiliary lens **£9·62**

Clamp, for clamping magnifier to the edge of a bench *See STH-610-X*



MAH-760

MAGNIFIER, wide angle, illuminated, bench standing, with aspheric lens providing stereoscopic subject enlargement greater than × 2. Lens, 165 × 100 mm, with focal length 210 mm, maximum depth 215 mm, is adjustable for height and angle. Illumination is by two fluorescent tubes. For 220–250 V a.c. single phase supplies.

MAH-760-W Magnifier, stereoscopic **£98·30**

Magnifiers, thermometer reading *See THM-890-M and THM-920-H*

OLYMPUS

LOW POWER STEREOSCOPIC MICROSCOPES

For details and prices see *MLP-200-S et seq.*



MAH-850

MAGNIFIER, dissection, with extra wide field × 2·5 lens, 100 mm diameter, on 270 mm flexible arm. The lens mount is rotatable and can be clamped by a locking screw or removed for use as a hand lens. The arm can rotate on a circular nylon coated base enabling the lens to be swung away from the dissection.

MAH-850-V Magnifier, dissection **£14·85**



MAH-880

MAGNIFIER, dissection, *BECK CORNER,* comprising hardwood base, 240 × 90 × 70 mm high, with glass stage 75 × 63 mm which can be illuminated using a mirror set at 45° and with cutaway angle sides to form hand rests. With two removable × 7 lenses, which can be used together to give approximately × 14 magnification, in plastics mount having a focusing motion and arranged so that the lens can be moved over the stage. Base has recesses to accommodate lenses when not in use.

MAH-880-A Magnifier, dissection **£22·50**

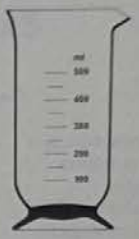
MEASURES

All capacities and subdivisions quoted are nominal

BEAKER MEASURES

MEASURES, beaker form, glass, BS 1922, graduated and Government stamped.

MEB-300-070W	Measure, 500 × 50 ml	£3·26
MEB-300-090Q	Measure, 1000 × 100 ml	£3·94



MEB-300



MEB-400

CONICAL MEASURES

MEASURES, conical, transparent, colourless polymethyl pentene, BS 3221/3. Capacity 50 ml, graduated 0 to 20 × 5 ml and 20 to 50 × 10 ml.

MEB-400-M	Measures	Pack of 10 £2·25



MEB-440

MEASURE, conical form, polythene, with two double scales graduated 0 to 500 × 50 ml and 0 to 20 × 1 fl. oz. for right and left hand use. With detachable polythene foot.

MEB-440-H	Measure	£0·42



MEB-500

MEASURES, conical, glass, BS 1922, graduated and Government stamped.

MEB-500-070G	Measure, 50 × 10 ml	£2·53
MEB-500-090A	Measure, 100 × 10 ml	£2·76
MEB-500-110U	Measure, 250 × 10 ml	£3·24



MEB-600

JUGS, GLASS

JUGS, *PYREX* **glass,** with spout and handle.

MEB-600-050E	Jug, 0·3 × 0·05 litres	£0·92
MEB-600-070V	Jug, 0·5 × 0·05 litres	£1·14



MEB-720

JUGS, PLASTICS

JUGS, rigid polypropylene, with spout and handle.

MEB-720-050F	Jug, 0·5 litre × 50 ml	£0·38
MEB-720-070W	Jug, 1 litre × 50 ml	£0·51
MEB-720-090Q	Jug, 2 litres × 100 ml	£2·15
MEB-720-110N	Jug, 3 litres × 500 ml	£2·76



MEB-800

JUGS, STAINLESS STEEL

JUGS, stainless steel, tapered, with handle, spout and concave base. Graduated inside in litres and decilitres. (F)

MEB-800-050L	Jug, 0·5 litre	£2·08
MEB-800-070F	Jug, 1 litre	£3·04
MEB-800-090W	Jug, 2 litres	£5·74



MEB-850-050 and MEB-850-070

JUGS, stainless steel, with handle, spout and flat base. Graduated in millilitres and pints. Capacities 0·5 and 1 litre have tapered sides and capacities 2·5 and 5 litres have vertical sides.

MEB-850-050W	Jug, 0·5 litre	£8·49
MEB-850-070Q	Jug, 1 litre	£11·25
MEB-850-090K	Jug, 2·5 litres	£23·96
MEB-850-130B	Jug, 5 litres	£28·63



MEB-850-090 and MEB-850-130

MEDICAL SCIENCES

General and specialised apparatus of medical interest will be found under the following page headings

Anaerobic jars	Dispensers	Glove box	Refrigeration
Autoclaves	Dissecting	Histology	Safety
Baths	Evaporators	Incubators	Spectrophotometers
Calorimeters	Fermenters	Magnifiers	Spectroscopes
Centrifuges	Filtration	Measures	Sterilisers
Clinical test	Flame analyser	Microscopes	Syringes
Colony counters	Fraction collector	Microtomes	Tissue grinders
Colorimeters	Freeze drying	Nitrogen	Titration
Cotton wool	Furniture	Ovens	Ultrasonics
Diluters	Gas analysers	Pipettes	Washing

MELTING POINT TUBES

CAPILLARY TUBES, 100 x 1·5 to 2mm, clean and dry.

MFB-210-532A Tubes, sealed both ends — Pack of 100 **£0·83**

MFB-210-538L Tubes, open both ends — Pack of 100 **£0·56**

Gallenkamp MICRO-MELTING POINT APPARATUS

Enables standard microscopes to be used to determine melting points up to 325°C on single crystals



MFB-500

- **For bench and dissecting stage mounting and for clipping on elevated microscope stages**
- **Sample can be illuminated from above or by light from a substage mirror or illuminator**
- **Mains or battery operation**
- **Suitable for melting point of nylon to BS 2782 Part 1 Method 103 C**

In use, the sample is placed on a cover glass within a central recess in an aluminium alloy melting point block. It is covered with a second cover glass and further shielded by a top plate having a central window of Chance HA1 heat absorbing glass. For samples liable to sublimation a suitable hole is provided for using a melting point capillary tube.

Sample temperature may be increased at a rate controlled by means of a variable autotransformer accessory or, if a battery supply is used, by means of a suitable rheostat. Temperature is measured using a thermometer which is fitted through a tubulure mounted horizontally in the block. Maximum power rating 60 W. Overall dimensions 100 x 80 x 45 mm high.



MFB-500 with MFB-510, microscope and thermometer

MICRO-MELTING POINT APPARATUS, *GALLENKAMP*, as specified, **without** cover glasses and thermometer. For 10 V a.c./d.c. supplies.

MFB-500-G Micro-melting point apparatus **£50·63**

Microscopes for use with the above must have a minimum objective lens to stage separation of 45 mm. For suitable microscope see MJA-300-V.

ACCESSORIES

Variable autotransformer, output 10 V at 60 W. For a.c. single phase supplies.

MFB-510-010G Autotransformer, 200-250 V **£48·09**

MFB-510-030A Autotransformer, 100-120 V **£48·09**

Capillary tubes, 100 x 1·5 to 2 mm *See MFB-210-532A*

Cover glasses, thickness approximately 0·13 mm, diameter 19 mm *See HUE-800-0700*

Thermometers, immersion depth 30 mm *See THR-690*

Gallenkamp MELTING POINT APPARATUS

Electrically heated, for determinations of single or mixed melting points up to 350°C

FEATURES

- Adjustable rate of temperature rise
- Built-in boost heater
- Three melting point tubes simultaneously observed by means of full field lens



MFB-600

ILLUMINATION AND VIEWING

An internal 15 W S.B.C. lamp provides uniform and shadowless illumination of the sample tubes, which are viewed through a 25mm diameter lens. The brightness of the background can be adjusted by rotating a knob to the rear of the apparatus.

HEATING

One heater is regulated by a built-in rotary rheostat which permits accurate adjustment of the rate of increase of temperature as the melting point is approached. The other heater, for boosting the heating rate, is controlled by a switch. A second switch controls the lamp and the power input to the apparatus.

DESIGN

A cast aluminium case encloses the heating block and controls. The case, 230 × 130 × 300mm high including thermometer support and melting point tube container, is finished in grey duotone stoved enamel. For rapid cooling of the apparatus between tests, a water cooled plug accessory can be inserted in place of the thermometer.

MELTING POINT APPARATUS, *GALLENKAMP*, electrically heated, as specified. **Without** thermometer, cooling plug and melting point capillary tubes. For a.c./d.c. supplies.

MFB-600-010F	Melting point apparatus, 220–240V	**£51·75**
MFB-600-030W	Melting point apparatus, 110–120V	**£52·31**

SPARE PARTS

MFB-610-010V	Lamp, 220–240V	**£0·48**
MFB-610-030P	Lamp, 110–120V	**£0·48**
MFB-610-110R	Heater, 220–240V (2 required)	**£1·49**
MFB-610-130L	Heater, 110–120V (2 required)	**£1·49**

ACCESSORIES

MFB-610-502A	Cooling plug	**£3·60**
	Capillary tubes, 100 × 1·5 to 2mm, clean, dry and sealed at both ends	*See MFB-210-532A*
	Capillary tubes, 100 × 1·5 to 2mm, open at both ends	*See MFB-210-538L*
	Thermometers, immersion depth 30mm	*See THR-690*

Gallenkamp

KOFLER HOT BENCH



MFB-850

A melting point apparatus with which determinations from 50 to 260°C on very small amounts of a substance can be completed in one minute. The substance is placed on a heated surface, not contained in a tube, so in addition to melting points, eutectic temperatures, behaviour of water of crystallisation, dissociation and volatility can be observed, leading to quicker identification of organic compounds.

The hot bench is essentially a stainless steel plate, 360 × 40 mm, in which a linear temperature gradient is produced by a 150 W electric heater connected to a voltage stabiliser. Stability is reached in about 40 minutes from switching on. A special temperature scale mounted parallel with the plate enables the temperature at any point to be read by means of a sliding pointer.

When a substance is scattered on the hot bench, a sharp border line between the liquid and solid phases will form within seconds. If the pointer is moved to this line, it will indicate the melting point temperature.

To set the pointer to indicate true temperature before making a series of determinations, a few crystals of calibrating substance are scattered on the surface in the appropriate region and the scale reader on the pointer slide is adjusted to show the correct temperature. The scale will then read to within ±1°C in the middle of the scale, but the error will increase towards the end, for which reason the calibrating substance should have a similar melting point to that of the substances under test.

HOT BENCH, Kofler, as specified, with voltage stabiliser and eight calibration substances covering the range 68 to 228°C. For 220–240 V supplies.

MFB-850-D Hot bench **£511·88**



MFB-900

THIELE TUBE, borosilicate glass. An inexpensive and accurate apparatus for heating capillary tubes at accurate rates for the determination of melting points. In use, a capillary tube is wired to a suitable melting point thermometer so that the sample it contains is held close to the thermometer bulb. By means of a drilled cork the thermometer and capillary are mounted in the Thiele tube which is filled to just above the side limb with a non-volatile liquid. On heating the bend of the side limb, heated liquid circulates and raises the temperature of the sample in such a way that stirring is unnecessary.

MFB-900-H Thiele tube **£1·43**

ACCESSORIES

Capillary tubes, 100 × 1·5 to 2 mm, open both ends
See MFB-210-538L

Thermometers, immersion depth 30 mm *See THR-690*

Drop point of grease apparatus to IP31 and BS894
See PEH-300-Q

Dropping point of lubrication greases to ASTM D566-IP132
See PEH-360-M

Softening point of asphalt, bitumen and tar to ASTM D2398-IP198
See PEL-910-N

Softening point of bitumen to IP58
See PEL-930-Y



METTLER AUTOMATIC MELTING, BOILING AND DROP POINT APPARATUS

MODEL FP 5 CONTROLLER

- **Results displayed digitally to 0·1°C**
- **Pushbutton recording for 1, 2 or all 3 channels with normal indications for any channel not being recorded**
- **Pushbuttons for five heating and cooling rates**
- **Pushbutton for fast up and down heating or cooling**
- **Pushbutton temperature reversal control for microscope hot stage**



MFM-300

Technical data

Temperature range	−20 to 300°C
Heating and cooling rates °C/min	0·2, 1, 2, 3 and exploratory 10°C/min rate
Admissable voltage fluctuation	±10%
Recorder output	100mV into not less than 5kΩ
Dimensions	360 × 385 × 215mm high

CONTROLLER, *METTLER* **FP 5,** as specified, with spare fuses and lamps. For 110, 125, 145, 160, 220 and 240V 50–60Hz supplies. (F)
MFM-300-X Controller **£1586·31**

MODEL FP 51 AUTOMATIC MELTING AND BOILING POINT OVEN

- **Temperature range −20 to 300°C**
- **Simultaneous determination of melting point on three samples, with individual readout. Sample size 1 to 3mg**
- **Up to 50 melting point determinations/hour**
- **Boiling points measured on single samples of 50 to 80 µl**
- **Up to 15 boiling point measurements/hour**



MFM-380

Melting point determination
When the start lever has been depressed the instrument carries the determinations to completion with no further attention. The operator is required to do nothing more than read and record the individual results, each clearly displayed on the readout panel.

Technical data

Heating rates, °C/min	0·2, 1, 2, 3 and 10
Accuracy of oven temperature (on 0·2°C/min rate and isothermal)	Between 30 and 100°C: ±0·1°C on melting point and ±0·3°C on boiling point Between 100 and 200°C: ±0·2°C on melting point and ±0·6°C on boiling point Between 200 and 300°C: ±0·3°C on melting point and ±1°C on boiling point

For operation below ambient temperature, down to −20°C the oven unit must be operated in a refrigerated cabinet.
Dimensions: 162mm diameter × 215mm high.

MELTING AND BOILING POINT OVEN, automatic, *METTLER* **FP 51,** as specified, including oven unit, melting and boiling point tubes, boiling capillaries, tube carrier, tube diameter gauge and standard benzoic acid. Requires but **does not include** controller MFM-300-X. (F)
MFM-380-E Melting/boiling point oven **£543·29**

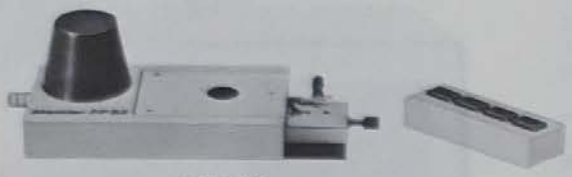
SPARE PARTS

MFM-390-050F	Melting point tubes (F)	Pack of 150 **£6·66**
MFM-390-090Q	Boiling point tubes (F)	Pack of 40 **£5·26**
MFM-390-130H	Boiling capillaries (F)	Pack of 10 **£11·00**

METTLER AUTOMATIC MELTING, BOILING AND DROP POINT APPARATUS

continued

MODEL FP 52 AUTOMATIC MICRO-MELTING POINT HOT STAGE



MFM-500

- **Temperature range −20 to 300°C**
- **Up to three independent values on one sample can be registered digitally**
- **Provides uniform temperature field pattern of the micro hot stage**
- **Heating stage can be connected to cold gas source for measurements below room temperature**

Technical data

Accuracy of hot stage temperature (on 0·2°C/min rate and isothermal)	±0·1°C between 30 and 100°C ±0·2°C between 100 and 200°C ±0·3°C between 200 and 300°C
Sample recess (prismatic)	45 × 30 × 2mm
Sample carrier (trimmed)	76 × 19 × 1mm
Hot stage dimensions	195 × 85 × 48mm high
Field of vision	2·5mm diameter
Sample/objective clearance	⩾7mm
Stage/objective clearance	⩾29mm

MICRO-MELTING POINT HOT STAGE, automatic, *METTLER* **FP 52,** as specified, comprising hot stage and pushbutton module. With two sets of 50 sample carriers and cover glasses, cooling vane, protective heat filter and replacement fan motor. Requires but **does not include** controller MFM-300-X. (F)

MFM-500-V Micro-melting point hot stage **£463·43**

SPARE PARTS

Object stages, 75 × 18 × 1mm thick. (F)

MFM-510-050W Object stage Pack of 100 **£4·96**

Cover slips, 15 × 15 × 0·2mm thick. (F)

MFM-510-090K Cover slips Pack of 100 **£2·49**

ACCESSORY

Phase sensing device. Fits in eyepiece of microscope in place of eyepiece to detect transition from solid to liquid phase of sample. Requires recorder with 100mV f.s.d. and microscope fitted with polarising attachment. (F)

MFM-510-502N Phase sensing device **£100·90**

MODEL FP 53 AUTOMATIC DROP POINT OVEN



MFM-600

- **Temperature range −20 to 300°C**
- **Drop points determined in accordance with methods described in ASTM D566 – IP 132 DIN 51801 and BS 894 (Ubbelohde) using grease cup of standard dimensions**
- **Softening point of pitches determination in accordance with ASTM D3104**
- **Up to 12 determinations/hour**

Technical data

Accuracy of oven temperature (on 0·2°C/min rate and isothermal)	±0·1°C between 30 and 100°C ±0·2°C between 100 and 200°C ±0·3°C between 200 and 300°C
Reproducibility with 99·9% stearic acid	±0·2°C
Sample quantity	0·4 to 0·6g
Dimensions	160mm diameter × 215mm high

For operation below ambient temperature down to −20°C the oven unit must be operated in a refrigerated cabinet.

DROP POINT OVEN, automatic, *METTLER* **FP 53,** as specified, comprising oven, seven grease cups, two grease cup holders, spatula and rod. Requires but **does not include** controller MFM-300-X. (F)

MFM-600-N Drop point oven **£566·28**

SPARE PARTS

Spares kit, comprising two grease cup holders, two grease cups, spatula and rod. (F)

MFM-610-050X Spares kit **£44·77**

MFM-610-090C Grease cups Pack of 5 **£6·17**

MFM-610-130Q Tar and bitumen cups Pack of 5 **£6·17**

DIGITAL READING MELTING POINT APPARATUS

- Temperature range: ambient to 400°C
- Digital temperature display
- Choice of interchangeable viewing modules
- Up to three samples viewed simultaneously
- Platinum resistance temperature sensors
- Fine and coarse heat controls
- Override boost button for rapid heating
- Temperature readout accuracy ±1°C



MFR-500

Capillary tubes containing samples are heated by a low thermal metal block. Observation by Direct Viewing or Shadowgraph systems both interchangeable within the basic unit. Temperature readout by digital display adjacent to observation point. Pushbutton controls for mains, lamp, boost heater, test zero, test temperature span and record temperature.

Overall dimensions	335×312×175mm high with Shadowgraph module fitted 335×312×346mm high with Direct Viewing module fitted
Mass	6kg

MELTING POINT APPARATUS, digital, *ELECTROTHERMAL*, **basic unit,** as specified. Supplied with 100 capillary tubes, 1 bottle Micropaque (for application to viewing area to remove glare and sharpen image) and 1 spare lamp. For 105, 110, 200, 220 and 240V 50–60Hz single phase supplies. Requires but **does not include** viewing module.

MFR-500-R Melting point apparatus £481·80

ACCESSORY VIEWING MODULES

SHADOWGRAPH VIEWING MODULE, for viewing samples in melting point apparatus. Image of samples is focused on ground screen adjacent to digital readout. Magnification ×9·7 approximately. Image size 90×50mm.

MFR-520-D Shadowgraph module £112·20

DIRECT VIEWING MODULE, interchangeable with shadowgraph module. Sample is viewed directly through a magnifying lens. Magnification ×2·5 approximately.

MFR-530-T Direct viewing module £178·20

METALLURGICAL APPARATUS

Apparatus for metallurgical purposes is listed under the following page headings

Boats
Colorimeters
Crucibles
Electrodeposition
Furnaces
Gas analysers
Microscopes
Mills
Mixers
Ovens
Particle sizing
Polishing
Presses
Safety
Sampling
Sieves
Thermal analysis
Thickness
Titration
Tools

METEOROLOGICAL APPARATUS

Apparatus of meteorological interest will be found under the following page headings

Barometers
Hygrometers
Soil science
Thermometers

Gallenkamp MERCURY STILL



MGH-300

Construction

The distillation vessel comprises a borosilicate glass bulb with a wide-bore capillary feed and outlet tubes. A water cooled cold-finger condenser is sealed into the top of the bulb, which rests on an electric heater in an asbestolite insulating box. The whole assembly, including a mercury feed system and siphon outlet, is mounted on a wood stand with a large mercury tray base. A rheostat is used to adjust the heat input.

Automatic feed

Comprises a stainless steel reservoir suspended from a spring which maintains a constant mercury level in the distillation bulb. The still will process about 10kg, without replenishment and the reservoir can be filled without interrupting the distillation process. A safety device switches off the heater when the mercury level falls too low.

Operation

The apparatus is initially evacuated by means of a pump. When heat is applied, the mercury in the bulb boils in vacuo, condenses and flows down the outlet tube. Raw mercury from the reservoir flows into the feed tube. The distillate falling into the outlet tube produces a Sprengel pumping action which maintains a sufficient vacuum for the process, provided the mercury is reasonably clean. Distilled mercury siphons out of the trap into a stock bottle. Output is approximately 2·5kg/hour.

Dimensions 310 × 360 × 1450mm high.

MERCURY STILL, AUTOMATIC, *GALLENKAMP*, as specified, electrically heated, with rheostat, automatic feed and instructions manual. For a.c. single phase supplies.

MGH-300-010E	Mercury still, 200–250V	**£228·38**
MGH-300-030V	Mercury still, 110–120V	**£234·00**

SPARE PARTS

MGH-310-010U	Heating element, 200–250V	**£14·06**
MGH-310-030X	Heating element, 110–120V	**£14·06**
MGH-310-090T	Main glass part only, borosilicate glass	**£13·11**



MGH-400

MERCURY COLLECTOR, for retrieving spilt mercury, thus reducing this dangerous laboratory hazard. Comprises a plastics foam pad inset in the screw lid of a polythene container. In use, the lid with the pad attached is pressed firmly against the surface where mercury has been spilt. Mercury globules enter the cells in the pad and are expelled into the container when the lid is replaced. The lid contains one spare foam pad.

MGH-400-W	Mercury collector	**£1·50**

SPARE PARTS

MGH-410-010M	Foam pads	Pack of 6 **£0·34**

MERCURY RESERVOIRS (LEVELLING BULBS), glass.

MGH-480-010J	Mercury reservoir, 150ml	**£2·81**
MGH-480-030D	Mercury reservoir, 250ml	**£2·93**



MGH-480

MERCURY, *ANALAR* Mass 500g. (F)

MGH-550-C	Mercury	**£23·10**

This item can be exported by deck cargo Sea Freight only.

MICROSCOPES

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	OLYMPUS STN-3RE	MJA-350-J	416
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OLYMPUS MICROSCOPES

Gallenkamp are exclusive Distributors in the United Kingdom for biological microscopes made in Japan by Olympus Optical Co. Ltd

OLYMPUS MODEL MIC MICROSCOPE

A compact, microscope for schools use. In carrying case.

- **Inclined monocular head**
- **Fixed square stage with clips**
- **Built-in magnification changer control**
- **Stage focusing by rack and pinion**
- **Adjustable focus stop protects slide and objective**
- **Magnifications ×40, ×75, ×150 and ×300**

MICROSCOPE, *OLYMPUS* **MIC,** as specified. (F)
MJA-200-G Microscope, MIC **£42·35**
No accessory optical elements can be fitted to this microscope.

ACCESSORY

Illuminator LSK-3 *See MMV-560-T*



MJA-200



MJA-350



MJA-500



MJA-550

OLYMPUS MODEL STN-3RE MICROSCOPE

A robust microscope for routine work. In carrying case.

- **Fixed square stage with clips**
- **Rack and pinion focus mechanism**
- **Rotating click-stop five-aperture diaphragm**
- **Triple nosepiece**
- **Adjustable focusing stop avoids damage to slide or objective**
- **Magnifications ×40, ×100 and ×200**
- **Optical elements – eyepiece H ×10 objectives ×4, ×10, ×20**

MICROSCOPE, *OLYMPUS* **STN-3RE,** as specified. (F)
MJA-350-J Microscope, STN-3RE **£62·26**

ACCESSORY

Substage illuminator LSK-2 *See MMV-520-B*

OLYMPUS MODELS HSC AND HSC PHASE MICROSCOPES

Versatile microscopes for advanced students use. In carrying case.

- **Monocular body which can be inclined through 90°**
- **Triple nosepiece**
- **Coarse and fine focusing**
- **Fixed square stage, drilled to accept accessory mechanical stage**
- **Abbe condenser N.A. 1·25 with iris diaphragm**
- **Condenser focusing by rack and pinion**
- **Preset focusing and condenser stops**
- **Magnification from ×40 to ×400**
- **Optical elements – eyepiece H ×10 – objectives ×4, ×10, ×40 achromatic**

MICROSCOPE, *OLYMPUS* **HSC,** as specified. (F)
MJA-500-F Microscope, HSC **£99·00**

ACCESSORIES

Mechanical stage FM2 *See MMW-850-K*
Substage illuminator LSK-2 *See MMV-520-B*

MICROSCOPE, *OLYMPUS* **HSC PHASE,** as specified. (F)
MJA-550-Q Microscope, HSC phase **£168·85**

ACCESSORIES

Annuli for phase contrast objectives. (F)
MJA-570-504U Annulus, for ×10 **£5·17**
MJA-570-508M Annulus, for ×20 **£5·17**
Phase objectives *See MMS-480*

OLYMPUS SERIES K MICROSCOPES

- **Coaxial coarse and fine focusing knobs**
- **Substage focusing by rack and pinion**
- **Inclined rotatable monocular head**
- **Quadruple nosepiece**
- **Large size stage to accommodate attachable mechanical stage**
- **Adjustable focusing lock protects slides and objectives**

A range of modern microscopes with features normally restricted to expensive research models. In fitted case with lock and key.

Stand
The stand and base are of rigid construction.

Head
The monocular head is inclined at 45° and is rotatable through 360°.

Eyepieces
All eyepieces are hard coated for high light transmission and quality definition.
The standard equipment includes a WF × 10 wide field eyepiece. Alternative eyepieces are available and are listed on page 433.

Nosepiece
The quadruple nosepiece gives accurate alignment of objectives.

Objectives
All achromatic objectives are parfocal and interchangeable and supplied in plastics tubes. Alternative objectives are available and listed on page 431.

Stage
A large size stage (110 × 140mm) is pre-drilled and tapped to accommodate a mechanical stage which is available as an accessory.

Substage
Rack and pinion focusing, pre-centred. 15mm movement.

Condenser
Abbe N.A. 1·25 with iris diaphragm and swing-out filter holder.

Illumination
A plano-concave mirror is included in the standard equipment. A 20 W illuminator or Universal illuminator with transformer are available as alternatives.

Focusing
Vertical movement of the stage, by conveniently located coaxial coarse and fine adjustment controls. Coarse focus range 28mm. Fine focus range 2mm.



MJF-300
MJF-320 and MJF-340 are similar

Replacement lamp	*See MMV-570-010J*
Universal light source LSD	*See MMV-600-H*
Dark field condenser DC	*See MMV-290-W*
Phase contrast outfit	*See MMW-700-M*
Graduated mechanical stage FM-2	*See MMW-850-K*
Substage illuminator LSK-3	*See MMV-560-T*
Immersion oil	*See MMS-800-V*

List No.	Model	Wide field eyepiece	Achromatic objectives	Abbe condenser	Magnification range	Each £	
MJF-300-R	K1	WF × 10	× 4, × 10, × 40	N.A. 1·25	× 40 to × 400	**149·60**	(F)
MJF-320-D	K2	WF × 10	× 10, × 40, × 100	N.A. 1·25	× 100 to × 1000	**174·90**	(F)
MJF-340-M	K3	WF × 10	× 4, × 10, × 40, × 100	N.A. 1·25	× 40 to × 1000	**181·50**	(F)

For details of the CHC series of Microscopes see the Addenda

OLYMPUS MODELS KHS AND KHC-LV MICROSCOPES

- Inclined binocular head rotatable through 360°
- High quality optics
- Magnifications from ×40 to ×1000 with optics supplied
- Enclosed rack and pinion focusing
- Coaxial coarse and fine focusing adjustment knobs
- Large built-in mechanical stage
- Adjustable focusing lock protects slides and objectives
- Built-in illuminator
- Tube length correction adjustments



MJF-600

Low priced research microscopes of modern design suitable for routine medical and biological studies and research.

Head
Inclined binocular head, rotatable through 360° with interocular distance adjustable from 56 to 74mm. Eyepiece tubes graduated in interocular separation allowing tube length adjustments to maintain parfocality of objectives.

Eyepieces
All eyepieces are hard coated for high transmission and quality definition.

Nosepiece
The quadruple click-stop nosepiece gives accurate alignment.

Objectives
All achromatic objectives are parfocal and interchangeable and supplied in plastics tubes.

Stage
Mechanical stage with convenient coaxial controls and vernier graduations. Movements 30 x 70mm. Stage mechanism removable to leave plain stage.

Substage
Rack and pinion focusing, pre-centred, movement 15mm.

Condenser
Abbe N.A. 1·25 with iris diaphragm and swing-out filter holder.

For details of the CHC series of Microscopes see the Addenda

Focusing
Vertical movement of the stage is by coarse and fine focusing controls. Coarse focus range 28mm. Fine focus range 2mm.

Illuminators
Built-in illumination system, two types available:
KHS 25 W mains lamp with voltage controller.
KHC low voltage 6 V 30 W lamp with separate transformer.

MICROSCOPE, *OLYMPUS* **KHS,** as specified, with ×4, ×10, S×40 and S×100 achromatic objectives, N.A. 1·25 Abbe condenser, 25 W pre-centred illuminator with built-in controller and two replacement lamp bulbs. In fitted case with lock and key. For 220–240 V a.c. single phase supplies. (F)

MJF-600-Q	Microscope, KHS	**£341·00**

MICROSCOPE, *OLYMPUS* **KHC-LV,** as MJF-600-Q but with 30 W low voltage, variable intensity illuminator and separate transformer. For 220–240 V a.c. single phase supplies. (F)

MJF-630-S	Microscope, KHC-LV	**£368·50**

SPARE PARTS

MJF-650-030S	Lamp bulb, 25 W for KHS	£2·86
MJF-650-070G	Lamp bulb, 30 W for KHC-LV	£1·71

ACCESSORY

Immersion oil	See MMS-800-Y
Eyepieces	See page 433
Objectives	See page 431
Condensers	See page 434

OLYMPUS SERIES BH SYSTEM MICROSCOPES

A modular series providing outfits suitable for routine and research applications

- **Wide range of interchangeable components**
- **High quality optics**
- **Designed for durability and operator comfort**
- **Accepts PM-6 and PM-10 camera systems**

Heads

Binocular and trinocular heads for observation and photomicrography. The maximum field number is 21. The heads are rotatable through 360° with clamping screw, permitting comfortable observation of an exceptionally large field of view. Observation tubes supplied with the recommended outfits are inclined at 45°. Alternative heads inclined at 30° are available.

Coating of the prisms in the observation tube reduces light loss to a negligible amount, thus increasing light transmission by more than twice as much compared with most conventional observation tubes.

Interpupillary distance adjustment from 53 to 72mm. An adjustment ring is provided on each eyepiece tube to maintain objective parfocality at different interpupillary distances.

On the trinocular head a light path selector lever directs either 100% of light to the observation tube or 80% to the phototube and 20% to the observation tube.

A circular dovetail mount permits interchange of heads with ease.

Nosepiece

Quintuple revolving nosepiece on ball races with dust-proof carrier. Smooth rotation maintains parfocality of all five objectives. The click stop is positive in action, so that each objective comes to a common centre when rotated into the working position.

A dovetail slide mount on the model BHA permits removal of the quintuple nosepiece thus facilitating rapid interchange of objective sets.

Focusing

The coaxial coarse and fine adjustments both operate over a common range of 40mm. A single ball bearing guideway is used to give a smooth and even movement.

The fine focusing adjustment is graduated in increments of 2 microns and incorporates special reduction gears for smooth operation and long-term reliability.

The adjustable coarse focus limit lever next to the left hand coarse focus knob is provided to prevent possible contact between specimen and objective, as well as to simplify coarse focusing. The lever should be locked after coarse focus has been accomplished. This prevents further upward travel of the stage and provides a limiting stop if the stage is lowered and then raised again. This mechanism does not restrict the fine focusing.

A tension adjustment ring is provided next to the right hand coarse adjustment knob. With this device the tension of the coarse adjustment is freely adjustable for either heavy or light movement as preferred.

Base

A square base incorporates a variable illumination control with separate ON-OFF switch.

The models BHA and BHB have a 30 W Kohler illumination system with high/low aperture selector lever and an integral low voltage transformer. The model BHC has a 15 W Kohler illumination system without high/low selector.

Stage

The basic stage is a large, graduated, square mechanical stage 142 x 140mm, on horizontal dovetail stage bracket, with clamping lever and large coaxial low level controls on the right hand side.

Traversing movements on ball guides covering an area 52 x 76mm, with verniers reading to 0.1mm.

Large specimen holder, capable of simultaneous use of two 26 x 76mm slides is removable to obtain a large unobstructed stage surface.

The horizontal dovetail stage bracket permits easy interchange of stages in accordance with various observation methods.

An alternative mechanical stage 135 x 135mm, which can be rotated through 110°, is interchangeable with the basic stage.



MKC-250



MKC-720

Continued overleaf

OLYMPUS SERIES BH SYSTEM MICROSCOPES

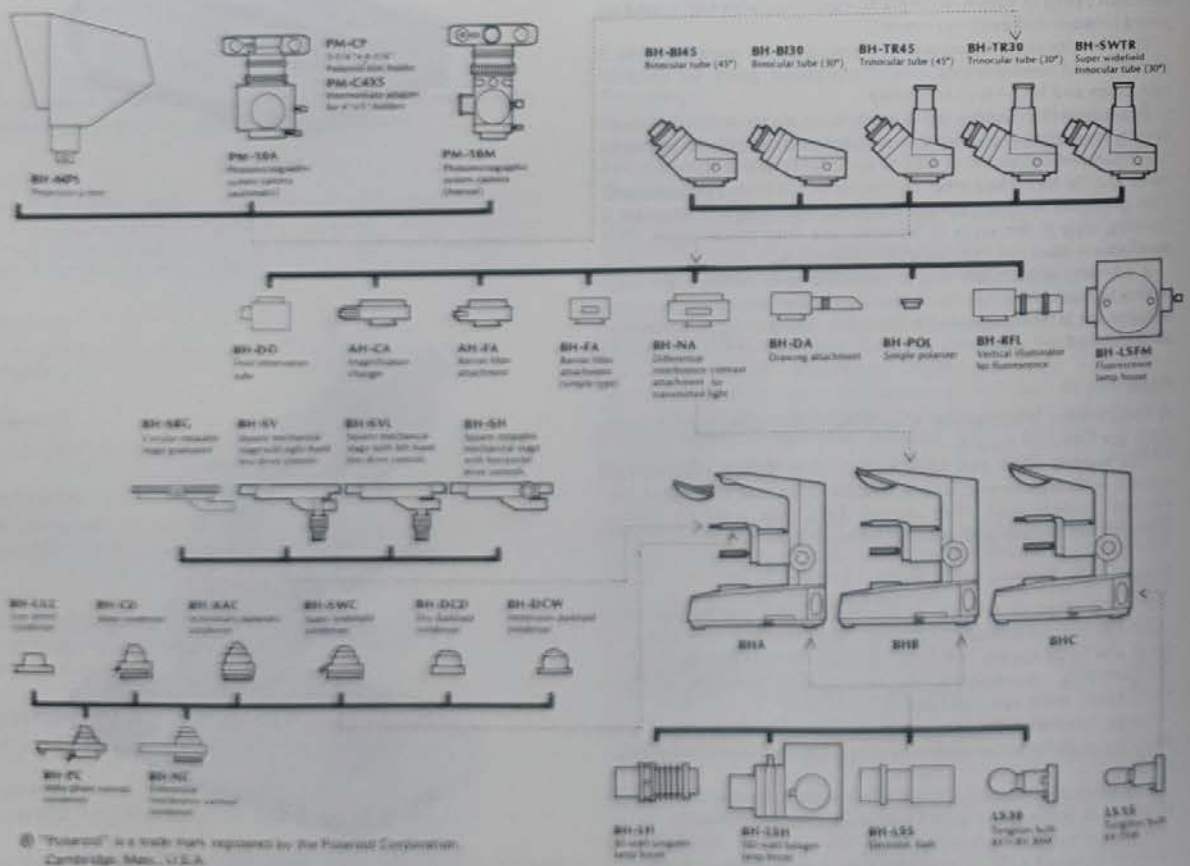
RECOMMENDED ASSEMBLIES

Heads supplied are inclined at 45°

List No.	Model	Eyepieces	Objectives	Condenser	Head	Each £
MKC-250-J	BHC211	Bi HEP WF×10	Achromats ×4, ×10, S×40, S×100	Abbe	Binocular	511·50 (F)
MKC-290-E	BHC411	Bi HEP WF×10 FK×5	Achromats ×4, ×10, S×40, S×100	Abbe	Trinocular	550·00 (F)
MKC-320-W	BHC411S	Bi HEP WF×10 FK×5	Achromats-semi flat ×4, ×10, S×40, S×100	Abbe	Trinocular	578·60 (F)
MKC-400-F	BHB211	Bi HEP WF×10	Achromats ×4, ×10, S×40, S×100	Abbe	Binocular	589·60 (F)
MKC-440-A	BHB411	Bi HEP WF×10 FK×5	Achromats ×4, ×10, S×40, S×100	Abbe	Trinocular	629·20 (F)
MKC-480-S	BHB213	Bi HEP WF×10	Planachromats ×4, ×10, S×40, S×100	Abbe	Binocular	798·60 (F)
MKC-520-G	BHB413	Bi HEP WF×10 FK×5	Planachromats ×4, ×10, S×40, S×100	Abbe	Trinocular	838·20 (F)
MKC-600-M	BHA211	Bi HEP WF×10	Achromats ×4, ×10, S×40, S×100	Abbe	Binocular	629·20 (F)
MKC-640-H	BHA411	Bi HEP WF×10 FK×5	Achromats ×4, ×10, S×40, S×100	Abbe	Trinocular	667·70 (F)
MKC-680-C	BHA213	Bi HEP WF×10	Planachromats ×4, ×10, S×20, S×40, S×100	Aplanatic	Binocular	950·40 (F)
MKC-720-N	BHA413	Bi HEP WF×10 FK×5	Planachromats ×4, ×10, S×20, S×40, S×100	Aplanatic	Trinocular	990·00 (F)

To obtain an alternative outfit to meet your individual requirements select from the following components a stand, head, light source with bulbs, stage, condenser, optics and other accessories.

BH MICROSCOPE SERIES COMPONENT DIAGRAM



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OLYMPUS SERIES BH SYSTEM MICROSCOPES

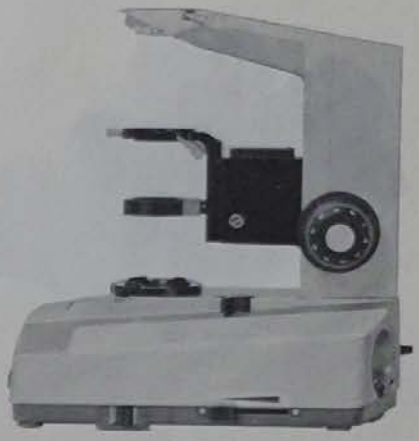
MICROSCOPE STANDS

MICROSCOPE STAND, *OLYMPUS* **BHA-F,** with coaxial fine and coarse focus controls which operate over the 40mm vertical travel. The coarse control has an adjustable limit stop and the fine control is graduated in 0·002mm steps. A high/low aperture selector and intensity control with voltmeter all mounted in the base provide for Köhler illumination. Includes dovetail carriers for stage and nosepiece, field iris diaphragm with graduated control, auxiliary condenser lens, condenser ring mount with centring device and rack and pinion adjustment of 32mm. The stand has an enamel finish and is supplied packed with mains lead, fuses, daylight blue filter, plastics cover and immersion oil. Requires but **does not include** nosepiece and lamp housing. (F)

MKE-300-Q	Microscope stand, BHA-F	**£292·60**

ACCESSORIES

	Revolving nosepiece, OLYMPUS BH-RE, quintuple, with ball races and click stops on dovetail mount.	
MKE-320-502B	Revolving nosepiece. (F)	**£39·60**
MKE-320-540Q	Storage cabinet, wood. (F)	**£31·90**
	Lamp housing	*See MKE-650-D*
	Lamp bulb	*See MKE-660-010Q*



MKE-300

MICROSCOPE STAND, *OLYMPUS* **BHB-F,** as MKE-300-Q but including non-removable quintuple nosepiece mounted on ball races with positive click stops. Requires but **does not include** lamp housing. (F)

MKE-370-N	Microscope stand, BHB-F	**£292·60**

ACCESSORIES

Lamp housing	*See MKE-650-D*
Lamp bulb	*See MKE-660-010Q*
Storage cabinet	*See MKE-320-540Q*

MICROSCOPE STAND, *OLYMPUS* **BHC-F,** as MKE-370-N but with integral lamp housing for 6V 15W light source to provide Köhler illumination. Includes graduated intensity control in place of voltmeter. For 220–240V a.c. single phase supplies. Requires but **does not include** lamp bulb. (F)

MKE-410-B	Microscope stand, BHC-F	**£227·70**

ACCESSORIES

MKE-430-504F	Lamp bulb, 15W, 6V (F)	**£1·63**
	Storage cabinet	*See MKE-320-540Q*



MKE-410

LIGHT SOURCES

LIGHT SOURCE, *OLYMPUS* **BH-LH.** With collector lens, heat absorbing filter, bulb socket, two bulbs and cable. For 220–240V a.c. single phase supplies. (F)

MKE-650-D	Light source, BH-LH	**£13·20**

SPARE PART

MKE-660-010Q	Lamp bulb, 30W 6V (F)	**£3·63**

LIGHT SOURCE, low voltage, halogen, *OLYMPUS* **BH-LSH.** With adjustable focus collector lens, lamp bulb socket, frosted glass filter, two 100W halogen bulbs, low voltage cable and transformer. For 220–240V a.c. single phase supplies. (F)

MKE-700-H	Light source, BH-LSH	**£239·80**

SPARE PART

MKE-720-506H	Lamp bulb, halogen, 100W. (F)	**£7·15**

LIGHT SOURCE, flash, *OLYMPUS* **BH-LSS.** For 220–240V a.c. single phase supplies. (F)

MKE-770-E	Light source, BH-LSS	**Price on application**

LIGHT SOURCE, fluorescence, *OLYMPUS* **BH-LSF.** For 220–240V a.c. single phase supplies. (F)

MKE-820-Y	Light source, BH-LSF	**Price on application**

SPARE PART

MKE-840-502Q	Mercury vapour bulb. (F)	**Price on application**



MKE-650



MKE-700

OLYMPUS SERIES BH SYSTEM MICROSCOPES

HEADS



MKF-250

BINOCULAR HEADS, interchangeable, *OLYMPUS* **BH-B145,** inclined at 45° or 30° and rotatable through 360°. With interpupillary distance adjustable from 53 to 72mm and individual adjustment of eyepiece observation tube. (F)

MKF-250-010W Binocular head, 45° **£85·25**
MKF-250-030Q Binocular head, 30° **£85·25**

TRINOCULAR HEADS, interchangeable, *OLYMPUS* **BH-TR45,** rotatable through 360°. With binocular eyetubes inclined at 45° or 30° and having interpupillary distance adjustable from 53 to 72mm. The tube length is individually adjustable on each binocular eyetube A two position lever directs light requirements to the observation and phototubes. (F)

MKF-290-010R Trinocular head, 45° **£115·50**
MKF-290-030L Trinocular head, 30° **£115·50**

PHOTOTUBE, vertical, *OLYMPUS* **BH-PT.** (F)

MKF-350-R Phototube **£12·10**



MKF-290

STAGES

MECHANICAL STAGE, graduated, interchangeable, *OLYMPUS* **BH-SV,** 142×140mm, with low positioned coaxial controls on right hand side and verniers reading to 0·1mm. Transversing area 52×76mm with movement on ball guides and rack and pinion. Includes removable specimen holder. (F)

MKF-600-F Mechanical stage, BH-SV **£71·50**

MECHANICAL STAGE, graduated, interchangeable, *OLYMPUS* **BH-SVL,** as MKF-600-F but with controls on left hand side. (F)

MKF-630-H Mechanical stage, BH-SVL **£71·50**

MECHANICAL STAGE, graduated, interchangeable, *OLYMPUS* **BH-SH,** 135×134mm, with coaxial controls and verniers reading to 0·1mm. Transversing area 44×76mm with movement on ball guides, rack and pinion, and leadscrew. The stage is rotatable through 110°. Includes removable specimen holder. (F)

MKF-680-S Mechanical stage, BH-SH **£105·60**



MKF-600



MKF-680

OLYMPUS SERIES BH SYSTEM MICROSCOPES

CONDENSERS

CONDENSER, Abbe, *OLYMPUS* **BH-CD,** N.A. 1·25. (F)
MKF-800-M Condenser, BH-CD **£18·15**

CONDENSER, achromatic/aplanatic, *OLYMPUS* **BH-AAC,** N.A. 1·4. (F)
MKF-820-V Condenser, BH-AAC **£78·65**



MKF-820

CONDENSER, single lens, *OLYMPUS* **BH-ULC,** low power, N.A. 0·1. (F)
MKF-840-H Condenser, BH-ULC **£9·35**

CONDENSER, dark field, oil immersion, *OLYMPUS* **BH-DCW,** N.A. 1·2 to 1·4. (F)
MKF-860-Q Condenser, BH-DCW **£93·50**



MKF-860

CONDENSER, dark field, dry, *OLYMPUS* **BH-DCD,** N.A. 0·8 to 0·92. (F)
MKF-880-C Condenser, BH-DCD **£95·70**

CONDENSER, phase contrast, *OLYMPUS* **BH-PC,** N.A. 1·25. With wrench and green filter. (F)
MKF-900-E Condenser, BH-PC **£89·10**

CONDENSER, Nomarski, *OLYMPUS* **BH-NC,** N.A. 0·9 to 1·4.
MKF-920-N Condenser, BH-NC (F) **£273·90**

ACCESSORIES

Magnification changer, with rotating turret, AH-CA. (F)
MKH-210-504F Magnification changer, AH-CA **£210·10**

Barrier filter attachment AH-FA, with rotating turret of filters and UV stop filter. (F)
MKH-210-516V Barrier filter, AH-FA **£45·10**
MKH-210-528X Simple filter attachment, BH-FA. (F) **£45·10**

Differential interference contrast (Nomarski) intermediate tube, BH-NA. (F)
MKH-220-506R Differential intermediate tube **£552·20**

For complete outfit *See MKH-240-520J*
MKH-220-512W Projection screen, BH-MPS. (F) **£143·00**
MKH-220-518K Projection screen, BH-SPS. (F) **on app.**

Dual observation outfit, BH-DO with pointer, manipulator, spare bulbs, transformer, trinocular head and eyepieces HEP WF x 10 and FK x 5. For 220–240V a.c. single phase supplies. (F)
MKH-220-530U Dual observation outfit, BH-DO **£346·50**
MKH-220-540R Transformer, spare for MKH-220-530U. (F) **£23·65**
MKH-220-544J Lamp bulb, spare for MKH-220-530U. (F) **£1·21**

Illuminator, bright field, vertical, BH-MA, with lamp housing and spare lamp.
MKH-230-510T Illuminator, BH-MA. (F) **£79·75**

Lamp bulb, spare *See MKE-430-504F*
Lamp housing, MF-LSH, halogen for MKH-220-544J. (F)
MKH-230-540K Lamp housing, MF-LSH **£74·80**
MKH-240-508W Polariser/analyser set, BH-PO. (F) **£39·60**

Differential interference contrast outfit, BH-MC. (F)
MKH-240-520J Differential outfit, BH-MC **£1160·50**
MKH-240-540D Incident fluorescence outfit, BH-RFL. (F) **£1562·00**
MKH-240-560U Drawing attachment, BH-DA. (F) **£148·30**

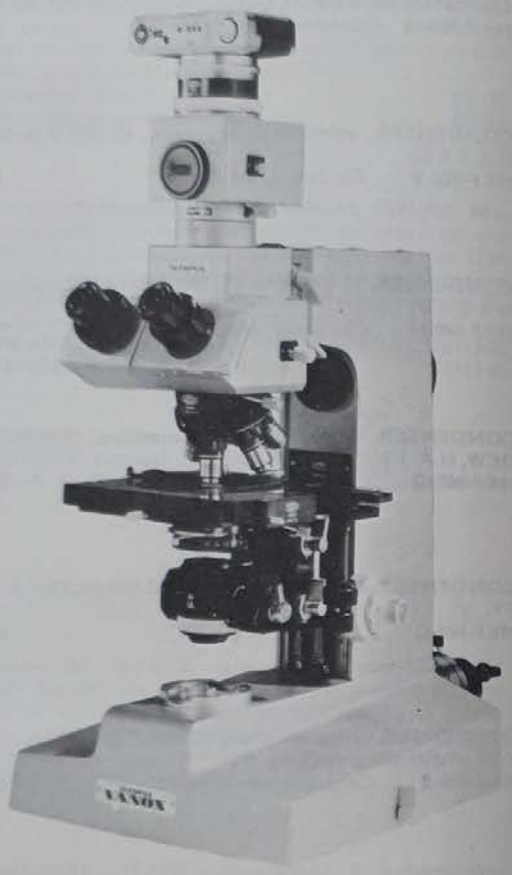


PHOTOMICROGRAPHIC SYSTEMS
for use with SERIES BH SYSTEM MICROSCOPES
See MMX-210-M to MMX-420-M

Gallenkamp

OLYMPUS VANOX UNIVERSAL RESEARCH MICROSCOPE

- **Modular design – wide range of interchangeable accessories**
- **Controls placed for maximum comfort to operator**
- **Wide range of photomicrographic assemblies possible**
- **High quality planachromatic objectives**
- **Köhler illumination at all magnifications**



MKU-350 with photomicrographic attachment MMX-350

A modular microscope system based on modern design and manufacturing techniques. A wide range of interchangeable accessories is available to enable the microscope to be modified or elaborated quickly and easily as required.

Stand

The basic stand is supplied with a quintuple, interchangeable nosepiece, a head with a three-position viewing system for combined direct viewing and photographic work, coarse and fine coaxial focusing controls and a 30 W tungsten illuminator.

Stages

A mechanical stage with low-level controls is supplied as standard. This stage measures 170 x 172mm and has vertical and horizontal movements of 52mm and 76mm with vernier scale adjustment reading to 0·1 mm. The specimen holder can be removed to give a plain stage. This stage is rotatable through 270°.

Other stages available include a mechanical stage with horizontal controls, fully rotatable and a circular rotatable polarising stage.

Objectives

High quality planachromatic objectives are supplied with the standard outfit but a large range of fluorite, apochromatic and planapochromatic objectives is also available.

Eyepieces

High eyepoint wide field x 10 eyepieces are supplied with the standard outfit. For photomicrographic work there are specially corrected photographic eyepieces and field of view eyepieces for various formats.

Transmitted light system

Köhler illumination is provided for the entire range of objectives from x 1·3 to x 100 by a system incorporating a reversible auxiliary lens assembly and an achromatic/aplanatic condenser. The standard light source is a 6V 30 W tungsten lamp in a well ventilated centring housing. Other interchangeable sources are available. Objectives are fully illuminated without unevenness, regardless of numerical aperture.

MICROSCOPE, *OLYMPUS* **VANOX,** as specified comprising:
Main stand with binocular head, combination binocular and photo head, quintuple nosepiece and mechanical stage with insert plate.
Achromatic/aplanatic condenser with centring device.
Planachromatic objectives x 4, x 10, x 20, x 40 and x 100.
Paired eyepieces x 10 high eyepoint wide field.
Auxiliary lens system with iris diaphragm.
Colour filters, green, yellow and cobalt.
Tungsten illumination system with built-in controls, heat filters and spare lamp.
Immersion oil.
Plastics dust cover, instructions and accessory storage box. For 220–240 V a.c. single phase supplies. (F)

MKU-350-F Microscope, Vanox **£1944·80**

OLYMPUS VANOX ATTACHMENTS

The following are available – full details on request:

Phase contrast attachment, model APC.

Fluorescence illuminator, model A-FL.

Incident fluorescence attachment A-RFL.

Fluorescence, phase contrast attachment A-FLPC.

Tungsten halogen light source for transmitted and reflected light, models A-LSH, A-M-LSH.

Vertical illuminator, model A-M.

Differential interference contrast equipment for reflected light (after Nomarski*), model A-NIC.

Incident phase contrast attachment, model A-MPC.

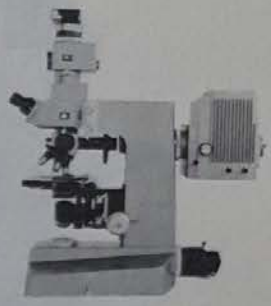
Vertical illuminator for bright field/dark field, model A-RL-B.

Polarising attachment, model A-P-I.

* sub-licensed from Union Optical Company.



Model A-M-LSH



Model A-RFL

ACCESSORIES

MKU-370-510X	Condenser, swing-out N.A. 0·85 max. (F)	**£30·25**
MKU-370-518V	Condenser, N.A. 1·2/1·4, dark field, glycerin immersion. (F)	**£102·85**
MKU-370-526W	Condenser, N.A. 0·8/0·92, dark field, dry. (F)	**£105·05**
	Magnification changer, A-CA	*See MKH-210-504F*

OLYMPUS VANOX PHOTOMICROGRAPHY OUTFITS

For routine or research photomicrography the Vanox microscope can be used directly with the OLYMPUS PM-10 system detailed on page 438. The PM-10 system is available with camera backs ranging from 35 mm to 3¼ × 4¼ in. *POLAROID* in both manual and automatic versions.

The manual versions incorporate a colour temperature metering system enabling matching of the light source and film colour temperatures. An exposure meter model EMM-7 is available for use with the manual versions.

The automatic versions determine correct exposure time and, for 35 mm format advance the film after each exposure. The built-in CdS meter controls the exposure between 1/100 sec and 32 min for black and white film of any speed from 6 to 3200 ASA or colour film speed 12–800 ASA.

If any PM-10 model is to be used exclusively with a Vanox, this should be stated on the order, in which case unnecessary items will be omitted effecting a possible price saving.

To use PM-10 with Vanox, additional eyepieces are required from the following listing.



MKU-350 with MMX-420

EYEPIECES

List No.	Format	Description	Each	
MKU-390-A	35 mm	Field of view WF × 10 with focusing front lens and reticule	**£35·75**	(F)
MKU-395-Q	4 × 5 in.	Field of view WF × 10 with focusing front lens and reticule	**£33·00**	(F)
MKU-405-C	3¼ × 4¼ in. POLAROID	Field of view WF × 10 with focusing front lens and reticule	**£33·00**	(F)
MKU-410-C	–	Field of view WF × 10 Used to make paired eyepieces with the above	**£25·30**	(F)

Photomicrographic eyepieces *See NMT-390*



MKU-350 with MMX-390

Gallenkamp

OLYMPUS MODEL CK INVERTED MICROSCOPES



MKX-500



MKX-580

- **Convenient positioning of controls for minimum fatigue and simple operation**
- **Rack and pinion focusing**
- **Focusing mechanism independent of stage allowing relatively heavy specimens to be placed on the stage without loss of focus**
- **Phase contrast accessories with ×10 and ×20 objectives and polarising attachment available**
- **Non-reversed image**

Simplified microscopes for routine examination of tissue cultures and living protozoa in bottles, dishes, plates or tubes.

Heads

Binocular or trinocular rotatable through 360°. The binocular tubes are inclined at 45° and have individual adjustments.

Eyepieces

Paired ×10. A photographic eyepiece FK×5 is supplied with trinocular models.

Nosepiece

Triple with click stop for quick accurate centring of objectives.

Objectives

Achromatic long working distance ×4 and ×10. Accessory ×20 objective available. Accessory ×10 and ×20 phase objectives available in kit MKX-610-520W.

Stages

Model CKP has a large plain stage 180×150mm with adjustable height stage clips for holding Petri dishes, etc. Side extension plates each measuring 140×70mm provide an overall width of 290mm suitable for examination of large vessels.

Model CKC has a mechanical stage 180×140mm and one side extension plate. The movement of the stage is 70×56mm with vernier scales reading to 0·1mm. The stage has a flat plate which will accept small culture plates, dishes or bottles.

Illumination

Compact illuminator slides on vertical pillar which can be attached to front or rear of stage. Incorporates helical focusing, centring screws for lamp and condenser, slide-in filters and iris diaphragm. Lamp is 6V 12W, supplied from a transformer in base of microscope.

For Model IMT Research Inverted Microscope see the Addenda

Focusing

Single focusing system operated by large diameter paired knobs, gives 15mm movement. The stage remains stationary and permits the contents of large containers to be examined.

Magnification

Standard outfit gives ×40 and ×100. Accessory ×20 objective available for magnification of ×200.

MICROSCOPE, inverted, *OLYMPUS* **CKP-Bi 1,** as specified, with inclined binocular head, triple nosepiece, plain stage, paired ×10 eyepieces, ×4 and ×10 achromatic long working distance objectives and built-in illumination. For 220–240V a.c. single phase supplies. (F)

MKX-500-R Microscope, CKP-Bi 1 **£368·50**

MICROSCOPE, inverted, *OLYMPUS* **CKP-Tri 1,** MKX-500-R but with trinocular head and additional FK×5 eyepiece. For 220–240V a.c. single phase supplies. (F)

MKX-520-D Microscope, CKP-Tri 1 **£408·10**

MICROSCOPE, inverted, *OLYMPUS* **CKC-Bi 1,** as specified, with inclined binocular head, triple nosepiece, mechanical stage, paired ×10 eyepieces, ×4 and ×10 achromatic long working distance objectives and built-in illumination. For 220–240V a.c. single phase supplies. (F)

MKX-560-V Microscope, CKC-Bi 1 **£432·30**

MICROSCOPE, inverted, *OLYMPUS* **CKC-Tri 1,** as MKX-560-V but with trinocular head and additional FK×5 eyepiece. For 220–240V a.c. single phase supplies. (F)

MKX-580-H Microscope, CKC-Tri 1 **£471·90**

SPARE PART

MKX-610-010W Lamp bulb, 6V 12W (F) **£1·21**

ACCESSORIES

MKX-610-504U Holder, for test tubes (F) **£19·80**

Phase contrast kit, OLYMPUS CK-PC-2, comprising long working distance objectives ×10 and ×20, condenser, centring telescope and storage case. (F)

MKX-610-520W Phase contrast kit **£165·00**

Objective, achromatic, long working distance, magnification ×20. (F)

MKX-610-540Q Objective **£35·75**

The optical elements used with these models are not suitable for use with other OLYMPUS microscopes.

OLYMPUS MODEL VT-2 LOW POWER STEREOSCOPIC MICROSCOPE

- **Stereoscopic viewing minimises eye-strain**
- **Natural, vivid images are erect and non-reversed**
- **Optical elements are hard-coated for high transmission**

Stereoscopic microscope with high quality optics. This functional microscope is valuable in the fields of science, education and medicine.

Stand
Incorporates a hand-grip for carrying, and camlock slide for extra height adjustment.

Head
Binocular head inclined at 45° and rotatable through 360° with individual dioptre and interpupilary adjustments. Detaches from stand for use on Universal stand or long-arm stand.

Eyepieces
Paired G x 10 eyepieces, which are supplied, provide large, distortion-free field. G x 15 and G x 20 eyepieces are available as accessories.

Objectives
Turret with twin paired objectives x1 and x2 for rapid magnification change.

Stage
Supplied with transparent glass stage plate, reversible black/white plastics stage plate and pair of removable stage clips.

Focusing
Rack and pinion focus mechanism, range 50mm.



MLP-200

MICROSCOPE, *OLYMPUS* **VT-2,** as specified, including optical elements. Supplied with plastics dust cover and fitted case with lock and key. (F)

MLP-200-S Microscope, VT-2 **£154·00**

ACCESSORIES

Eyepieces, G x 15 and G x 20	*See MMT-440*
Micrometer eyepiece	*See MMT-790-C*
Epi-illuminator, model LSG-2	*See MMV-650-070U*
Trans-illuminating substage base	*See MMW-330-A*
Iris diaphragm for MMW-330-A	*See MMW-340-510Q*
Universal stand, model VS-4	*See MMW-370-S*
Long arm Stand	*See MLP-260-W*

The head and focusing mechanism part only of MLP-200-S can be supplied separately for use on long arm stand MLP-260-W.

Objective	Mechanical working distance	Wide field eyepiece G x 10		Wide field eyepiece G x 15		Wide field eyepiece G x 20	
		Magnification	Field of view (mm dia.)	Magnification	Field of view (mm dia.)	Magnification	Field of view (mm dia.)
x1	128mm	x10	20	x15	15	x20	10
x2	78mm	x20	10	x30	7·5	x40	5

For Models VMF and VMT Stereoscopic Microscopes see the Addenda

Gallenkamp LONG-ARM STAND

LONG-ARM STAND, *GALLENKAMP,* for use with *OLYMPUS* microscope MLP-200-S. A heavy base supports a vertical pillar which has a horizontal arm 120mm long for holding the microscope. The arm rotates through 360° and can be clamped in any position. An adjustable locking collar is provided to limit movement of the arm down the vertical pillar.

MLP-260-W Long-arm stand **£32·63**



MLP-260 with microscope

Gallenkamp

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OLYMPUS MODEL VB STEREOSCOPIC MICROSCOPE

- **Magnifications up to × 160**
- **Erect stereoscopic image**
- **90mm between specimen and objective provides adequate space for dissecting instruments, etc.**



MLP-500

A high power, stereoscopic microscope with characteristics which render it especially suitable for dissections, quality control inspections and other applications.

Stand
Durable finish.

Head
Binocular head inclined at 45° and rotatable through 360° with individual dioptre and interpupillary adjustments.

Eyepieces
Wide field G × 10 eyepieces supplied with standard equipment. Eyepieces G × 15 and G × 20 optically available.

Objectives
Fixed × 4 objectives are supplied with the standard equipment providing magnification of × 40 with 5·5mm visual field diameter. Attachable conversion lenses × 0·5, × 0·75, × 1·5 and × 2 optionally available.

Stage
Supplied with transparent glass stage plate, reversible black/white plastics stage plate and pair of removable stage clips.

Focusing
Single focusing movement of 40mm by rack and pinion mechanism. A further movement of 37mm is possible by adjustment on the pillar.

Body
Rotates horizontally about the pillar; clamping screw provided.

MICROSCOPE, *OLYMPUS* **VB454,** as specified, with white/black plastics plate, G × 10 eyepieces × 4 objective, and plastics dust cover. (F)

MLP-500-R Microscope, VB454 **£165·00**

ACCESSORIES

MLP-S20-504V	Conversion lens, × 0·5, with extension pillar. (F)	**£23·65**
MLP-S20-508N	Conversion lens, × 0·75. (F)	**£19·80**
MLP-S20-512W	Conversion lens, × 1·5. (F)	**£20·90**
MLP-S20-516X	Conversion lens, × 2·0. (F)	**£21·45**
	Eyepieces, G × 15 and G × 20	*See MMT-440*
	Micrometer eyepiece	*See MMT-790-C*
	Epi-illuminator, model LSG-2	*See MMV-650-110L*
	Trans-illuminating substage base	*See MMW-330-A*
	Iris diaphragm for MMW-330-A	*See MMW-340-510Q*

Eyepiece	Objective	Conversion lenses Working distance	× 0·5 155mm	× 0·75 100mm	None 90mm	× 1·5 42mm	× 2 28mm
†G × 10	× 1	Magnifications Visual field diameter	× 5 44mm	× 7·5 29·3mm	× 10 22mm	× 15 14·7mm	× 20 11mm
	× 2	Magnifications Visual field diameter	× 10 22mm	× 15 14·7mm	× 20 11mm	× 30 7·3mm	× 40 5·5mm
	† × 4	Magnifications Visual field diameter	× 20 11mm	× 30 7·3mm	× 40 5·5mm	× 60 3·7mm	× 80 2·7mm
G × 20	× 1	Magnifications Visual field diameter	× 10 24·4mm	× 15 16·2mm	× 20 12·2mm	× 30 8·1mm	× 40 6·1mm
	× 2	Magnifications Visual field diameter	× 20 12·2mm	× 30 8·1mm	× 40 6·1mm	× 60 4mm	× 80 3mm
	† × 4	Magnifications Visual field diameter	× 40 6·1mm	× 60 4mm	× 80 3mm	× 120 2mm	× 160 1·5mm

† Fitted as standard to MLP-500-R.

Model VB Stereoscopic Microscope is available also with heads inclined at 60° and 90° and with built-in objectives N × 1 and N × 2

OLYMPUS MODEL X-Tr STEREOSCOPIC MICROSCOPE

- **Erect stereoscopic image**
- **Individual interpupillary and dioptre adjustment to compensate for personal visual acuity of user**
- **Rapid change of magnification**

A trinocular stereoscopic microscope designed for photomicrography. It has an integral phototube which makes it an attractive instrument where photographic records are required. Magnification is altered in steps by a magnification changer drum.

Stand

Robust with adjustable pillar.

Head

The inclined binocular head permits a natural viewing position and reduces user fatigue. The phototube enables a photomicrographic attachment to be fitted.

Eyepieces

Wide field eyepieces G × 10 and G × 20 provided for the binocular viewing system and P × 10 eyepiece for photomicrography.

Stage

Supplied with transparent glass stage plate, reversible black/white plastics stage plate and pair of removable stage clips. The working depth between the stage and the objective varies from 47 to 90mm depending upon magnification. Sloping stage insert supplied for photomicrography.

Magnification

The drum selector gives five different magnifications simply by turning a knob.



MLP-700 with MMW-330

MICROSCOPE, *OLYMPUS* **X-Tr,** as specified, with trinocular head, G × 10 and G × 20 eyepieces, P × 10 parfocal eyepiece for photomicrography and a fixed × 1 objective.

MLP-700-B Microscope, X-Tr **£440-00**

ACCESSORIES

Eyepieces, G × 15	See MMT-440-290D
Micrometer eyepiece	See MMT-790-C
Epi-illuminator, model LSG-2	See MMV-650-150W
Trans-illuminating substage base	See MMW-330-A
Iris diaphragm for MMW-330-A	See MMW-340-510Q
Universal stand model VS-4	See MMW-370-S
Photomicrographic outfit, PM-6	See MMX-210-M
Photomicrographic outfit, PM-10-35M	See MMX-350-W
Photomicrographic outfit, PM-10-35A	See MMX-360-P

MAGNIFICATION TABLE

Eyepiece G × 10	Magnification	× 6·3	× 10	× 16	× 25	× 40
	Field	32mm	20mm	12·5mm	8mm	5mm
Eyepiece G × 20	Magnification	× 12·6	× 20	× 32	× 50	× 80
	Field	16mm	10mm	6·25mm	4mm	2·5mm

OLYMPUS MODEL SZ STEREOSCOPIC ZOOM MICROSCOPES

- **Continuous magnification from ×7 to ×40 without defocusing**
- **Alternative optical elements provide magnification ranges from ×3·5 to ×160**
- **Erect stereoscopic images**
- **Trinocular model for photography**



MLR-320



MLR-350

Microscopes for general purpose stereoscopic examination of samples in botany, zoology, mineralogy and other branches of science. Both models have a zoom ratio of 5·7:1. The trinocular model SZ-Tr is fitted with a phototube to which a camera may be attached.

Stand

Durable finish with countersprung height adjustment.

Stage

Supplied with transparent glass plate, reversible black/white plastics stage plate and pair of removable stage clips.

Focusing

Single focusing movement by rack and pinion mechanism.

Objectives

Paired ×1 objectives are supplied with the standard equipment. **Conversion lenses** for alternative magnifications are listed under accessories.

Heads

Model SZ-3: Binocular head inclined at 45° and rotatable through 360° with individual dioptre and interpupillary adjustments on each eyepiece. Magnification ratio indicated on graduated ring.

Model SZ-Tr. As the SZ-3 head but with a light path selector which may be used to direct light from one eyepiece to the built-in phototube.

Eyepieces

Wide field G×10 eyepieces supplied with both models. In addition a PX10 photo eyepiece is supplied with the SZ-Tr.

PHOTOGRAPHIC ACCESSORIES

The model SZ-Tr may be fitted with either the OLYMPUS PM-6 manually operated camera or the PM-10 manual or automatic camera attachments.

MICROSCOPE, *OLYMPUS* **SZ-3,** as specified, with clear and opaque stage plates, eyepiece shades, plastics dust cover and wooden cabinet. (F)

MLR-320-W	Microscope, SZ-3	**£314·60**

MICROSCOPE, *OLYMPUS* **SZ-Tr,** as MLR-320-W but with fitted phototube. (F)

MLR-350-B	Microscope, SZ-Tr	**£385·00**

ACCESSORIES

MLR-370-506B	Conversion lens, ×0·5. (F)	**£37·40**
MLR-370-510K	Conversion lens, ×0·75. (F)	**£15·95**
MLR-370-514C	Conversion lens, ×1·5. (F)	**£18·15**
MLR-370-518R	Conversion lens, ×2. (F)	**£18·70**
	Eyepieces, G×15 and G×20	*See MMT-440*
	Micrometer eyepiece	*See MMT-790-C*
	Epi-illuminator, LSG-2	*See MMV-650-030J*
	Trans-illuminating substage	*See MMW-330-A*
	Iris diaphragm for MMW-330-A	*See MMW-340-510Q*
	Universal stand, VS-4	*See MMW-370-S*
	Universal stand VS-5	*See MMW-410-G*
	Photographic outfits for SZ-Tr	*See MMX-350 et seq.*
	Exposure meter for SZ-Tr	*See MMX-820-D*

The head and focusing mechanism part only of MLR-320 can be supplied separately for use on stand MMW-370-S.

Objective assembly		G×10 Eyepieces		G×20 Eyepieces	
Conversion lens	Working distance	Magnification ranges	Field of view (mm dia.)	Magnification ranges	Field of view (mm dia.)
×0·5	166 mm	× 3·5 to × 20	62·9 to 11·0	× 7 to × 40	34·8 to 6·1
×0·75	111 mm	× 5·3 to × 30	41·9 to 7·3	× 10·5 to × 60	23·2 to 4·1
None	97 mm	× 7 to × 40	31·4 to 5·5	× 14 to × 80	17·4 to 3·1
×1·5	52 mm	× 10·5 to × 60	21·0 to 3·7	× 21 to × 120	11·6 to 2·0
×2	36 mm	× 14 to × 80	15·6 to 2·8	× 28 to × 160	8·7 to 1·5

For Model VMZ Stereoscopic Zoom Microscope see the Addenda

OBJECTIVES FOR OLYMPUS BIOLOGICAL MICROSCOPES

All objectives are corrected for chromatic aberration and are parfocal, interchangeable and coated for maximum contrast and resolution.

All objectives (except those for stereoscopic microscopes) are colour coded.

All objectives corrected for 160mm tube length and 0·17mm cover glass thickness unless otherwise stated.

ACHROMATIC.

List No.	Magnification	Numerical aperture	Working distance (mm)	Remarks	£	
MMS-200-070C	×4	0·1	19·87	Dry	6·60	(F)
MMS-200-090T	×10	0·25	5·4	Dry	9·35	(F)
MMS-200-110Q	×20	0·4	1·58	Dry	23·65	(F)
MMS-200-130K	×40	0·65	0·39	Dry	19·80	(F)
MMS-200-150E	×40	0·65	0·39	Dry sprung	24·75	(F)
MMS-200-170V	×60	0·8	0·26	Dry sprung	24·75	(F)
MMS-200-190P	×100	1·3	0·11	Oil sprung	34·10	(F)

ACHROMATIC, for use with uncovered specimens.

MMS-220-130T	×40	0·65	0·39	Dry	31·90	(F)

ACHROMATIC, with iris diaphragm, for use with dark field condenser.

MMS-240-190K	×100	1·3	0·11	Oil	39·60	(F)

SEMI-FLAT ACHROMATIC.

MMS-270-070W	×4	0·1	–	Dry	13·20	(F)
MMS-270-090Q	×10	0·25	–	Dry	19·80	(F)
MMS-270-110N	×20	0·4	–	Dry	23·65	(F)
MMS-270-130H	×40	0·65	–	Dry sprung	34·65	(F)
MMS-270-190M	×100	1·3	–	Oil sprung	35·75	(F)

PLANACHROMATIC

MMS-320-030P	×1·3*	0·03	19·92	Flat field	42·35	(F)
MMS-320-050J	×2*	0·05	18·29	Flat field	40·15	(F)
MMS-320-070D	×4	0·1	5·5	Flat field	31·90	(F)
MMS-320-090U	×10	0·25	7·18	Flat field, sprung	50·60	(F)
MMS-320-110R	×20	0·4	0·78	Flat field, sprung	52·80	(F)
MMS-320-130L	×40	0·63	0·22	Flat field, sprung	68·20	(F)
MMS-320-190Q	×100	1·25	0·14	Flat field, oil sprung	135·30	(F)
MMS-320-210N	×100	1·25	0·08	Flat field, oil, super wide sprung	169·40	(F)

* Must be used with condenser MMV-260-U or MKF-840-K.

Continued overleaf

OBJECTIVES FOR OLYMPUS BIOLOGICAL MICROSCOPES

FLUORITE (semi-apochromatic). Corrected for chromatic aberration, leaving a secondary spectrum $< \frac{1}{10}\lambda$ for every colour.

List No.	Magnification	Numerical aperture	Working distance (mm)	Remarks	£	
MMS-360-130G	×40	0·75	0·49	Dry	55·35	(F)
MMS-360-170R	×60	–	–	Dry	72·05	(F)
MMS-360-190L	×100	1·30	0·1	Oil with iris diaphragm	92·95	(F)

APOCHROMATIC. With high aperture corrected fully for achromatic and spherical aberrations and giving maximum definition. Should be used with corrected condenser.

MMS-390-130Y	×40	0·85	0·23	Dry sprung	154·00	(F)
MMS-390-150C	×40	1·0	0·19	Oil sprung	129·80	(F)

PLANAPOCHROMATIC. Corrected for flatness of field and giving excellent results in photomicrography. Should be used with corrected condenser.

MMS-420-070S	×4	0·16	4·35	Dry	107·80	(F)
MMS-420-090M	×10	0·32	0·16	Dry sprung	107·80	(F)
MMS-420-110J	×20	0·65	0·14	Dry sprung	157·30	(F)
MMS-420-130D	×40	0·95	0·10	Dry sprung	363·00	(F)
MMS-420-190Y	×100	1·3	0·09	Oil sprung	442·20	(F)

ACHROMATIC, phase contrast.

MMS-480-090Q	×10	0·25	5·78		25·30	(F)
MMS-480-110N	×20	0·4	1·6		28·05	(F)
MMS-480-130H	×40	0·65	0·61	Sprung	44·00	(F)
MMS-480-190M	×100	1·3	0·11	Sprung	51·70	(F)

FLUORITE, phase contrast.

MMS-510-130C Fluorite, ×40. (F) £56·10
MMS-510-190H Fluorite, ×100. (F) £97·35



PLANACHROMATIC, phase contrast. For use with differential interference contrast condenser (Nomarski).

MMS-540-090N Planachromatic ×10. (F) £63·80
MMS-540-130E Planachromatic ×40. (F) £86·35
MMS-540-190J Planachromatic ×100. (F) £169·40

FLUORESCENCE FREE.

MMS-570-090P Fluorescence free, ×10. (F) £62·15
MMS-570-110M Fluorescence free, ×20. (F) £162·80
MMS-570-130G Fluorescence free, ×40. (F) £143·00
MMS-570-190L Fluorescence free, ×100. (F) £98·45

IMMERSION OIL

IMMERSION OIL, a non-drying oil with refractive index $n_D^{23°C}$ 1·5150. Suitable for oil immersion lenses and as a transparent mounting medium. Supplied in bottle containing approximately 28ml. (F)

MMS-800-V Immersion oil £1·91

IMMERSION OIL, for fluorescence microscopy. Refractive index $n_D^{23°C}$ 1·404. Supplied in bottle containing approximately 28ml. (F)

MMS-840-Q Immersion oil, fluorescence £2·31

EYEPIECES FOR OLYMPUS BIOLOGICAL MICROSCOPES

All eyepieces are hard coated for high transmission and quality definition

LENS CODE

H – Huygenian
P – Compensated for chromatic aberration and distortion of objectives.
K – As P, but for use with high power or fluorite objectives.
WF – Wide field.
Bi – Binocular.
G – Paired Greenough type stereoscopic eyepieces.
FK – Photographic eyepieces for use with PM-10 camera systems.
HEP – High eye point for spectacle wearers.

Field number should be divided by objective magnification to obtain field of view diameter in millimeters.

HUYGENIAN. Especially effective when used with low power objectives. (F)

List No.	Magnification	Field No.	Code	
MMT-220-110P	×5 single	19	H	£4-95
MMT-220-190X	×7 single	18	H	£4-95
MMT-220-230F	×10 single	13	H	£4-95

COMPENSATION. These eyepieces compensate for chromatic aberration of the objective. The ×7, ×10 and ×15 are suitable for photographic use and the ×20 is for use with high power or fluorite objectives. (F)

MMT-250-190Q	×7 single	18	P	£10-45
MMT-250-210N	×7 paired	18	Bi P	Pair £19-80
MMT-250-230H	×10 single	13	P	£10-45
MMT-250-270S	×15 single	9·9	P	£10-45
MMT-250-290M	×15 paired	9·9	Bi P	Pair £19-80
MMT-250-310J	×20 single	7·5	K	£12-10
MMT-250-330D	×20 paired	7·5	Bi K	Pair £24-20

COMPENSATION, pointer. This eyepiece has a movable pointer for indicating details of specimens. (F)

MMT-270-230Q	×10 single	13	P	£10-45

WIDE FIELD. Provide a large field of view. (F)

MMT-310-230E	×10 single	18	WF	£12-10
MMT-310-250V	×10 paired	18	Bi WF	Pair £24-20
MMT-310-270P	×15 single	12	WF	£12-10
MMT-310-290J	×15 paired	12	Bi WF	Pair £24-20

WIDE FIELD, high eyepoint. Suitable for spectacle wearers. (F)

MMT-330-250H	×10 paired	18	Bi HEP WF	Pair £28-05

PHOTO. Suitable for photomicrography. The Field numbers given are for the 35mm format. (F)

MMT-390-030C	×2·5 single	17·3	FK	£9-35
MMT-390-070N	×3·3 single	13·1	FK	£9-35
MMT-390-110E	×5 single	8·6	FK	£10-45
MMT-390-150P	×6·7 single	6·4	FK	£12-10

WIDE FIELD, stereoscopic. For use with stereoscopic microscopes only. (F)

MMT-440-250P	×10 paired	20	G	Pair £19-80
MMT-440-290D	×15 paired	13	G	Pair £19-80
MMT-440-330R	×20 paired	10	G	Pair £19-80



Gallenkamp

OLYMPUS MICROMETER EYEPIECES

The use of a micrometer eyepiece enables measurements to be made with minimum eyestrain and parallax effects. All the micrometer eyepieces listed include an auxiliary focusing top lens.



MMT-700

MICROMETER EYEPIECE, Filar (screw), *OLYMPUS* **OSM,** magnification × 10. Can be inserted into the eyepiece sleeve on a monocular, binocular or trinocular head. An accurate measurement of 0·0001 mm is possible when using an × 100 objective. The drive incorporates a micrometer screw. (F)

MMT-700-T Micrometer eyepiece **£73·15**

MICROMETER EYEPIECE, compensation, *OLYMPUS.* Magnification × 7. Focal length 36mm. Field number 18. Fitted with scale graticule 10mm/100. (F)

MMT-730-V Micrometer eyepiece **£14·30**

MICROMETER EYEPIECE, compensation wide field, *OLYMPUS.* Magnification × 10. Focal length 25mm. Field number 18. Fitted with scale graticule 10mm/100. (F)

MMT-760-A Micrometer eyepiece **£15·95**

Graticules *See page 443*

MICROMETER EYEPIECE, *OLYMPUS,* G × 10, fitted with graticule combined crossline and scale 10mm/100. For use with stereoscopic microscopes. (F)

MMT-790-C Micrometer eyepiece **£19·80**



MMV-230

OLYMPUS CONDENSERS

For use with HSC, K, KH and BH series microscopes.

CONDENSER, *OLYMPUS,* **Abbe type,** N.A. 1·25, with variable iris diaphragm. (F)

MMV-200-Q Condenser **£18·15**

CONDENSER, *OLYMPUS,* **achromatic/aplanatic,** N.A. 0·9 dry: N.A. 1·4 oil immersion. With variable iris diaphragm. Ensures maximum definition from high N.A. objectives. (F)

MMV-230-S Condenser **£78·65**

CONDENSER, *OLYMPUS,* N.A. 0·22 for use only with × 1·3 and × 2 achromatic objectives. (F)

MMV-260-U Condenser **£30·25**

CONDENSER, dark field, *OLYMPUS* **DC,** for observation of transparent specimens. When using × 100 oil immersion objectives the aperture of the objective must be reduced to less than N.A. 1·0, therefore objectives × 100 with iris diaphragm are recommended. (F)

MMV-290-W Condenser, DC **£48·95**



MMV-330

CONDENSER, *OLYMPUS* **DC-6,** N.A. 1·2–1·4, glycerine immersion, for high power, dark field applications. Has a wide field and permits the use of wide field eyepieces. Suitable for use with objectives × 10 to oil immersion × 100. (F)

MMV-330-K Condenser, DC-6 **£93·50**

CONDENSER, *OLYMPUS* **DC-7,** dry, for low power dark field examination of specimens without the need for oil immersion. Suitable for use with up to × 40 objectives. (F)

MMV-360-M Condenser, DC-7 **£103·40**



MMV-520



MMV-600 on stand, without transformer

OLYMPUS ILLUMINATORS

ILLUMINATOR, substage, *OLYMPUS* **LSK-2,** with 20 W lamp and two spares; requires no transformer. For use with ST, STN and HSC series microscopes. For 220–240 V a.c. or d.c. supplies. (F)

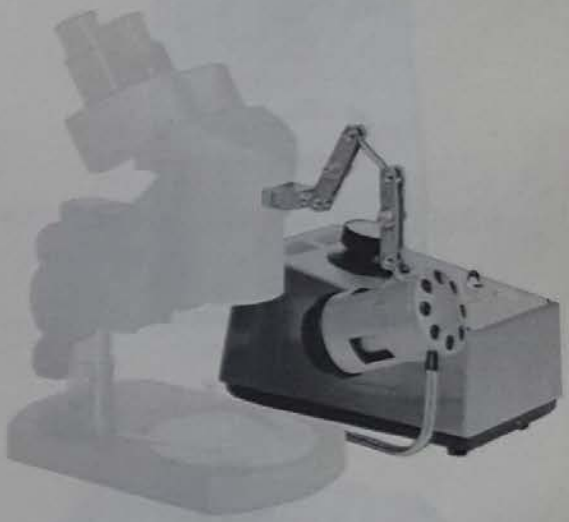
MMV-520-B Illuminator, LSK-2 **£11·55**

ILLUMINATOR, substage, *OLYMPUS* **LSK-3,** as MMV-520-B but for use with MIC and K series microscopes. For 220–240 V a.c. or d.c. supplies. (F)

MMV-560-T Illuminator, LSK-3 **£11·55**

SPARE PART for MMV-520-B and MMV-560-T

MMV-570-010J Lamp bulb, 20 W. (F) **£1·21**



MMV-650

ILLUMINATOR, universal, *OLYMPUS* **LSD,** with adjustable light intensity and focusing. Provides high quality Köhler illumination. Includes adjustable output transformer in ventilated case with voltmeter, pilot lamp and two spare lamps. For 220–240 V a.c. single phase supplies. (F)

MMV-600-H Illuminator, LSD **£75·90**

SPARE PART

MMV-610-010U Lamp bulb, 30 W. (F) **£1·21**

EPI-ILLUMINATOR, *OLYMPUS* **LSG-2,** for stereoscopic microscopes. With light focusing facility and adjustable output transformer in ventilated case fitted with pilot lamp. Includes two spare lamps. For 220–240 V a.c. single phase supplies. (F)

MMV-650-030J Illuminator, for SZ-3 and SZ-Tr **£55·55**
MMV-650-070U Illuminator, for VT-2 **£55·55**
MMV-650-110L Illuminator, for VB **£55·55**
MMV-650-150W Illuminator, for X-Tr **£55·55**

SPARE PART

MMV-670-010B Lamp bulb, 12 W. (F) **£1·21**



MMV-700

ILLUMINATOR, *OLYMPUS* **VL-FL,** with fluorescent tube for stereoscopic microscopes. Includes choke for 220–240 V a.c. single phase supplies. (F)

MMV-700-W Illuminator, VL-FL **£68·20**

SPARE PART

MMV-710-010M Fluorescent tube. (F) **£8·80**

Gallenkamp



MMV-900



MMV-930



MMW-330



MMW-370

OLYMPUS TRANSFORMERS

TRANSFORMER, *OLYMPUS* **TE-2,** variable output. Mounted in ventilated case fitted with voltmeter and pilot lamp. Rated output 6V 5A. For 220–240V a.c. single phase supplies. (F)

MMV-900-G Transformer, TE-2 **£30·25**

TRANSFORMER, *OLYMPUS* **TH,** variable output. For use with 100W halogen light source MKE-700-H. Output 12V. For 220–240V a.c. single phase supplies. (F)

MMV-930-Y Transformer, TH **£33·00**

Transformer TDO See *MKH-220-540R*

OLYMPUS STANDS FOR STEREOSCOPIC MICROSCOPES

SUBSTAGE BASE, trans-illuminating, *OLYMPUS*, with fork-mounted adjustable mirror with polished metal curved surface, and matt white finish on the other side. A 20W illuminator is incorporated in the back of the stand. Complete with inclined arm rests and two spare lamps. For 220–240V a.c. or d.c. supplies. Can be used with an external light source. (F)

MMW-330-A Substage base **£46·75**

SPARE PART and ACCESSORY

MMW-340-010N Lamp bulb, 20W. (F) **£1·21**
MMW-340-510Q Iris diaphragm. (F) **£12·10**

STAND, universal, *OLYMPUS* **VS-4,** for examining large objects with any OLYMPUS stereoscopic microscope. (F)

MMW-370-S Stand, VS-4 **£92·95**

STAND, *OLYMPUS* **VS-5,** as MMW-370-S but larger and heavier for extra stability. (F)

MMW-410-G Stand, VS-5 **£103·40**



MMW-410

OLYMPUS PHASE CONTRAST OUTFITS

Phase contrast equipment is used for the study of transparent specimens, such as living cells or materials which are not easily stained.

PHASE CONTRAST OUTFIT, *OLYMPUS.* A simple outfit comprising a modified Abbe condenser with swing-out annulus, which can be centred, ×40 achromatic phase objective and a green filter. Provides positive low absorption phase contrast. Suitable for use in the examination of asbestos fibres as described in Asbestosis Research Council Technical Note No. 1. Can be used also for normal bright field illumination. (F)

MMW-600-U Phase contrast outfit **£90·20**

SPARE PART and ACCESSORY

MMW-610-030E Filter, green **£1·71**
MMW-610-508A Centring telescope, CT-4 **£14·30**

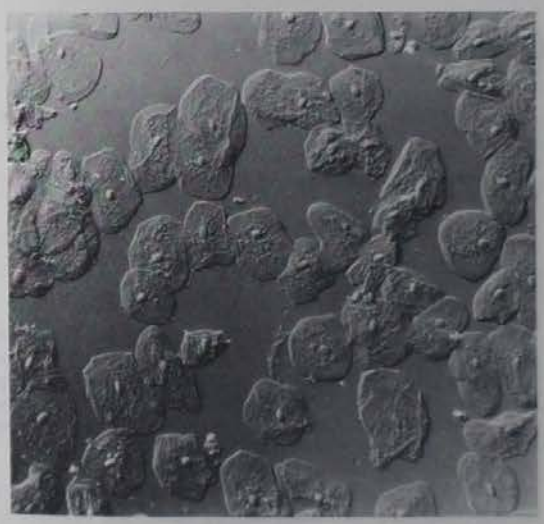


MMW-600

PHASE CONTRAST OUTFIT, *OLYMPUS* **PB,** positive phase, low absorption. Comprises four objectives ×10, ×20 and ×40 and ×100 spring mounted, one substage condenser assembly with iris diaphragm, one centring telescope and one green filter. In wood cabinet. (F)

MMW-700-M Phase contrast outfit, PB **£249·70**


MMW-700



DIFFERENTIAL INTERFERENCE CONTRAST

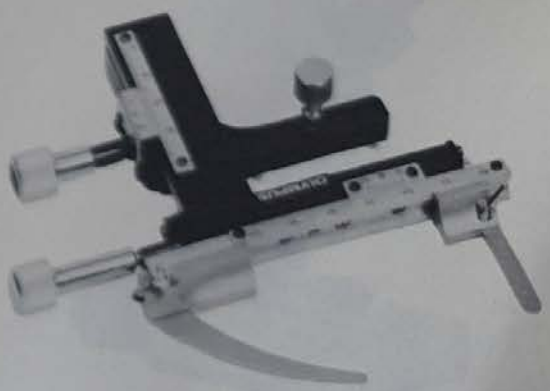
Another technique available for examining unstained preparations is Differential Interference Contrast (Normarski)

See MKF-920-N and MKH-240-520J

OLYMPUS STAGE

MECHANICAL STAGE, graduated, *OLYMPUS* **FM-2,** range of movement 50 × 25 mm. Vernier scales reading to 0·1 mm. (F)

MMW-850-P Mechanical stage, FM-2 **£30·25**


MMW-850

OLYMPUS PHOTOMICROGRAPHIC OUTFIT PM-6

- **Specimen may be observed while photographing**
- **Shutter mechanism mounted in elastomer foam to minimise vibration effects and assure crisp photographs**
- **Suitable for stereomicroscopes by exchanging standard adapter for stereo version**
- **Accepts sensing head of MMX-820-D exposure meter**
- **35mm full-frame format**
- **Data insert facilities**



MMX-210

PHOTOMICROGRAPHIC OUTFIT, *OLYMPUS* **PM-6,** with 35mm camera and pre-cocking shutter which minimises vibration effects. Shutter speeds 1/250 to 1sec with provision for brief exposure. A three-position switch allows for monitoring and exposure meter connection. The monitoring eyepiece has dioptre adjustment and a format frame. Complete with cable release. In wood case. (F)

MMX-210-M	Photomicrographic outfit, PM-6	**£161·70**

ACCESSORY

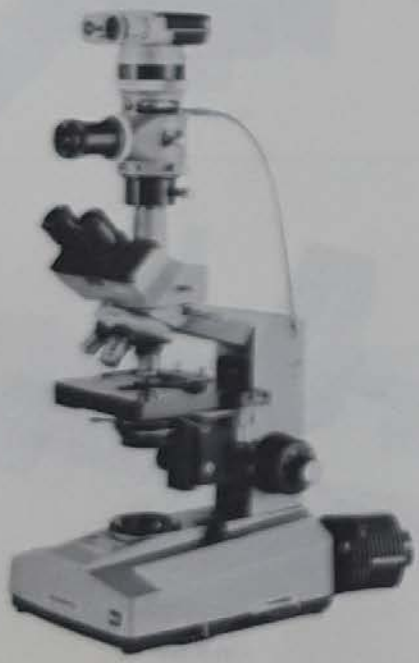
Adapter, to enable **MMX-210-M** to be used with OLYMPUS stereoscopic microscopes. (F)

MMX-220-506T	Adapter	**£7·70**

OLYMPUS PHOTOMICROGRAPHIC OUTFITS PM-10

A modular system suitable for standard microscopes. Outfits may be built up as required.

- **Camera backs interchangeable**
- **Manual or automatic bodies**
- **Manual model incorporates light path selector for diverting all light to viewing eyepiece or all to phototube, or splitting light 80% to phototube – 20% to eyepiece. Accepts sensing head of MMX-820-D**
- **Automatic model has exposure/colour temperature meter, electric shutter release, automatic film advance and adjustments: 6–3200 ASA; shutter 1/100sec to 32 minutes**
- **Set of filters included with automatic outfits**
- **Variety of formats available**



All models require but do not include photomicrographic eyepieces MMT-390.

MMX-380-B and MMX-390-R are supplied with an adapter only which accepts any standard 4×5in. plate holder. All other models are supplied with the appropriate camera back.

PHOTOMICROGRAPHIC OUTFITS, *OLYMPUS* **PM-10 series,** comprising main body, viewing system and eyepiece and camera back or adapter. (F)

	Model	Camera type	
MMX-350-W	PM-10-35M	35mm manual	**£314·60**
MMX-360-P	PM-10-35A	35mm automatic	**£1134·10**
MMX-380-B	PM-10-L1M	*4×5in. manual	**£445·50**
MMX-390-R	PM-10-L1A	*4×5in. automatic	**£1191·30**
MMX-410-T	PM-10-L2M	3¼×4¼in. POLAROID manual	**£507·10**
MMX-420-M	PM-10-L2A	3¼×4¼in. POLAROID automatic	**£1251·80**

* Require but **do not include** film holder.

When required for use exclusively with the Vanox microscope it is possible to dispense with some components from the above. Quotations for such simplified outfits on request.

ACCESSORY

Filters, set of three colour temperature compensation filters and four neutral density filters. (F)

MMX-510-504G	Filters set	**£7·00**

PHOTOMICROGRAPHIC OUTFIT ED-10

Simple manual photomicrographic outfit for use with most microscopes including the OLYMPUS range.

PHOTOMICROGRAPHIC OUTFIT, *POLAROID* **ED-10.** Enables 82 × 108mm 'instant' picture to be made of the specimen under observation. Accepts POLAROID colour or black and white film packs type 105, 107, 108. Complete with focusing tube, microscope adapter and instructions. (F)

MMX-650-V Photomicrographic outfit, ED-10 **£30·69**

POLAROID is a registered trade mark of the Polaroid Corporation, Cambridge, Mass., USA.



MMX-650

OLYMPUS EXPOSURE METER

An exposure meter suitable for use with photomicrographic outfits such as the OLYMPUS PM-6 or PM-10.

- **Suitable for colour or black and white film**
- **Capable of measuring exposure and colour temperature**
- **Colour compensating filters included**
- **Adjustments:**
  Film speeds 6 to 400 ASA (3000)
  Shutter speeds 1/250 to 32sec direct reading

EXPOSURE METER, *OLYMPUS* **EMM-7,** as specified, direct reading and incorporating a colour temperature regulation. For 220–240V a.c. single phase supplies. (F)

MMX-820-D Exposure meter, EMM-7 **£187·00**



MMX-820

DYNASCOPE HEADS

DYNASCOPE HEAD, vertical, with adapter for fitting to OLYMPUS microscopes EHS, EHT and FHT in place of normal head. Allows direct viewing with or without spectacles. No eyepieces are used and full resolution and clarity are retained. With 100mm rotor adjustable mirror and reversible hood which allows a wide range of adjustments for maximum viewing comfort. Dynascope disc diameter 117mm, motor speed 2800rev./min. For 240V a.c. single phase supplies.

MMX-900-J Dynascope head **£337·70**

DYNASCOPE HEAD, as MMX-900-J but for use with OLYMPUS BH series microscopes. For 240V a.c. single phase supplies.

MMX-920-S Dynascope head **£337·70**



MMX-900

Gallenkamp

Griffin STEREO MICROSCOPE

- Long working distance and wide field of view
- 12V integral illuminator
- Inclinable head for convenience in use



MNC-440

The GRIFFIN Stereo microscope has been designed to overcome many of the problems previously experienced with stereoscopic microscopes. Problems such as insufficient working distance for dissections, unsuitable magnifications with too small a field of view and instability in use. The eyepieces and objectives have been chosen to give the optimum magnifications with wide field of view and long working distances. An integral illuminator is fitted to the head with its 12V power supply transformer housed in the heavy cast base, giving a low centre of gravity to the instrument and hence great stability.

Heavy cast base 200 x 140 x 60mm high, housing 12V output transformer with ON-OFF switch, carries two 4mm sockets for connection to integral illuminator, and microscope support pillar, 300mm length, on its upper surface. Horizontal arm 225mm total length, supporting viewing head, may be positioned at any height up to 330mm above bench level. It may be either securely clamped by turning a knob or made free to swing radially as required, by tightening the collar on the pillar.

Inclinable viewing head comprises two x 10 wide field eyepieces with interocular adjustment from 45 to 80mm. Paired objectives x1 and x2 interchangeable by sliding laterally in dovetailed groove giving total magnifications of x 10 and x 20.

With x 1 objectives – field of view 20mm diameter, working distance 170mm.

With x 2 objectives – field of view 10mm diameter, working distance 107mm.

Head incorporates 12V lamp to illuminate field of view. Rack and pinion fine focus control operated by knobs on each side of head with safety stop at lower end of traverse. Complete with matching x 1 and x 2 objectives and approximately 1·5m of mains cable.

MICROSCOPE, *GRIFFIN* **STEREO**, as specified. For 220-240V a.c. supplies. (F)

MNC-400-5 Microscope **£87·86**

SPARE PART

MNC-420-810B Lamp, 12V. (F) **£1·32**

BECK DIAMAX MICROSCOPES

The stand is mounted on a broad base to ensure stability and is fitted with an inclined monocular viewing tube, quadruple nosepiece, Abbe condenser and focusing substage. The plain stage is adjustable by concentric coarse and fine focusing controls.

MICROSCOPE, *BECK DIAMAX* **6350,** as specified, with ×6 and ×10 eyepieces, ×5, ×10 and ×45 objectives and plane mirror.
MND-200-B Microscope **£254·93**

MICROSCOPE, *BECK DIAMAX* **6353,** as specified, with ×6 and ×10 eyepieces, ×10, ×45 and ×100 (oil immersion) objectives and integral illuminator. For 220–240V a.c. supplies.
MND-300-Q Microscope **£302·50**

ACCESSORIES for MND-200-B and MND-300-Q

MND-320-504U Case, wood **£16·61**
Illuminator, for 230–250V supplies.
MND-320-510C Illuminator **£12·10**



MND-200

ACCESSORIES for MND-200-B and MND-300-Q

PROJECTION HEAD, to reduce operator fatigue and also to permit group viewing. Comprises a translucent viewing screen approximately 150mm diameter mounted in a glass fibre case which also houses the optical elements. Used in conjunction with MND-370-N illuminating base and is easily fitted to microscope on removal of the viewing tube.
MND-350-E Projection head **£66·55**

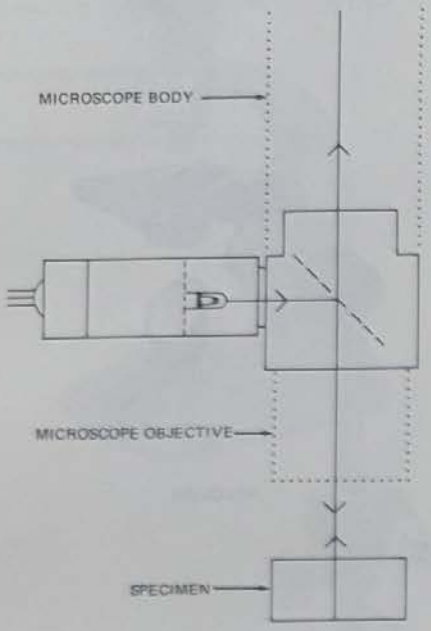
ILLUMINATING BASE, for direct eyepiece viewing or for use with MND-350-E projection head. The microscope, with mirror or illuminator removed, fits into a locating holder on the base. Light from a 12V 100W tungsten iodide lamp passes through an iris diaphragm and is reflected by a mirror in the base up through the microscope base and along the optical axis of the microscope. A heat-absorbing filter can be brought into the light path and a holder for a colour filter is fitted. The intensity of the light can be adjusted by a BRIGHT-DIM switch which is mounted on the front of the base together with a mains switch and indicator lamp. For 220–240V a.c. single phase supplies.
MND-370-N Illuminating base **£148·50**

PHASE CONTRAST OUTFIT, comprising ×45 phase contrast objective, matching annulus, substage condenser with green filter in swing-out tray and observing microscope, in fitted case. When used with a standard ×10 objective, the annulus becomes an effective dark field stop.
MND-390-W Phase contrast outfit **£99·00**



MND-300 with projection head and illuminating base

BECK EPIMAX METALLURGICAL MICROSCOPE





MND-650

The stand is mounted on a broad base to ensure stability and is fitted with an inclined monocular viewing tube, quadruple nosepiece and 6V 15 W incident light illuminator. The plain stage is adjustable through 25 mm by concentric coarse and fine focusing controls. The focusing mechanism incorporates an Autofocus feature which enables a series of specimens of the same thickness to be brought into focus automatically by means of an adjustable stop.

METALLURGICAL MICROSCOPE, *BECK EPIMAX,* as specified with ×6 and ×10 eyepieces, ×10/0·17, ×45/0·65 and ×100/1·00 (oil immersion) objectives, 6V transformer with control rheostat, and case. For 220–240V a.c. supplies.

MND-650-D Microscope **£448·25**



MNE-550

MICROSCOPE LAMP, HIGH INTENSITY, for transmitted, Kohler or top illumination. The 6V 48 W bulb is fitted in a centring mount at the rear of the lamphouse. A lever controlled iris diaphragm is interposed between the lamp and the focusing condenser assembly the front of which has slots for three 51 × 51 mm filters. The lamphouse is clamped to the stand rod with an adjustable bosshead and the base houses an adjustable output transformer. For 220–240V a.c. single phase supplies.

MNE-550-B Microscope lamp **£80·33**

SPARE PART

MNE-570-010H Lamp bulb, 6V 48 W **£2·59**

EYEPIECE GRATICULES

Eyepiece graticules mounted on optical glass discs 19mm dia. to fit OLYMPUS and most other standard microscope eyepieces. The scales and rulings are in opaque black on a transparent background.



MNH-200

EYEPIECE GRATICULE, horizontal scale, length 10mm, subdivided 100μm.
MNH-200-H Eyepiece graticule, horizontal **£5·49**

EYEPIECE GRATICULE, vertical scale, length 10mm, subdivided 100μm.
MNH-230-J Eyepiece graticule, vertical **£6·64**

EYEPIECE GRATICULE, vertical/horizontal scale, length 10mm, subdivided 100μm.
MNH-260-L Eyepiece graticule, vertical/horizontal **£6·30**

EYEPIECE GRATICULE, cross-lines at 90°.
MNH-290-N Eyepiece graticule, cross-lines **£5·85**

EYEPIECE GRATICULE, with one square, 1cm sides, divided into 100 squares of 1mm numbered and lettered along two edges.
MNH-330-B Eyepiece graticule, square **£6·30**

EYEPIECE GRATICULE, to BS 3625 for determination of the particle size of powders.
MNH-370-T Eyepiece graticule, BS 3625 **£9·11**

EYEPIECE GRATICULE, Whipple, for counting bacteria and for calibrating.
MNH-420-A Eyepiece graticule, Whipple **£6·30**

STAGE GRATICULES

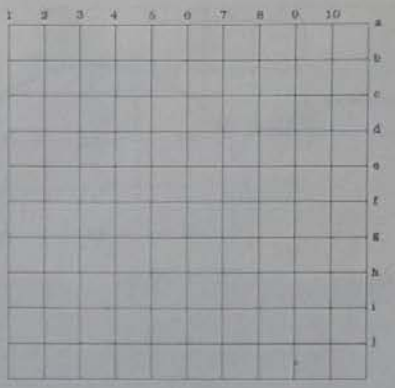
Graticules on glass discs mounted in 75 x 25mm black anodised slides and supplied in plastics cases.

STAGE GRATICULE, length 10mm, subdivided 100μm.
MNH-550-R Stage graticule **£5·96**

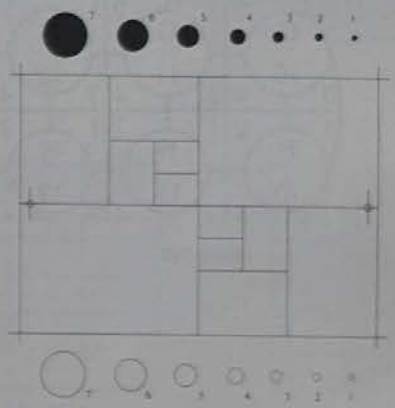
STAGE GRATICULE, length 1mm, subdivided 10μm.
MNH-580-T Stage graticule **£5·96**

STAGE GRATICULE, length 100μm, subdivided 2μm.
MNH-610-X Stage graticule **£11·81**

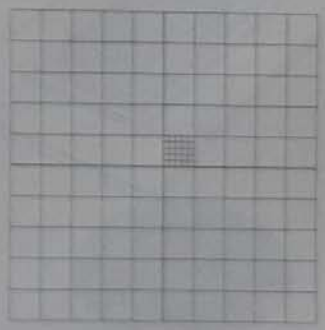
For slides, cover glasses, handling forceps and slide storage cabinets see HISTOLOGY.



MNH-330



MNH-370

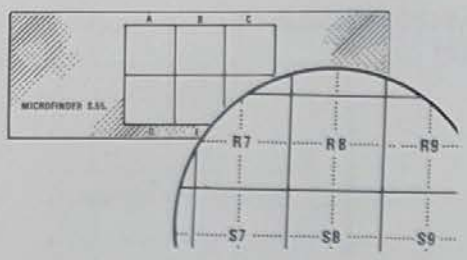


MNH-420



MNH-550

Gallenkamp



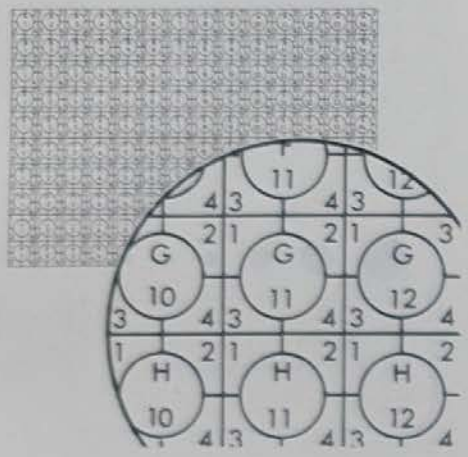
MNH-680

MICROFINDER GRATICULES, glass slides 76 × 26mm with a semi-permanent reference grid on which specimens or sections may be mounted directly to enable positions to be recorded or to facilitate the continuous examination of cultures. The size of organisms can also be estimated.

The ruled area is divided into six major squares, lettered A to F, and each is divided into 625 squares of side 0·4mm. The small squares are lettered A to Z in one direction and 1 to 25 in the other. When viewed under a microscope fitted with a ×10 eyepiece and a ×40 objective, one small square fills the field.

The printed grid is water resistant and microfinders may be cleaned and used again provided that the specimen is removed by soaking or rinsing and that no rubbing action is applied.

MNH-680-L Microfinders Pack of 5 **£4·61**



MNH-710

ENGLAND FINDER GRATICULE, a 75 × 25mm glass slide marked over the whole top surface in such a way that a reference position can be obtained by direct observation. The slide is marked with a square grid at 1 mm intervals. Each square contains a centre ring bearing a reference letter and number; the remainder of the square being subdivided into four segments numbered 1 to 4. All three locating edges are marked with arrow heads and the slide is marked with a positioning label. Complete with instructions.

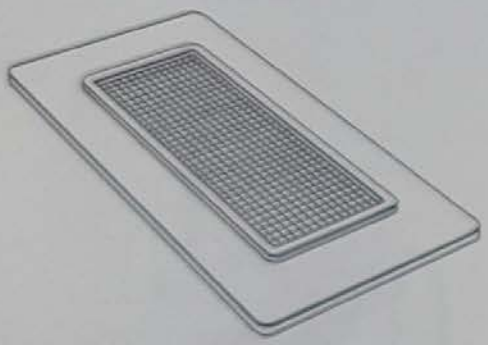
MNH-710-G England finder **£7·15**

SEDGEWICK RAFTER COUNTING CELL, a transparent plastics slide with central cell 50 × 20 × 1 mm ruled in 1 mm squares, with cover glass to contain 1 ml of liquid. For use in water analysis, particle analysis, etc. Can be used with MNH-420-A.

MNH-760-R Sedgewick Rafter cell **£2·75**

McMASTER WORM EGG COUNTING SLIDE, for counting parasite eggs from animals. The glass slide, 75 × 25mm, has two chambers each 1 cm² counting area and 1·5mm deep. Particularly suitable for investigating red-worm disease in horses and parasitic gastroenteritis in cattle and sheep. In case.

MNH-810-V McMaster slide **£3·03**



MNH-760

HOWARD COUNTING CHAMBER, for tomato and yeast moulds.

MNH-850-Q Howard chamber **£15·75**

SPARE PART

MNH-860-010G Cover **£5·94**



MNH-810



MNH-850

HAEMACYTOMETER, BS 748, with improved Neubauer ruling. The double counting chamber is rhodium coated to give bright lines against a neutral background and has a depth of 0·1 ±0·001 mm over the ruled areas. With plane cover glasses, one red and one white cell pipette, each with tubing and mouthpiece, in case.

MNK-400-H	Haemacytometer	**£12·21**

SPARE PART

MNK-410-010U	Chamber, with cover glasses	**£6·94**

HAEMACYTOMETER, BS 748, with modified Fuchs-Rosenthal ruling, chamber depth of 0·2 ±0·001 mm and two white cell pipettes. Otherwise similar to MNK-400-H.

MNK-440-C	Haemacytometer	**£12·21**

SPARE PART

MNK-450-010S	Chamber, with cover glasses	**£6·94**



MNK-400

HAEMACYTOMETERS BS 748, with improved Neubauer ruling. The BS counting chambers have a depth of 0·1 ±0·001 mm. With two optically plane cover glasses 0·4 mm thick, one red and one white cell pipette, each with tubing and mouthpiece, in case.

MNK-500-010T	Haemacytometer, single chamber	**£9·39**
MNK-500-030N	Haemacytometer, double chamber	**£10·74**

HAEMACYTOMETERS, BS 748, with modified Fuchs-Rosenthal ruling, chamber depth of 0·2 ±0·001 mm and two white cell pipettes. Otherwise similar to MNK-500.

MNK-530-010V	Haemacytometer, single chamber	**£9·39**
MNK-530-030P	Haemacytometer, double chamber	**£10·86**

SPARE PARTS

Chambers, with cover glasses.

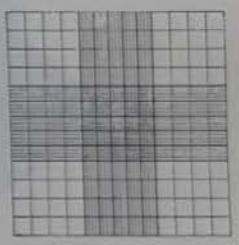
MNK-550-010H	Chamber, single, for MNK-500-010T	**£4·65**
MNK-550-030B	Chamber, double, for MNK-500-030N	**£5·96**
MNK-550-070M	Chamber, single, for MNK-530-010V	**£4·65**
MNK-550-090G	Chamber, double, for MNK-530-030P	**£5·96**

Cover glasses. Size 22 × 16 mm is for the single chamber and size 25 × 22 mm is for the double chamber.

MNK-550-210W	Cover glasses, 22 × 16 mm	Pack of 10 **£2·14**
MNK-550-230Q	Cover glasses, 25 × 22 mm	Pack of 10 **£2·14**
	Pipettes, red and white cell	See PMK-690



Modified Fuchs-Rosenthal Ruling



Improved Neubauer Ruling

HELBER BACTERIA COUNTING CHAMBER, with circular cell depth of 0·02 mm, and Thoma ruling on a 1 mm thick slide. Suitable for dark ground illumination. With two 22 × 25 mm cover glasses in case.

MNK-780-T	Bacteria counting chamber	**£7·18**

SPARE PART

Cover glasses	See MNK-640-280A



MNK-780

MICRO-HAEMATOCRIT CENTRIFUGE

- **Suitable for the determination of red blood cell volume**
- **Maximum speed 11000 rev/min**
- **Accessory micro-haematocrit readers**

See CFM-300-T



MICROMANIPULATORS

For use in applications where precise controlled movement of tools and probes is required. Vertical movement is by 'coarse' rack and pinion with vernier reading to 0·1 mm and a fine control knob. One revolution of the 'fine' control produces a vertical movement of 0·127 mm. Horizontal movement is by rack and pinion for longitudinal travel and pinion and worm for transverse travel. Each movement has a vernier scale reading to 0·1 mm. The head drilled to accept and clamp three 6·3 mm diameter probes mutually at right angles is fitted to the end of the transverse movement. All models listed are for right hand use.



MNL-300

MICROMANIPULATOR, *PRIOR* as specified, with standard cast base and vertical, longitudinal and transverse drives. For right hand use.

MNL-300-F Micromanipulator **£91·35**

MICROMANIPULATOR, *PRIOR*, as MNL-300-F but with tilt movement which permits the transverse movement to be inclined through 180° and clamped at any angle.

MNL-320-X Micromanipulator **£97·48**

MICROMANIPULATOR, *PRIOR*, as MNL-300-F but with magnetic base controlled by a hold/release button, for machine or surface plate mounting.

MNL-340-A Micromanipulator **£106·48**

MICROMANIPULATOR, *PRIOR*, as MNL-300-F but with tilt movement which permits the transverse movement to be inclined through 180° and changed at any angle.

MNL-360-J Micromanipulator **£112·50**

SPARE PARTS

Micro-drive or 10 mm movement in a single direction, with micrometer reading to 0·01 mm. Fits standard head and accepts standard needle holders.

MNL-380-030J Micro-drive **£21·43**

Ball and socket joint, permits needle holder to be set at any angle. Fits standard head.

MNL-380-070U Ball and socket joint **£10·69**

Needle holder with 6·3 mm diameter shaft to fit standard head and with screw chuck to grip probes from 0 to 1 mm outside diameter.

MNL-380-110L Needle holder **£2·90**

Needle holder, as MNL-380-110L but to grip probes from 0·75 to 1·5 mm outside diameter.

MNL-380-150W Needle holder **£2·90**

Needle holder, as MNL-380-110L but to grip probes from 1·25 to 3 mm outside diameter.

MNL-380-170Q Needle holder **£2·90**

Gallenkamp EMBEDDING APPARATUS

Wax Embedding Bath, maximum temperature 100°C, thermostatic control *See HJC-200*

Wax Embedding Oven, maximum temperature 100°C thermostatic control *See HJC-280*

Wax Heater/Dispenser, maximum temperature 100°C *See HJC-500*

Floating-out Bath, maximum temperature 80°C *See HJC-600*



HJC-600

MICROTOMES

CAMBRIDGE ROCKING MICROTOME

For cutting paraffin embedded specimens of comparatively soft tissues and for use as a freezing microtome with the freezing attachment accessory. It will cut long ribbons of sections from specimens not exceeding 20mm diameter and, using the accessory wood blocks, sections of specimens up to 18 x 25mm may be cut. The thickness of the sections may be varied between 2 and 24μm.

Simplicity of operation makes it an ideal instrument for student use and routine work.



MNT-300

MICROTOME, ROCKING, *CAMBRIDGE*, as specified, for small sections. With simple object holder, orientating object holder and knife.

MNT-300-R	Microtome, rocking	**£237-60**

SPARE PART

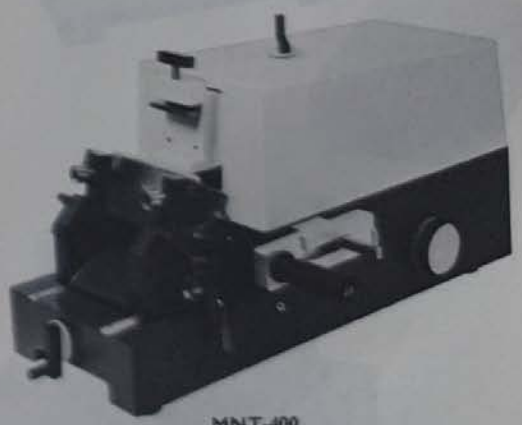
MNT-320-030R	Knife	**£23-38**

ACCESSORIES

MNT-320-502C	Freezing attachment	**£107-80**
	Blocks, hardwood, with 22 x 32mm mounting face.	
MNT-320-522T	Blocks, thickness 16mm	Pack of 10 **£0-99**
MNT-320-528H	Blocks, thickness 22mm	Pack of 10 **£1-10**
MNT-320-532Y	Object holder, for wood blocks	**£16-50**

CAMBRIDGE ROTARY MICROTOME

For cutting practically flat sections between 1 and 24μm of specimens up to 38 x 50mm. A rotary drive microtome having click-control feed selection and precise positive mechanical linkages which ensure accurate and reproducible specimen thickness. Retraction of the specimen during the return stroke prevents damage to cut sections. A long advance screw, essential for continuous serial sectioning can be reset. Cutting stops automatically at the end of the screw travel. The specimen advances automatically at the end of each return stroke. Two knives are available, with 17° and 22° cutting angles for sectioning soft and hard tissues respectively. Knife angle adjustment over a scale, calibrated 0 to 20°, caters for a variety of sectioning conditions. A safety device locks the specimen arm at the top of its travel for safety when changing specimens and all moving parts are enclosed in a sturdy dust cover. Overall dimensions 490 x 300 x 260mm high.



MNT-400

MICROTOME, ROTARY ROCKING, *CAMBRIDGE*, as specified, with 17° knife for soft tissues, 12 wood blocks and adapter for securing standard and orientating object holders.

MNT-400-J	Microtome, rotary rocking	**£572-00**

ACCESSORIES

MNT-420-502R	Knife, 22°, for hard tissues.	**£39-69**
MNT-420-522L	Object holder, standard, for 45mm specimen.	**£27-50**
MNT-420-528W	Object holder, orientating, for 45mm specimen.	**£74-25**
MNT-420-532Y	Blocks, hardwood, 16 x 38 x 50mm.	Pack of 10 **£1-76**

MILLS

All capacities quoted are nominal

MILL, ball, *PASCALL* **Model 9,** for grinding approximately 0·5 litre of material. With 50mm diameter rubber covered rollers which can accommodate containers from 76 to 140mm diameter and 180mm long, such as a 0·5 or 1 litre porcelain pot. The drive is from a fractional h.p. geared motor giving an output speed of 224rev/min. Pot speed is approximately 80rev/min. Bench space required 380 × 220mm. For 200–250V 50Hz single phase supplies. **Without** pot or ball charge.

MPF-300-U Mill, ball, 0·5 litre **£168·30**



MPF-300 with MPF-340
MPF-330 is similar

MILL, ball, *PASCALL* **Model 2,** for grinding approximately 2 litres of material. With rubber covered rollers, 64mm diameter × 350mm long, which can be adjusted to accommodate containers from 76 to 230mm diameter. Suitable pot combinations are 2 × 0·5 litre, 2 × 1 litre, 1 × 2·5 litre or 1 × 5 litre pots. The drive is from a fractional h.p. motor giving an output speed of 182rev/min. Pot speeds vary from approximately 50 to 95rev/min depending on pot combination used. Bench space required 760 × 380mm. For 220–240V 50Hz single phase supplies. **Without** pot or ball charges.

MPF-330-W Mill, ball, 2 litres **£252·45**

ACCESSORIES for MPF-300-U and MPF-330-W

Pots, hard acid resisting porcelain, with ground covers and fittings. Supplied with rubber gaskets for use when wet grinding with certain liquids. **Without** ball charge.

MPF-340-030G	Pot, 0·5 litre	**£21·38**
MPF-340-050A	Pot, 1 litre	**£22·22**
MPF-340-070R	Pot, 2·5 litres	**£26·78**
MPF-340-090L	Pot, 5 litres	**£38·25**

Ball charges, comprising fused magnesium silicate balls of different diameters selected as being suitable for appropriate ball mill pot capacities.

MPF-344-030F	Ball charge, for 0·5 litre pot	**£3·06**
MPF-344-050W	Ball charge, for 1 litre pot	**£3·83**
MPF-344-070Q	Ball charge, for 2·5 litre pot	**£7·65**
MPF-344-090K	Ball charge, for 5 litre pot	**£13·78**

Pourers, tin plated mild steel, for straining liquid products from ball mill **without** discharging ball charge.

MPF-348-030E	Pourer, for 0·5 litre pot	**£13·78**
MPF-348-050V	Pourer, for 1 litre pot	**£22·95**
MPF-348-070P	Pourer, for 2·5 litre pot	**£22·95**
MPF-348-090J	Pourer, for 5 litre pot	**£26·04**

HIGH SPEED MILL

The grinding member is a four-armed high grade steel alloy beater-cross which revolves at high speed and shatters or tears sample passed into the feed aperture.

Sample is fed through an aperture 38 × 30mm and the ground material is collected in a cloth bag which is detachable from the metal frame clipping it to the underside of the mill.



MPF-550

MILL, beater-cross, *C & N SENIOR,* as specified, with 200mm diameter grinding chamber and vee belt drive giving a beater-cross speed of 8000rev/min. Complete with capacitor start motor, starter and ammeter mounted on base plate, feed tray, set of eight steel plate screens with perforations from 0·4 to 2·45mm, three collecting bags and spare pair of vee drive belts. For 220–240V 50Hz single phase supplies.

MPF-550-P Mill, beater-cross **£487·30**

END RUNNER MILL

Mechanically operated pestle and mortar of acid resistant porcelain for dry or wet grinding. A loaded pestle is made to rotate by friction between it and the rotating mortar. The pestle is free to rise and fall in the mortar, so that the grinding action is one of impact and shear. Both mortar and pestle have spring loaded scrapers, and the pestle may be swung clear of the mortar to facilitate emptying and cleaning. The mortar is fixed to a revolving table which is powered by a motor with pushbutton starter enclosed in the steel base. Mortar diameter 250mm, approximate capacity 1 litre. Overall dimensions 550 × 470 × 1200mm high.



MPF-660

MILL, end runner, *PASCALL,* as specified, with pestle, mortar and plastics dust cover for mortar. For 220–240V a.c. single phase supplies.

MPF-660-A Mill, end runner **£778·80**

SPARE PART

MPF-670-050B Mortar and pestle Set **£133·14**

MECHANICAL MORTAR AND PESTLE

Designed to reduce up to approximately 20g of sample to a fine powder. The aluminium alloy body is stove enamelled and is hinged to provide access to the agate mortar and pestle. Geared motors drive the mortar and pestle independently at 30rev/min and 90rev/min respectively in opposite directions. A deflector plate is fitted to assist grinding and a shield is provided to retain sample within the mortar. Mortar capacity approximately 25ml. Overall dimensions 310 × 550 × 470mm high.

MORTAR AND PESTLE, mechanical, *PASCALL* as specified, with agate mortar and pestle, deflector and mortar shield. For 200–250V 50Hz single phase supplies.

MPF-780-B Mortar and pestle **£588·06**



MPF-780

MIXERS

MIXER, *KENWOOD,* for mixing pastes and viscous materials. With interchangeable beater and whisk rotors and heat resistant glass bowl, capacity 3 litres. Rotor speed can be controlled in steps up to approximately 200rev/min. Mounted on hinged stand. Overall dimensions 380 × 270 × 305mm high. Power rating 450 W. For 200–240V 50Hz single phase supplies.

MPR-200-A Mixer, pastes **£57·09**



MPR-200

MIXER, for blending, grinding, liquefying and disintegrating. Comprises a 1 litre nominal capacity glass jar with plastics lid and base containing a four-bladed cutter mounted on a power unit fitted with seven speed settings selected by pushbuttons. For dry grinding, maximum running time must not exceed 1 minute. Overall dimensions 160 × 200 × 380mm high. Power rating 1kw For 220–240V a.c. single phase supplies. (F)

MPR-240-S Mixer, blending **£23·72**

SPARE PART

MPR-260-010B Glass jar. (F) **£3·08**



MPR-240

MIXER, powder, capacity approximately 3 litres, for mixing trace components and other additives. A detachable thick acrylic cylindrical container, 300 × 150mm diameter, rotates in two planes simultaneously at approximately 40rev/min. This movement produces a mix very quickly. The cylinder is fitted with stationary spreaders for breaking up coagulating material. For 220–240V a.c. single phase supplies.

MPR-310-Y Mixer, powder **£249·75**

SPARE PART

MPR-330-010X Container **£39·38**



MPR-310

HOMOGENISER *See QHX-100*

STIRRERS *See SWP-300 to SWT-740*

TISSUE GRINDERS *See TKW-300 to TKW-370*

Gallenkamp ROLLER MIXER

For mixing blood specimens, plasma, powders, etc.

- **Rotating and rocking action**
- **Simple construction – minimal cleaning and maintenance**
- **Accepts stoppered cylindrical mixing vessels**
- **Can be loaded or unloaded while rollers in motion**



MPR-450

Two plastics coated rollers, each 315mm long × 30mm diameter, are spaced 37mm apart and are rotated at 60rev/min by a 24W shaded pole motor via a direct-drive gearbox. Each roller has a built-on helix of 80mm pitch causing vessels up to a maximum length of 150mm, placed on the roller, to be rocked. Longer vessels can be accommodated but will be subjected to a rotating action only. Each roller has a pair of side supports arranged in vee-formation to maintain vessels of up to about 45mm diameter in contact with the roller. The two inner supports may be removed so that larger vessels can be accommodated on both rollers. The mixer is mounted on a steel base fitted with rubber feet. Overall dimensions 440 × 145 × 195mm high.

ROLLER MIXER, *GALLENKAMP*, as specified, with ON-OFF switch and 3-core cable. For 200–250V a.c. single phase supplies.

MPR-450-S Roller mixer **£79·88**



MPR-600

ROLLER TUBE CULTURE APPARATUS

ROLLER TUBE CULTURE APPARATUS, for virus tissue culture and similar applications. The anodised dural drum accommodates 54 test tubes 12·5mm diameter and is rotated by an a.c. motor at 12rev/hour. Power consumption is less than 2W. Adjustable tilt ensures that the medium is sloped away from the open ends of the tubes.

Overall dimensions with drum 225 × 180 × 180mm high. For 200–250V 50Hz supplies.

MPR-600-X Culture apparatus **£39·60**



MPR-700 MPR-730

MIXER EMULSIFIERS

CONSTRUCTION

All working parts are of stainless steel except the self-lubricating bushes. Heads are quickly interchanged without the use of special tools.

HEADS

Emulsor screen, used in the preparation of liquid phase emulsions or dispersion of finely milled powders. Can be used with the axial flow head.

Disintegrator head, used for disintegration and suspension of fibrous vegetable materials. Can be used with the axial flow head.

Square hole high shear screen, used for reduction of agglomerates and pigments in granular form. Can be used with axial flow head and disintegrator head.

Axial flow head, for use where mixing free from aeration is required, and is specially suitable for preventing heavy liquids and insoluble solids settling during the mixing process. Used with emulsor screen, square hole screen or disintegrator head.

Pump head, a submersible self priming centrifugal pump with an output of up to 18 litres/min.

MIXER EMULSIFIER, *SILVERSON*, **laboratory model,** as specified, with variable speed drive. Suitable for a maximum immersion depth of 200mm and a minimum opening of 60mm. Complete with axial flow, disintegrator, screen and pump heads, and bench stand. For 200–240V 50Hz single phase supplies.

MPR-700-G Mixer emulsifier **£218·81**

MIXER EMULSIFIER, *SILVERSON*, **heavy duty model,** for processing viscous materials. As specified, with variable speed drive. Suitable for a maximum immersion depth of 300mm and a minimum opening of 60mm. Complete with axial flow, disintegrator, screen and pump heads, and bench stand. For 200–240V 50Hz single phase supplies.

MPR-730-Y Mixer emulsifier **£277·31**

MOISTURE

MOISTURE BALANCE, infrared, *OHAUS* **6010H,** completely automatic, with a 375 W tungsten filament infrared lamp mounted over a 150 mm diameter stainless steel pan. The intensity of heating can be adjusted by a control knob. The time of heating may be preset for periods of 0·5 to 60 minutes after which an alarm sounds and the heat is switched off. The weighing system comprises a temperature compensated spring, a beam with self-aligning steel and agate bearings, magnetic damping and readout which is projected from an optical scale on a screen with vernier at the front of the balance. Readout gives decrease in mass and percentage of moisture loss. Capacity 10 g, sensitivity 0·01 g and 0·1%, tare 5 g. For 220–240 V 50–60 Hz supplies. (F)

MRX-270-H Moisture balance **£505-13**



MRX-270

MOISTURE BALANCE, infrared, for direct reading moisture loss determinations on many solid and semi-solid materials such as food products, cereals, sand, soil, pharmaceutical products, soap, paper, cosmetics, etc., using approximately 2 g of sample. A tare facility of ± 10 mg and a zero control allow for small variations in sample mass. The heater is a 150 W infrared lamp, the height of which is adjustable against a scale graduated 50 to 137°C. The lamp can be swung aside while the sample is being weighed. The magnetically damped beam balance has a notched, sliding mass bar graduated 5 to 100 × 5% and a fine scale calibrated 0 to 5 × 1%. It is supported by steel knife edges on agate bearings. The balance mechanism is contained within a cabinet with levelling facilities and a glass window allows the scales to be viewed. The 100 mm diameter removable sample pan is surrounded by a draught shield and beneath it is a glass/asbestos base. Supplied with two interchangeable sample pans. For 220–240 V a.c. single phase supplies.

MRX-370-W Moisture balance **£148-11**



MRX-370

Infrared dryer *See BDX-650-W*
Infrared heaters *See HCT-540 et seq.*

Gallenkamp

MOISTURE EXTRACTION OVEN

- **Temperature range 40 to 250°C**
- **Capacity 210 litres**
- **Stainless steel interior**
- **Forced ventilation and large heater for rapid drying**

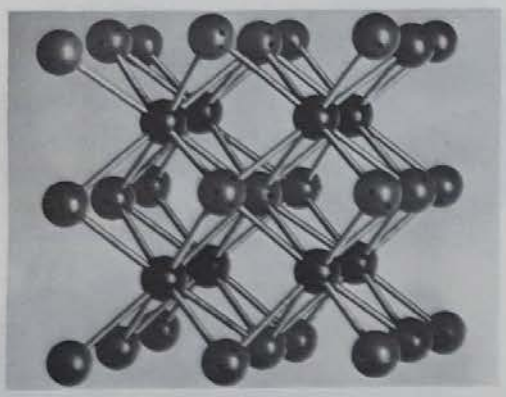
See OVH-500 et seq



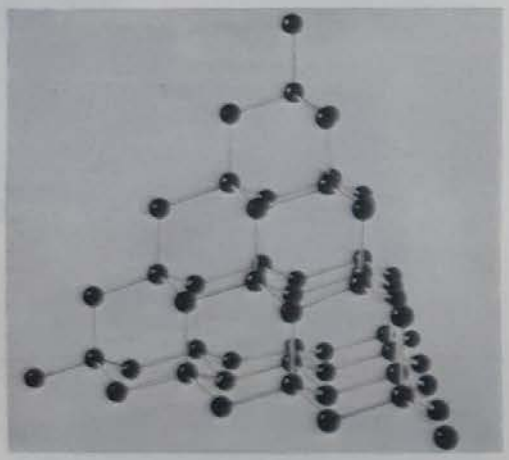
Gallenkamp

Gallenkamp LINNELL MOLECULAR MODELS

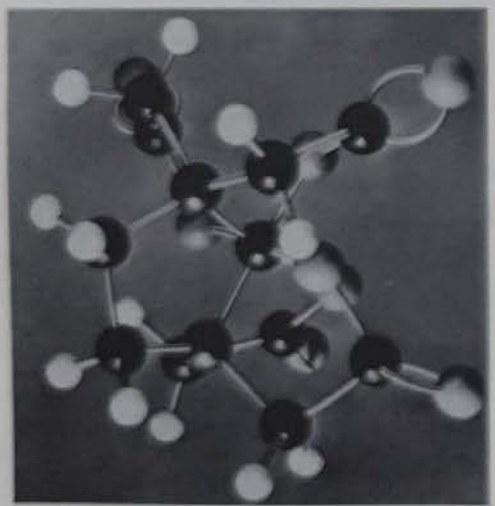
Originally suggested by Professor W. H. Linnell, D.Sc., Ph.D., F.P.S., F.R.I.C. and repeatedly improved, these models provide a simple means of demonstrating many aspects of molecular and crystal structure.



Caesium chloride lattice



Diamond lattice showing tetrahedral arrangement of carbon atoms



Model of the calcium complex of e.d.t.a. showing the octagonal structure of the calcium atom and its occurrence in five 5-membered rings

They are suitable for making models of the molecular, ionic and lattice structures specified in Nuffield Chemistry courses and in many G.C.E. and C.S.E. Chemistry and Physical Sciences syllabuses.

FOR ORGANIC CHEMISTRY

- To exhibit stereochemical properties
- Choice of inter-nuclear distance scales
- Valence angles provided by accurate drilling
- For construction of highly strained molecule models

FOR INORGANIC CHEMISTRY

- For construction of practically any simple inorganic model
- To demonstrate details of configuration
- Especially useful for metal co-ordination chemistry
- Wide range of symmetries available

FOR CRYSTALLOGRAPHY

- Vivid spatial representation of atoms in lattices
- Invaluable for discussion of crystal properties

The model atoms are moulded polythene spheres drilled to accept the spring bonds. Hole configurations are as follows:

1 hole
2-holes – holes subtend an angle 109° at the centre of the sphere.
4-holes – directed from the centre towards the apices of a regular tetrahedron.
5-holes – directed from the centre towards the apices of a regular trigonal bipyramid.
6-holes – directed from the centre towards the apices of a regular octahedron.
8-holes – directed from the centre towards the corners of a cube.
14-holes – positioned in a unique pattern which enables all common chemical symmetries to be represented.

The connecting springs are close-wound helices of rust resistant steel and are available in four lengths – 25, 38, 60 and 75 mm. These lengths provide for inter-nuclear distances scaled 0·1 nm ≡ 35 or 48 or 60 mm. Each spring is tapered to fit securely at a controlled depth in all drillings. The assembled models are sufficiently rigid to withstand handling and due to the use of springs for bonding, atomic vibrations can be demonstrated.

CHEMISTRY AND CRYSTALLOGRAPHY SETS

These introductory sets include quantities of spheres and springs for trial purposes or individual student use.

The chemistry set enables simple molecules and ions to be made and stereochemical and structural distinctions to be clearly illustrated. The crystallography set permits the construction of several different lattice types using the 14-hole spheres.

DEMONSTRATION SET

The demonstration set is suitable for making numerous models of which the following are examples:

Crystal lattices

Sodium chloride, caesium chloride, calcium fluoride, rutile, zinc blende, diamond, graphite and ice.

Molecules and ions

Phosphorus, sulphur, phosphorus pentoxide, phosphorus pentachloride, phosphate, carbonate, sulphate, nitrate, ammonium and many complex ions.

MOLECULAR MODELS, *GALLENKAMP* **LINNELL** chemistry set comprising:

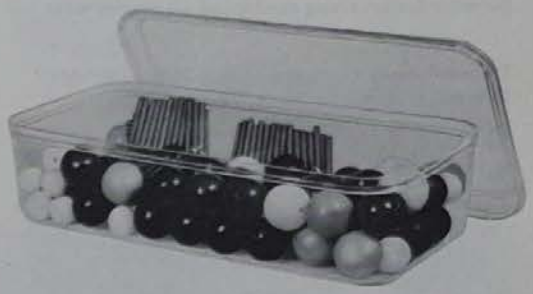
40 Spheres, 16mm diameter, 1-hole, white
58 Spheres, 22mm diameter, viz.:

1-hole	6 green		
2-hole	6 red		
4-hole	20 blue	6 blue	6 yellow
14-hole	6 black	2 brown	6 yellow

40 Bonds, helical spring, close coiled, 25mm long
40 Bonds, helical spring, close coiled, 38mm long

With instruction leaflet, in plastics box.

MTH-600-B Molecular models, chemistry set **£12·66**



MTH-600

MOLECULAR MODELS, *GALLENKAMP* **LINNELL** crystallography set comprising:

108 Spheres, 22mm diameter, viz.:

14-hole	36 brown	36 orange	36 purple

150 Bonds, helical spring, close coiled, 38mm long
150 Bonds, helical spring, close coiled, 60mm long

With instruction leaflet, in plastics box.

MTH-640-T Molecular models, crystallography set **£18·11**

MOLECULAR MODELS, *GALLENKAMP* **LINNELL** demonstration set comprising:

60 Spheres, 16mm diameter, 1-hole, white
24 Spheres, 16mm diameter, white, with hole of clearance diameter of a spring bored right through. To represent hydrogen in hydrogen bonding
468 Spheres, 22mm diameter, viz.:

2-hole	24 red			
4-hole	60 black	24 blue	24 brown	
	24 green	24 red	24 yellow	
5-hole	60 black	12 blue	12 green	12 red
6-hole	48 green		48 yellow	
8-hole	48 green		24 yellow	

12 Bonds, helical spring, close coiled, 25mm long
84 Bonds, helical spring, close coiled, 38mm long
420 Bonds, helical spring, close coiled, 60mm long
1 Stencil of organic structural chemical formulae

With illustrated instruction booklet, in multi-drawer storage cabinet with drawer contents labels.

MTH-680-X Molecular models, demonstration set **£53·44**



MTH-680

SPARE PARTS and ACCESSORIES

	Spheres, 16mm diameter.	
MTH-710-030A	Spheres, 1-hole, white	Pack of 12 £0·41
MTH-710-050R	Spheres, 1-through-hole, white	Pack of 12 £0·54
	Spheres, 22mm diameter.	
MTH-710-170H	Spheres, 1-hole, green	Pack of 12 £0·41
MTH-710-210V	Spheres, 2-hole, red	Pack of 12 £0·64
MTH-714-030W	Spheres, 4-hole, black	Pack of 12 £0·74
MTH-714-050Q	Spheres, 4-hole, blue	Pack of 12 £0·74
MTH-714-070K	Spheres, 4-hole, brown	Pack of 12 £0·74
MTH-714-090E	Spheres, 4-hole, green	Pack of 12 £0·74
MTH-714-110B	Spheres, 4-hole, red	Pack of 12 £0·74
MTH-714-130S	Spheres, 4-hole, yellow	Pack of 12 £0·74
MTH-718-030V	Spheres, 5-hole, black	Pack of 12 £0·81
MTH-718-050P	Spheres, 5-hole, blue	Pack of 12 £0·81
MTH-718-090D	Spheres, 5-hole, green	Pack of 12 £0·81
MTH-718-110A	Spheres, 5-hole, red	Pack of 12 £0·81
MTH-722-090J	Spheres, 6-hole, green	Pack of 12 £0·81
MTH-722-130A	Spheres, 6-hole, yellow	Pack of 12 £0·81
MTH-726-090Y	Spheres, 8-hole, green	Pack of 12 £0·97
MTH-726-130W	Spheres, 8-hole, yellow	Pack of 12 £0·97
MTH-730-030J	Spheres, 14-hole, black	Pack of 12 £1·46
MTH-730-070U	Spheres, 14-hole, brown	Pack of 12 £1·46
MTH-730-090X	Spheres, 14-hole, orange	Pack of 12 £1·46
MTH-730-110L	Spheres, 14-hole, purple	Pack of 12 £1·46
MTH-730-130F	Spheres, 14-hole, yellow	Pack of 12 £1·46
MTH-742-030N	Bonds, 25mm long	Pack of 12 £0·18
MTH-742-050H	Bonds, 38mm long	Pack of 12 £0·20
MTH-742-070B	Bonds, 60mm long	Pack of 12 £0·24
MTH-742-090S	Bonds, 75mm long	Pack of 12 £0·28
	Stencil	See 57X-360-E

SUGGESTED COLOUR CODE

Black	– Carbon	**White**	– Hydrogen
Blue	– Nitrogen	**Yellow**	– Sulphur or sodium, calcium or caesium in some lattices
Brown	– Metals		
Green	– Halogen	**NOTE:**	The orange and purple spheres can be used to represent nuclei in crystal structures, co-ordination compounds, complex ions, etc.
Orange	–		
Purple	–		
Red	– Oxygen		

MORTARS AND PESTLES

All capacities and dimensions quoted are nominal



MWA-300

MORTARS AND PESTLES, porcelain, grinding surfaces unglazed. Dimension given is external diameter of mortar. (F)

MWA-300-030H	Mortar and pestle, 70mm	**£0·98**
MWA-300-050B	Mortar and pestle, 90mm	**£1·10**
MWA-300-070S	Mortar and pestle, 110mm	**£1·61**
MWA-300-090M	Mortar and pestle, 125mm	**£2·04**
MWA-300-110J	Mortar and pestle, 140mm	**£2·95**
MWA-300-170B	Mortar and pestle, 210mm	**£5·81**
MWA-300-190Y	Mortar and pestle, 250mm	**£8·85**
MWA-300-210F	Mortar and pestle, 305mm	**£16·67**

MORTARS AND PESTLES, glass.

External dia., mm	75	100	150
Capacity, ml	70	220	850

MWA-480-030M	Mortar and pestle, 75mm	**£4·06**
MWA-480-070A	Mortar and pestle, 100mm	**£4·23**
MWA-480-110X	Mortar and pestle, 150mm	**£6·02**

MORTARS AND PESTLES, agate, highly polished. The natural stone is cut so that the working area is as free as possible from blemishes. Dimensions given are external × internal diameters of mortar.(F)

MWA-580-030E	Mortar and pestle, 40 × 34mm	**£13·55**
MWA-580-050V	Mortar and pestle, 57 × 51mm	**£17·42**
MWA-580-070P	Mortar and pestle, 70 × 60mm	**£25·54**
MWA-580-090J	Mortar and pestle, 100 × 87mm	**£58·33**

Mechanical mortar and pestle *See MPF-780-B*



MWA-480





MWA-580

Gallenkamp MUFFLE FURNACES

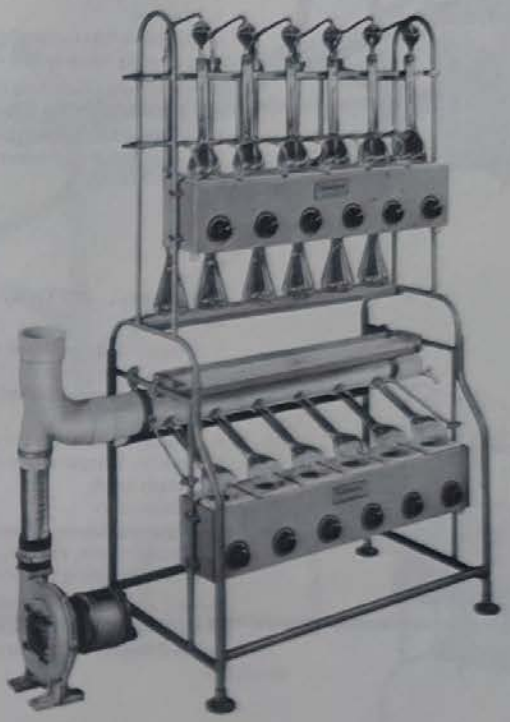
- Electrically heated
- Maximum temperature 1100°C
- Fitted thermal fuse
- Efficient thermal insulation



See FSE-230 et seq

NITROGEN

Gallenkamp KJELDAHL EQUIPMENT



Typical arrangement of GALLENKAMP Kjeldahl equipment arranged for electric heating and permitting simultaneous digestion of six samples and distillation of six further samples.

This range of equipment for determination of nitrogen by the Kjeldahl method comprises a versatile series of interchangeable components which can be assembled in many ways to meet individual requirements. The units are based on a bank of six tests and can be extended in multiples of six as required.

HEATERS

Alternatives are available, all of which can be used for digestion or distillation.

NKH-300 Electric with individual energy regulator controls, suitable for flasks 300 to 1000ml.

NKH-400 Gas with individual tap controls, suitable for flasks 300 to 800ml.

NKH-690 Electric heating mantles with individual energy regulator controls, suitable for flasks 100 to 500ml.

FUME EXTRACTION

A comprehensive range of components fabricated in rigid PVC enables the assembly of an ejector extraction system to suit any location.

STANDS

For **digestion** purposes three alternatives are available.

The simplest, for use in a fume cupboard, comprises flask rest NKA-550-Q on support rods NKH-420-504Q mounted on the ends of a heater unit.

For open bench use the above can be supplied together with vapour tube stand NKA-510-V – see NKA-200.

For permanent installations NKA-530 is recommended.

For **distillation** purposes NKA-570-C is used – see NKA-240. This may be stood on a bench or mounted on top of the digestion stand NKA-530-H for combined digestion and distillation – see NKA-280-T.

CONDENSERS

Individually jacketed Liebig condensers are used. The inner tubes are of glass with ends bent to suit upward or downward sloping stillheads. Rack NKA-620-G provides support combined with water inlet and outlet manifolds.

Gallenkamp KJELDAHL EQUIPMENT



NKA-200

KJELDAHL DIGESTION ASSEMBLY, *GALLENKAMP*, comprising:

1 Heater unit for 500ml Kjeldahl flasks
2 Support rods
1 Flask rest
1 Vapour tube bench stand
1 Vapour tube
1 End cap
6 Kjeldahl flasks, capacity 500ml
And jointing material for vapour extraction components

For a.c. single phase supplies.
NKA-200-010D Digestion assembly, 220–240V **£218·81**
NKA-200-030U Digestion assembly, 110–120V **£224·44**
The vapour tube terminates in a socket to fit trunking NKM-530 et seq.

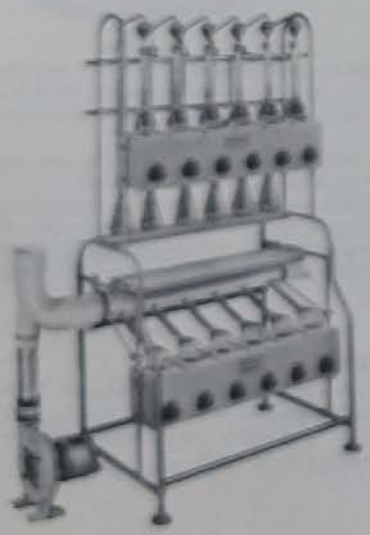


NKA-240

KJELDAHL DISTILLATION ASSEMBLY, *GALLENKAMP*, comprising:

1 Heater unit for 500ml Kjeldahl flasks
1 Distillation stand
1 Flask holder for 500ml Kjeldahl flasks
1 Condenser rack
6 Kjeldahl flasks, capacity 500ml
6 Rubber stoppers, size No. 29, drilled 10mm hole
6 Splash heads
6 Condensers
6 Safety bulbs
6 Conical flasks, capacity 500ml
1m Flexible tubing to connect splash heads to condensers

For a.c. single phase supplies.
NKA-240-010V Distillation assembly, 220–240V **£313·31**
NKA-240-030P Distillation assembly, 110–120V **£318·94**



NKA-280

KJELDAHL COMBINED DIGESTION AND DISTILLATION ASSEMBLY, *GALLENKAMP*, comprising:

2 Heater units for 500ml Kjeldahl flasks
1 Floor stand
1 Flask rest
1 Distillation stand
1 Flask holder for 500ml Kjeldahl flasks
1 Condenser rack
12 Kjeldahl flasks, capacity 500ml
6 Rubber stoppers, size No. 29, drilled 10mm hole
6 Splash heads
6 Condensers
6 Safety bulbs
6 Conical flasks, capacity 500ml
1 Vapour tube
1 End cap
1 Ejector unit
1 Fan
1 Connecting sleeve
2 Hose clips
450mm flexible metallic tubing, 1m flexible tubing to connect splash heads to condensers and jointing material for vapour extraction components

For a.c. single phase supplies.
NKA-280-T Combined assembly, 220–240V **£786·94**

NOTE: The fan and fume ejector unit is suitable for an ejection path of up to 6m either straight or with one bend. The ejector unit terminates in a socket to fit trunking NKM-530 et seq.

Gallenkamp KJELDAHL EQUIPMENT

STANDS AND FITTINGS



NKA-510



NKA-550



NKA-620

BENCH STAND, for mounting vapour tube NKM-220-K at a centre distance of about 400mm above the bench top. Rust resistant steel finished in stoved grey enamel.

NKA-510-V Bench stand **£24·98**

FLOOR STAND, for *GALLENKAMP* 6-test digestion unit and for supporting distillation assemblies mounted on stand NKA-570-C. Tubular steel construction finished in stoved grey enamel, with rubber-lined shelf to support the receiving flasks. Overall dimensions 1000 × 600 × 770mm high.

NKA-530-H Floor stand **£89·78**

For illustration see assembly on page 458.

FLASK REST, for use with heaters NKH-300, NKH-400 and NKH-690 to form a digestion unit which may be used in a fume cupboard. Stainless steel, crimped to support flask necks and with clamps to fit stand NKA-530-H or support rods NKH-420-S04Q.

NKA-550-Q Flask rest **£10·35**

DISTILLATION STAND, to take heaters NKH-300, NKH-400 and NKH-690, flask holder NKA-590 and condenser rack NKA-620. A rubber-lined shelf is fitted to take 500ml conical receiving flasks. The flasks may be lowered at the end of the distillation process for draining the condenser tubes. The steel stand is rust resistant and finished in stoved grey enamel. Overall dimensions 970 × 430 × 1070mm high.

NKA-570-C Distillation stand **£37·13**

For illustration see assembly on page 458.

FLASK HOLDERS, for *GALLENKAMP* Kjeldahl distillation unit, comprising a bar with six spring clips to grip the necks of distillation flasks. The holder clamps to stand.

NKA-590-030C Flask holder, 300/500ml flasks **£13·05**

NKA-590-050T Flask holder, 800/1000ml flasks **£13·05**

CONDENSER RACK, for *GALLENKAMP* Kjeldahl distillation unit, constructed of tubular copper with spring clips suitable to take 300mm Liebig condensers NKR-450-010M and 030G. The horizontal tubes of the rack form the water supply and waste pipes and are fitted with corrugated nozzles for rubber tubing connections to the six condensers which operate in parallel.

NKA-620-G Condenser rack **£49·16**

Gallenkamp

Gallenkamp KJELDAHL EQUIPMENT

6-TESTS HEATER UNITS

The GALLENKAMP electric and gas units and the ELECTROTHERMAL electric unit have similar fittings by which they can be suspended on stands NKA-530-H or NKA-570-C. When used as free-standing units, a pair of support rods NKH-420-504Q may be attached to the GALLENKAMP heater units for fitting flask rest NKA-550-Q. The ELECTROTHERMAL heater unit is supplied with a pair of support rods and a flask rest. Overall width of each unit is 970mm.



NKH-300 with support rod and flask rest

HEATER UNIT, *GALLENKAMP*, electric, comprising six nickel-chromium spiral elements on fireclay formers mounted in an enamelled steel case. The elements have good thermal insulation and each has a replaceable asbestolite cover for supporting a flask. The heaters are individually controlled by energy regulators. Supplied with asbestolite covers NKH-320-030U, for flasks size 500ml. **Without** support rods or flask rest. Maximum load 3kW. For a.c. single phase supplies.

NKH-300-010R	Heater unit, 220–240V	**£151·88**
NKH-300-030L	Heater unit, 110–120V	**£157·50**

SPARE PARTS

NKH-320-030U	Asbestolite covers, 500ml flask	Set of 6 **£11·08**
NKH-320-110W	Heater, 500W, 220–240V	**£2·03**
NKH-320-130Q	Heater, 500W, 110–120V	**£2·03**

ACCESSORIES

NKH-320-510G	Asbestolite covers, 300ml flask	Set of 6 **£11·08**
NKH-320-520D	Asbestolite covers, 800/1000ml flasks	Set of 6 **£11·08**
	Support rod	See *NKH-420-504Q*

HEATER UNIT, *GALLENKAMP*, gas, comprising a bank of six burners with individual control taps and a stove enamelled steel case. Each burner is surrounded by heat insulating material and is supplied with a dished rust resistant iron wire gauze cover.

NKH-400-030D	Heater unit, coal gas	**£130·50**
NKH-400-070X	Heater unit, natural gas	**£130·50**

SPARE PART

NKH-420-030M	Gauze covers	Pack of 6 **£4·61**

ACCESSORIES

NKH-420-504Q	Support rods for rest	Pair **£1·52**
	Flask rest	See *NKA-550-Q*



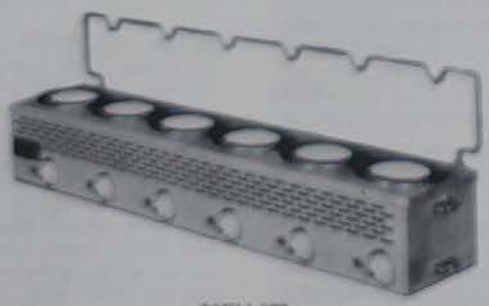
NKH-400 with support rod and flask rest

HEATER UNIT, *ELECTROTHERMAL*, electric. Comprising a bank of six heating mantles for 100 to 300ml Kjeldahl flasks mounted in an aluminium case. Each heater is controlled by an energy regulator and there is an indicator lamp for each circuit. With support rods and flask rest. Maximum power rating 1·8kW.

NKH-690-010W	Heater unit, 220–240V	**£181·50**
NKH-690-030Q	Heater unit, 110–120V	**£181·50**

HEATER UNIT, *ELECTROTHERMAL*, as NKH-690 but with six mantles for 500ml Kjeldahl flasks. Maximum power rating 2·7kW.

NKH-710-010B	Heater unit, 220–240V	**£207·90**
NKH-710-030S	Heater unit, 110–120V	**£207·90**



NKH-690
NKH-710

Gallenkamp KJELDAHL EQUIPMENT

FUME EXTRACTION ACCESSORIES

Small numbers of digestions may be carried out in a fume cupboard using a heater bank and flask rest. This method is not recommended for more than occasional use because of the risk of sulphuric acid fumes causing damage to the heater and fume extraction system.

A fume extraction system fabricated in rigid PVC is listed below for routine work and may be installed in any laboratory.

The fumes are extracted by an ejector and exhausted outside the building through PVC trunking.

All components are listed separately so that a selection can be made to suit any particular location. The vapour tube, end cap, and ejector unit can be assembled either way round to provide exhaust on left or right.

Socket ends are of a size to fit accurately over plain ends. Temporary joints may be made with a smear of grease. Permanent joints are made by painting both components with welding solution and pushing them together.

NOTE: This type of installation is suitable for an ejection path of up to 6 metres either straight or with one bend. We will be pleased to offer ejection systems for more complex situations on receipt of full details and dimensioned sketch of site.

VAPOUR TUBE, PVC, 100mm internal diameter, overall length approximately 1070mm with six holes to take necks of digestion flasks up to 1000ml capacity. Socket at one end for fixing to ejector.

NKM-220-K Vapour tube **£9·00**

END CAP, PVC, with drain tube, to fit vapour tube NKM-220-K.

NKM-250-M End cap **£6·08**

T-TUBE, PVC, with socket on central limb, for central fume extraction from two vapour tubes NKM-220-K.

NKM-290-H T-tube **£6·86**

EJECTOR UNIT, PVC, all-welded construction, capable of fume extraction from one or two vapour tubes NKM-220-K connected in series or parallel. Requires fan NKM-390-W, flexible metallic tubing NKM-420-R, sleeves NKM-440-D and clips NKM-460-M.

NKM-340-L Ejector unit **£18·00**

FAN, with integral ⅛ h.p. induction motor and condenser. For 200–250V 50Hz single phase supplies. Suitable for ejection path not exceeding 6 metres (see Note above).

NKM-390-W Fan, 200-250V **£172·80**

TUBING, flexible metal, 75mm diameter, for connecting fan NKM-390-W to ejector unit NKM-340-L. **Without** rubber connecting sleeves or hose clips.

NKM-420-R Tubing Per metre **£4·12**

NOTE: Approximately 1m required if used with bench stand NKA-510-V.
Approximately 0·5m required if used with floor stand NKA-530-H.

CONNECTING SLEEVE, canvas lined rubber, for connecting NKM-420-R to fan NKM-390-W.

NKM-440-D Connecting sleeve **£1·54**

HOSE CLIPS, for above.

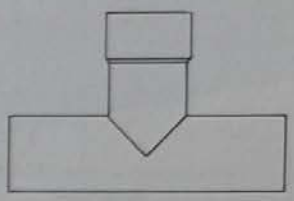
NKM-460-M Hose clips Set of 2 **£0·62**



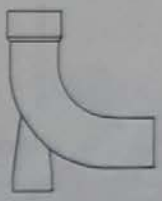
NKM-220



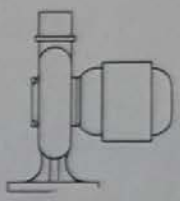
NKM-250



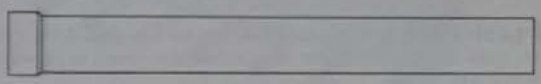
NKM-290



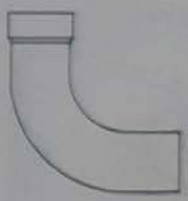
NKM-340



NKM-390



NKM-530



NKM-570



NKM-620

TUBES, PVC, 100mm internal diameter, with socket at one end. Dimension given is length.

NKM-530-030Q Tube, 900mm **£5·40**

NKM-530-070E Tube, 1500mm **£7·88**

ELBOW, PVC, 90°, with socket at one end.

NKM-570-U Elbow **£11·25**

COWL, PVC.

NKM-620-B Cowl **£9·56**

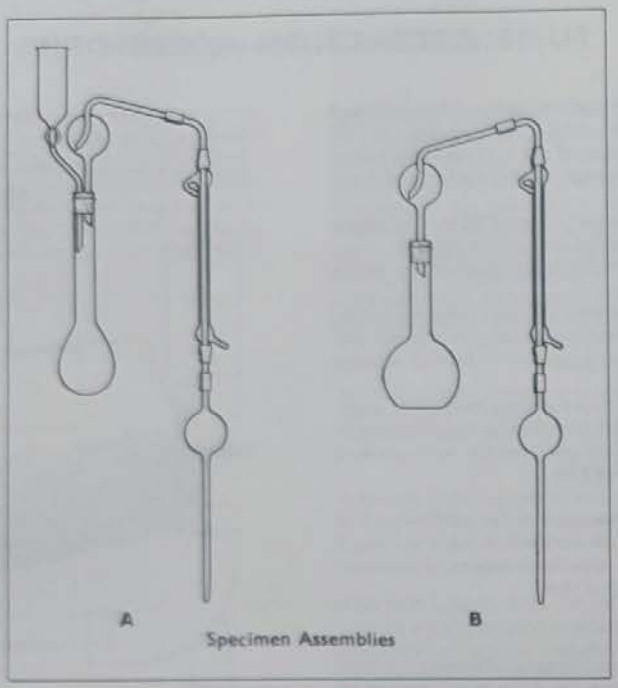
WELDING SOLUTION, sufficient for 10 joints, in can containing approximately 280ml. This solution is unsuitable for export.

NKM-650-D Welding solution **£4·50**

WELDING MATERIAL, sufficient for 40 joints. In export pack containing resin and hardener.

NKM-680-F Welding material Pack **£5·85**

KJELDAHL GLASSWARE



Specimen Assemblies

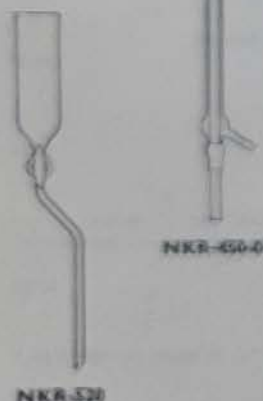
The specimen assemblies A and B illustrated show two of the many combinations possible by selection from the glassware listed below.

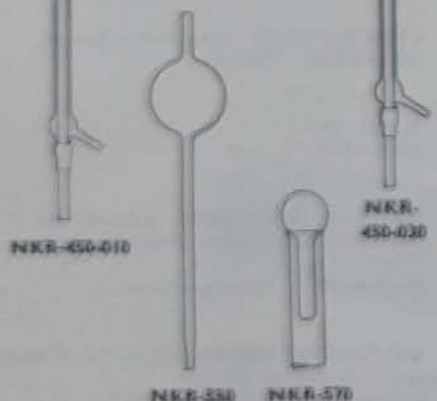
SPLASH HEADS, Kjeldahl type, borosilicate glass. Length of side tube 150mm. Available with either downward or upward sloping side tube.

NKR-420-010K	Splash head, downslope	**£3·07**
NKR-420-030E	Splash head, upslope	**£3·79**


NKR-420-010


NKR-420-030


NKR-520



CONDENSERS, Liebig type, borosilicate glass, comprising inner tube with end bent to match splash head NKR-420 and 300mm jacket attached by rubber tubing. NKR-450-010M is for use with NKR-420-010K and NKR-450-030G is for use with NKR-420-030E.

NKR-450-010M	Condenser, upslope	**£2·67**
NKR-450-030G	Condenser, downslope	**£2·67**

ACCESSORY

Tubing to connect splash head to condenser
See TWR-290-170E

STOPPERS, rubber, bored with 10mm hole to connect splash heads to flasks.

Stopper size	23	29	31
For flasks, ml	300	500/800	1000

NKR-490-030B	Stoppers, 23	Pack of 6 **£0·77**
NKR-490-0505	Stoppers, 29	Pack of 6 **£1·04**
NKR-490-070M	Stoppers, 31	Pack of 6 **£1·28**

TAP FUNNEL, cylindrical dropping, open top 100ml, with stem bent to clear splash head.

NKR-520-F	Tap funnel	**£2·63**

SAFETY BULB ABSORBER TUBE, for use with 500ml conical flasks.

NKR-550-H	Safety bulb	**£1·31**

BULB STOPPER, for Kjeldahl flasks.

NKR-570-Q	Bulb stopper	**£0·70**

Flasks for use in Kjeldahl determinations

KJELDAHL FLASKS, 300 to 800ml *See FHD-430*
ROUND BOTTOM FLASKS, 500 and 1000ml *See FHB-270*
CONICAL FLASKS, 500ml *See FHB-370-1500*

DIGESTION STANDS

DIGESTION STAND, micro-Kjeldahl, *GALLENKAMP*, electrically heated, to hold six 30ml digestion flasks. Sheet metal with asbestolite heating unit and ends. Heating is by nickel-chromium spirals. Adjustable spring clips are fitted to support a glass exhaust tube. For 220–240V a.c. single phase or d.c. supplies. **Without** flasks or exhaust tube.

NKT-200-A Digestion stand **£88·88**

SPARE PART

NKT-220-010G Heating element, 220–240V **£1·80**

DIGESTION STAND, micro-Kjeldahl, *GALLENKAMP*, gas heated, to hold six 30ml digestion flasks. The stand is constructed in asbestolite and the burner tube has six gas jets with individual control valves. Spring clips on adjustable arms support the exhaust tube. Supplied with six wire gauzes but **without** flasks or exhaust tube.

NKT-270-030L Digestion stand, coal gas **£26·10**
NKT-270-050F Digestion stand, natural gas **£26·10**

SPARE PARTS

NKT-290-010D Wire gauzes Pack of 12 **£0·68**

ACCESSORY

Kjeldahl flasks, 30ml *See FHD-450-Y*

EXHAUST TUBE, borosilicate glass, to BS 1428 Part B1 with six holes at centre distances of 55mm and tubulure for extraction pump connection.

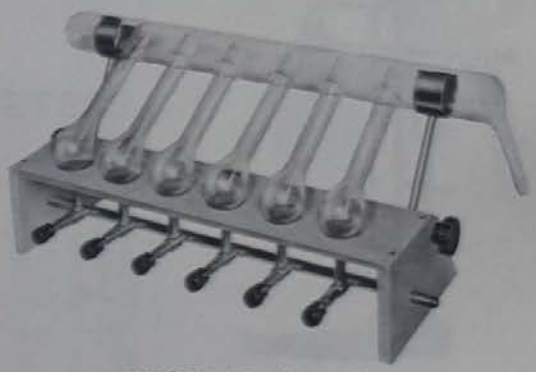
NKT-390-V Exhaust tube **£4·74**

EXHAUST TUBE, as NKT-390-V but with larger holes to conform to BS 1428 Part B3.

NKT-410-A Exhaust tube **£4·74**



NKT-200 with exhaust tube and flasks



NKT-270 with exhaust tube and flasks

KING* TYPE DIGESTION STAND

Used for non-protein nitrogen, total base and many other estimations, using tubes, crucibles or digestion/centrifuge tubes NKT-610-H where controlled heating is required.

The sheet steel and asbestos stand will hold 24 tubes up to 150×19mm, with a minimum length of 75mm. The tubes rest against a stainless steel support.

Two nickel-chromium spirals heat the bottom and sides of the tubes, respectively. Heating can be controlled to give gentle bottom heat with high top heat, gentle bottom and top heat and full bottom heat.

DIGESTION STAND, micro-Kjeldahl, *GALLENKAMP*, as specification, electrically heated for 220–240V a.c. single phase or d.c. supplies.

NKT-550-K Digestion stand **£84·38**

SPARE PART

NKT-570-010Q Heating elements, 220–240V Set of 2 **£3·04**

TUBE, digestion/centrifuge, borosilicate glass, 110×16·5mm with constriction approximately 19mm from bottom.

NKT-610-H Tube **£0·26**

* King and Wootton, *Micro-Analysis in Medical Biochemistry*, 3rd Ed., p. 17, Churchill, London.



NKT-550

MICRO-KJELDAHL APPARATUS

DISTILLATION APPARATUS

To BS 1428 Part B1 with Parnas-Wagner automatic discharge

The digestion products are introduced into the vacuum jacketed distillation vessel, treated with alkaline reagents and steam distilled. Steam is generated in the bolthead flask. The ammoniacal distillate is led through the splash head and condenser into a flask containing suitable absorbent solution. At the end of the distillation, removal of the heat source from the steam generator causes a partial vacuum in the system which transfers the contents of the distillation vessel into the cylindrical waste receiver leaving the distillation vessel empty for the next test.



NKT-670



NKT-730

DISTILLATION APPARATUS, micro-Kjeldahl, borosilicate glass, to BS 1428 Part B1, with automatic discharge. Comprising condenser tube NKT-690-090Q and components NKT-690-030L to NKT-690-150B listed below mounted on 600mm retort stand with clips.

NKT-670-L	Distillation apparatus	**£72·00**

SPARE PARTS

NKT-690-030L	Distillation flask, with vacuum jacket	**£14·34**
NKT-690-050F	Receiver, cylindrical	**£2·70**
NKT-690-070W	Condenser jacket	**£4·39**
NKT-690-090Q	Condenser tube, borosilicate glass	**£1·97**
NKT-690-110N	Condenser funnel	**£1·63**
NKT-690-130H	Sample funnel, 50mm dia.	**£1·07**
NKT-690-150B	Steam generating flask, 1 litre	**£2·48**

ACCESSORIES

Flask, 100ml, to receive distillate
See FHB-370-090S

Condenser tube, silver plated, interchangeable with NKT-690-090Q *See NKT-750-502Q*

DISTILLATION APPARATUS

To BS 1428 Part B3, non-transference pattern

The same flask is used for digestion and distillation. After digestion, the products are diluted and the flask assembled to the stillhead. Alkaline reagents are added through the funnel, the air inlet tube inserted and the flask heated while air is pumped through its contents. The ammonia and water vapour are led through the splash head and condenser into a receiver flask. To terminate the test the heat source and air inlet tube are removed.

DISTILLATION APPARATUS, micro-Kjeldahl, borosilicate glass, non-transference pattern to BS 1428 Part B3. Comprising all 7 spare parts as listed below and 450mm retort stand with mounting clips.

NKT-730-Y	Distillation apparatus	**£50·63**

SPARE PARTS

	Condenser jacket	*See NKT-690-070W*
	Condenser funnel	*See NKT-690-110N*
NKT-750-030Y	Digestion/distillation flask, with 19/26 socket	**£1·63**
NKT-750-050C	Stillhead, with 19/26 cone and 10/19 socket	**£6·10**
NKT-750-070T	Inlet tube, with 10/19 cone	**£0·73**
	Condenser tube, borosilicate glass	*See NKT-690-090Q*
	Peg stopper	*See NKT-940-130S*

ACCESSORIES

NKT-750-502Q	Condenser tube, silver plated, interchangeable with NKT-690-090Q	**£29·70**
	Air pump suitable for use with NKT-730-Y	*See PXW-370-W*
	Flask, 100ml, to receive distillate	*See FHB-370-090S*



NKT-670

MARKHAM APPARATUS

DISTILLATION APPARATUS, ultra-micro-Kjeldahl, borosilicate glass, Markham pattern. Designed for use in biochemical work on quantities of distillate up to 2ml. One piece assembly with 7/11 stopper.

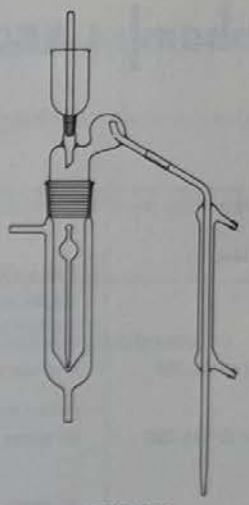
NKT-670-S	Distillation apparatus	**£15·98**

MARKHAM micro-Kjeldahl apparatus see **QUICKFIT SECTION.**

MICRO-KJELDAHL APPARATUS

HOSKINS* MICRO-KJELDAHL DISTILLATION APPARATUS. For convenient and precise distillations with 40 or 80ml samples. The apparatus incorporates a steam condensation-suction device for the automatic removal of the sample thereby enabling successive determinations to be made rapidly.

The apparatus comprises an outer vessel with 50/42 socket, steam entry sidearm and drain tube, two alternative inner tubes with 50/42 cone, splash head, funnel with 10/19 socket for peg stopper and a narrow jacket condenser.



NKT-920

MICRO-KJELDAHL DISTILLATION APPARATUS, Hoskins, borosilicate glass as specified, with 40 or 80ml inner tube.

NKT-920-030N	Distillation apparatus, 40ml	£16-82
NKT-920-050H	Distillation apparatus, 80ml	£17-10

SPARE PARTS

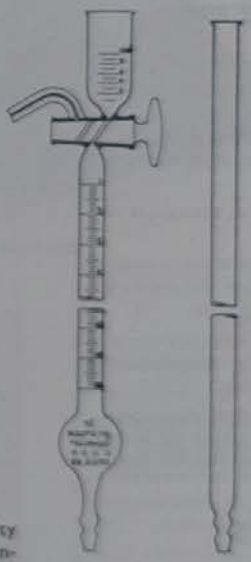
	Inner tubes, with splash head and funnel, on 50/42 cone.	
NKT-940-030W	Inner tube, 40ml	£10-01
NKT-940-050Q	Inner tube, 80ml	£9-73
NKT-940-090E	Outer vessel, 50/42 socket	£3-38
NKT-940-110B	Condenser	£2-98
NKT-940-130S	Peg stopper, 10/19 cone	£0-73

* Hoskins, *Analyst*, **69**, 1944, 271.

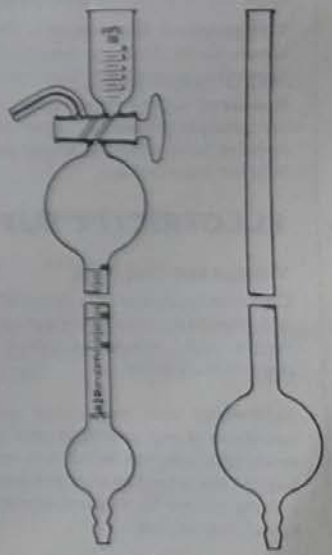
NITROMETERS



NMT-330



NMT-380



NMT-410

NITROMETER, micro, *TECHNICO*, BS 1428 Part D3. Capacity 1·5ml subdivided in 0·01ml. With works' certificate of examination stating the volume at five points of the scale.

NMT-330-S	Nitrometer, micro	£15-75

NITROMETER, Lunge,† *TECHNICO*, borosilicate glass, BS 2070. Comprises measuring tube graduated 1 to 50 x 0·01ml, with a double oblique bore stopcock and 10ml cup graduated in 2ml. With plain levelling tube.

NMT-380-G	Nitrometer	£10-76

NITROMETER, Lunge, *TECHNICO*, borosilicate glass, BS 2070, particularly suitable for nitrocellulose and nitroglycerine determinations. Comprises measuring tube graduated from 100 to 130 x 0·1ml with a 100ml bulb surmounted by a double oblique bore stopcock and a 10ml cup graduated in 2ml. With plain levelling tube.

NMT-410-B	Nitrometer	£18-90

† Lunge and Ambler, *Technical Gas Analysis*, p. 371.

Gallenkamp LABORATORY AND INDUSTRIAL OVENS

SECTION INDEX

List No.	Description	Working volume litres	Maximum temperature °C	Page
OVB-200	Griffin oven	20	200	467
OVB-300	Hotbox oven/sterilisers	50	200	468
		97	200	468
OVE-250 and OVE-300	Modular ovens	60	250	469
		105	250	469
		195	250	469
OVH-200 and OVH-220	BS ovens	66	250	473
		140	250	473
		210	250	473
OVH-300	BS ovens	66	300	476
		140	300	476
OVH-400	BS ovens/sterilisers	210	250	478
OVH-500 and OVH-520	Moisture extraction ovens	210	250	479
OVL-220	Drying cabinet	170	120	481
OVL-600	Vacuum ovens	23	150	483
		53	150	483
OVR-200	Humidity oven	190	60	484
OVR-400	Humidity oven	390	100	486
OVH-700 to OVH-740	Stands	–	–	480

DEFINITION OF TERMS

The following terms, defined in BS specifications, are used in the tabulated performance data given for *GALLENKAMP* ovens:

Working space – That portion of the internal space which is above the lowest shelf and not less than 30mm from any wall (including the roof).

Oven temperature – The temperature at the centre of the working space.

Temperature variation – The difference at any moment between the temperature at the centre of the working space and at any other part in the working space.

Temperature fluctuation – The short term changes in temperature (due to operation of the temperature controller) at any point in the working space.

Recovery – The time taken for an oven to regain temperature within 1°C after the temperature has been reduced from an initial steady state by opening the door fully for one minute.

ELECTRICITY SUPPLIES

Voltage and frequency

Electrical apparatus manufactured by *Gallenkamp* is offered and labelled for one, or for a choice of two or more voltage ranges and, where necessary, frequencies of mains electricity supplies.

Gallenkamp does not accept any responsibility for the operation of any such apparatus should it be connected to electricity supplies which are nominally outside or vary outside the stated voltage and frequency values for which it is designed, nor for any consequencial loss, damage or injury howsoever caused.

USEFUL INFORMATION

Load indicator lamps – Most *GALLENKAMP* ovens are fitted with load indicator lamps. With ovens controlled by hydraulic thermostats the lamp lights during the periods when the thermostat switches power to the heater. With ovens controlled by the solid state COMPENSTAT thermostat the lamp lights as the power to the heater is **reduced.** The light intensity thus increases as the set temperature is approached and reaches a maximum when the temperature is reached.

Power rating – The figure included in the Technical Data for each oven is the maximum power that the apparatus will require for any combination of control settings. The electricity supply outlet to which the apparatus is connected must have sufficient current carrying capacity to supply this power otherwise the mains installation may be damaged. Over a period of time the **actual power consumption** of an apparatus incorporating controls for temperature, motor speed, etc., will be normally less than the maximum rating.

Safety thermostats – Most *GALLENKAMP* ovens are fitted with an over-ride thermostat which, when set correctly, will maintain **coarse** control of temperature in the event of failure in the main thermostat system.

Choice of size – One major factor to influence the choice of an oven is the internal capacity. It is always advisable to have ample capacity for the work in hand. Undue congestion of the oven working space invariably leads to a loss of performance.

Griffin OVEN, 200°C

A simply designed and ruggedly constructed thermostatically controlled oven suitable for general heating and drying purposes up to 200°C

- **All-steel basic construction**
- **Black vitreous enamelled interior – easily cleaned**
- **Drop-down door acts as temporary shelf for transfer of samples**
- **Thermostat with scale on knob calibrated in °C**
- **Thermometer hole in top**
- **Glass fibre and reflective foil insulation**
- **White enamelled exterior**



OVB-200

Design

The exterior has a smooth finish with radiussed corners for easy cleaning. The door, which opens downwards to act as a temporary shelf, is opened by pulling a recessed handle which folds flush when not being used. A thermometer port, lined with a tube of 17mm diameter is fitted to the top of the oven. If required this hole may be used as a ventilator for entry of tubing or wires or it may be closed with a cork.

The interior has a sheathed heater mounted beneath a fixed shelf in its base. The walls are impressed with shelf runners and the two chromium plated steel wire grid shelves supplied have offset guide rails. This enables the shelves to be fitted either way up and allows for alternative positions and spacings.

Operation

The single control knob is a combined ON-OFF switch and thermostat setting knob. Its skirt is engraved with a scale in °C. Mains and load (thermostat operation) indicator lamps are also fitted.

Technical data

Temperature range	10°C above ambient to 200°C
Temperature fluctuation	3°C
Power rating, maximum, W	700
No. of shelves supplied	2
Internal dimensions, height × width × depth, mm	265 × 403 × 288
Overall dimensions, height × width × depth, mm	393 × 472 × 415

OVEN, *GRIFFIN,* as specified, with instructions but **without** thermometer. For 220–240V a.c. single phase supplies.

OVB-200-B Oven, 220–240V **£78·75**

Gallenkamp HOTBOX OVEN/STERILISERS, 200°C

Economically priced, wide shelved ovens for general laboratory use including drying and sterilising

- **Control by direct reading hydraulic thermostat**
- **Gravity convection**
- **Welded steel exterior**
- **Aluminium interior**
- **Large area grid shelves**
- **Both sizes accommodate pipette sterilising boxes SVF-760**



OVB-300

Design

With a welded steel exterior and an aluminium liner having fixed shelf positions. A sheathed heater mounted in the base is protected by a removable grid. Temperature control is by a direct reading thermostat scaled 30 to 200°C and a load indicator lamp is fitted. A fixed ventilator is provided in the top with a hole for insertion of a thermometer.

The wide shelves enable pipettes and other long pieces of glassware to be accommodated.

Technical data

For definition of terms, see page 466.

Size No.	1	2
Temperature fluctuation at 100°C	±1·5°C	±1·5°C
Time to heat to 200°C, min	45	60
Power rating, maximum, W	500	750
Shelf size, mm	480 × 300	480 × 400
No. of shelves supplied	2	3
No. of shelf positions	4	6
Working volumes, litres	50	97
Internal dimensions, height × width × depth, mm	330 × 480 × 330	470 × 480 × 430
Overall dimensions, height × width × depth, mm	575 × 590 × 475	710 × 590 × 580
Mass, kg	23	25

OVEN/STERILISERS, *GALLENKAMP* HOTBOX, 200°C maximum, as specified, with hydraulic thermostat, load indicator lamp, sheathed heater, shelves and instructions. For a.c. single phase supplies.

OVB-300-010N	Oven/steriliser, size No. 1, 220–240V	**£122·63**
OVB-300-030H	Oven/steriliser, size No. 1, 110–120V	**£136·13**
OVB-300-110J	Oven/steriliser, size No. 2, 220–240V	**£174·38**
OVB-300-130D	Oven/steriliser, size No. 2, 110–120V	**£176·63**

ACCESSORIES

OVB-320-502B	Shelf, size No. 1	**£3·21**
OVB-320-512V	Shelf, size No. 2	**£3·71**
	Floor stand	*See OVH-720-Q*
	Thermometer, −10 to 250°C	*See THL-210-090H*
	Thermometer, 50 to 110°C	*See THM-460-050E*
	Thermometer, 150 to 210°C	*See THM-460-090P*
	Labels 'STERILE'	*See LAB-780-L*
	Sterilising boxes	*See SVF-760*

Gallenkamp MODULAR OVENS, 250°C



- Three sizes designed for free standing or building into space saving stacks
- Door mounted controls, to save space by eliminating side or bottom control compartments
- Transparent plastics protective cover for controls
- Ventilation control adjustable from front
- Door opening button concealed in underside of control box for security
- Choice of hydraulic or solid state thermostat

Continued overleaf

Gallenkamp MODULAR OVENS

HYDRAULIC THERMOSTAT SERIES

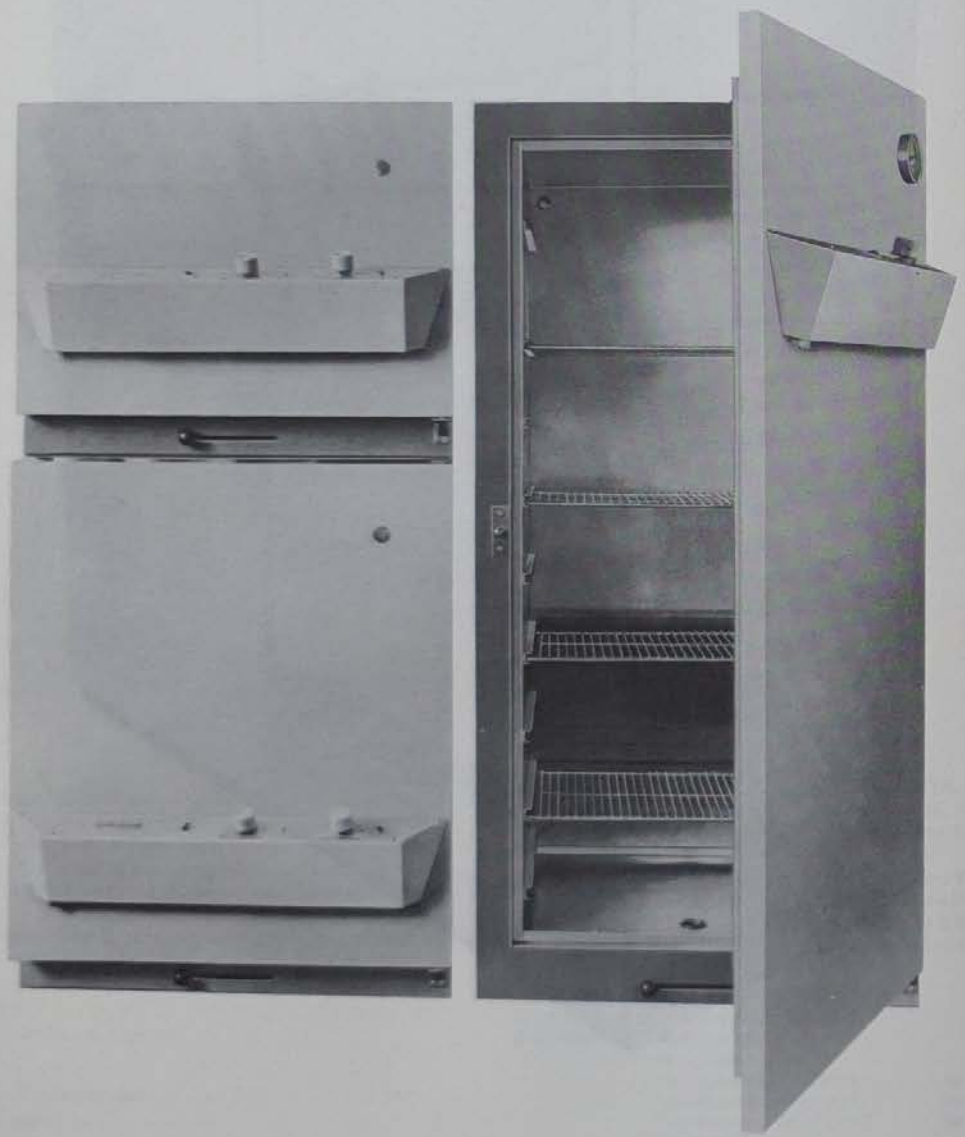
Provides general purpose temperature control accuracy and reliable performance at an economic price.

- Hydraulic thermostat
- Aluminium interior
- Gravity convection

SOLID STATE THERMOSTAT SERIES

For applications requiring close temperature control and the security in operation provided by a safety thermostat.

- COMPENSTAT solid state thermostat
- Stainless steel interior
- Fan convection
- Safety thermostat



STACKING FACILITY

Three sizes – one bench model, one bench and/or floor model and one floor model are available. The three are designed so that they can be formed into multiple stacks of similar or mixed models and sizes. With this feature, many different laboratory requirements may be accommodated, with the optimum utilisation of laboratory space.

Gallenkamp MODULAR OVENS

DESIGN

Exterior

The cases of these ovens are constructed of steel and finished in smooth, easily cleaned stoved enamel. Coloured in two tones of grey with the lighter shade on the door, the ovens present an attractive appearance. The door, held shut by a positive action latch, is opened by operating the button which is concealed in the underside of the control box. This avoids accidental opening of the door.

Interior

The interiors of the hydraulic thermostat series are of aluminium. Those of the solid state thermostat series are of stainless steel to BS 971, EN 58B. Both series have fixed, non-tilt runners for the heavily chromium plated wire grid shelves which are supplied or for the optional basket shelves. The same size of shelf fits all three sizes of each oven series.

Insulation

Efficient insulation with effective heat-breaks and a spring-loaded door gasket gives a cool exterior and operating economy even at the maximum temperature.

Ventilation

Oven air is circulated in the hydraulic thermostat series by natural convection. In the solid state COMPENSTAT thermostat series, air is circulated within the workspace by a guarded fan at the rear to provide improved temperature distribution. In both series, fresh air enters at the bottom front of the oven and fumes, water vapour, etc. leave through vents in the top rear corners. An inlet ventilator shutter, with its control knob conveniently located below the door, enables the air flow through the oven to be adjusted to suit the application.

Controls

All the oven temperature controls are in a control box mounted on the door with the fascia at a convenient height and angle.

Protective cover

All models are fitted with a hinged transparent plastics cover to protect the controls from accidental alteration of the settings.

Choice of controls

The hydraulic thermostat series of ovens has temperature control by a direct reading hydraulic thermostat scaled 30 to 250°C. An indicator lamp shows operation of the thermostat.

The solid state thermostat series of ovens is fitted with a COMPENSTAT direct reading solid state thermostat scaled 30 to 250°C. An indicator lamp lights when the oven reaches the set temperature. In addition, a completely independent, adjustable safety thermostat is fitted and an indicator lamp lights when the setting temperature of the safety thermostat is exceeded.

Temperature measurement

All the ovens have a hole in the top for a thermometer THL-210. For underbench or stacking applications, a capped hole in the door enables insertion of a thermometer such as OVE-320-526D.

Because of their unique combination of features, including door mounted controls and stacking facility, these ovens, designed and manufactured by GALLENKAMP allow better space utilisation than practically any other available range of ovens.

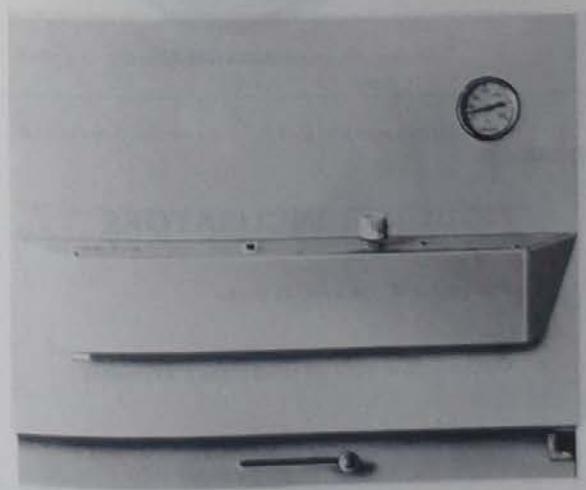
Stacking

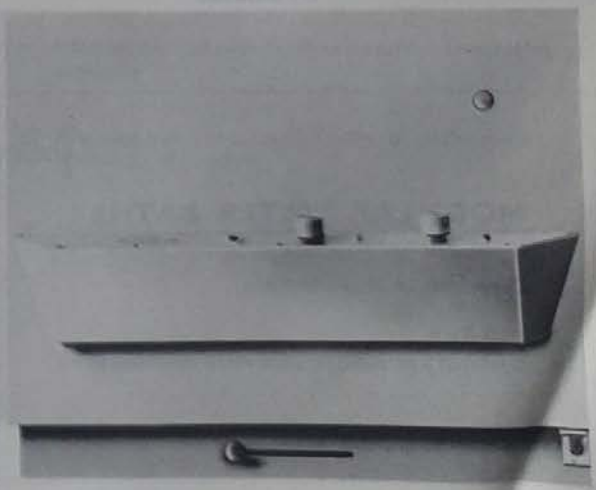
When it is wished to stand one oven on top of another, the two may be firmly linked together by the use of steel straps and screws which are fitted to the ovens. This eliminates the risk of the upper oven sliding off the lower one.

A heat deflector plate is also installed and may be advanced to deflect hot air from the top of the door of the lower oven towards the back where its effects on the temperature control of the upper oven will be minimised.

Floor stand

A stand is available for the modular ovens sizes 1 and 2 which raises them above floor level. The stand is supplied unassembled and it is a simple operation requiring a screwdriver to tighten eight screws only to assemble it. Of steel construction, finished with a plastics coating in a colour to match the oven bodies.





Continued overleaf

Gallenkamp MODULAR OVENS

TECHNICAL DATA

For definition of terms, see page 466.

Series	Hydraulic Thermostat			Solid State Thermostat		
Size No.	1	2	3	1	2	3
Temperature fluctuation	±1·5°C	±1·5°C	±1·5°C	±0·1°C	±0·1°C	±0·1°C
Time to heat to 250°C, approximate (vent closed), h	1	1	1	1	1	1
Power rating, maximum, W	500	750	1250	500	750	1250
Shelf size, mm	470×330	470×330	470×330	470×330	470×330	470×330
No. of shelves supplied	2	3	4	2	3	4
No. of shelf positions	3	5	9	3	5	9
Working volume, litres	60	105	195	60	105	195
Internal dimensions, height × width × depth, mm	330×475×370	580×475×370	1080×475×370	330×475×370	580×475×370	1080×475×370
Overall dimensions, height × width × depth, mm	500×610×680	750×610×680	1250×610×680	500×610×680	750×610×680	1250×610×680

OVENS, modular, *GALLENKAMP*, hydraulic thermostat series, as specified. With instructions. For a.c. single phase supplies.

OVE-250-010C	Oven, size No. 1, 220–240V	**£240·75**
OVE-250-030T	Oven, size No. 1, 110–120V	**£243·00**
OVE-250-110V	Oven, size No. 2, 220–240V	**£225·00**
OVE-250-130P	Oven, size No. 2, 110–120V	**£227·25**
OVE-250-210R	Oven, size No. 3, 220–240V	**£275·63**
OVE-250-230L	Oven, size No. 3, 110–120V	**£277·88**

OVENS, modular, *GALLENKAMP*, solid state COMPENSTAT **thermostat series,** as specified. With instructions. For a.c. single phase supplies.

OVE-300-010G	Oven, size No. 1, 220–240V 50 Hz	**£266·63**
OVE-300-030A	Oven, size No. 1, 110–120V 60Hz	**£268·88**
OVE-300-110C	Oven, size No. 2, 220–240V 50Hz	**£294·75**
OVE-300-130T	Oven, size No. 2, 110–120V 60Hz	**£297·00**
OVE-300-210V	Oven, size No. 3, 220–240V 50Hz	**£355·50**
OVE-300-230P	Oven, size No. 3, 110–120V 60Hz	**£357·75**

SPARE PART

OVE-320-150W	Shelf	**£4·61**

ACCESSORIES

OVE-320-502R	Basket shelf, 470×330×70mm deep	**£10·91**
OVE-320-526D	Dial thermometer, 0 to 300°C. Thermometers	**£16·88** *See THL-210*
OVE-320-540J	Stand for sizes 1 and 2	**£40·95**



OVE-320-502



OVE-320-526

Gallenkamp

MODULAR WATER BATHS

- **Capacities 12, 20 and 30 litres**
- **Optional hydraulic or solid state thermostat**

See BKA-200-010J to BKA-300-230K

MODULAR INCUBATORS

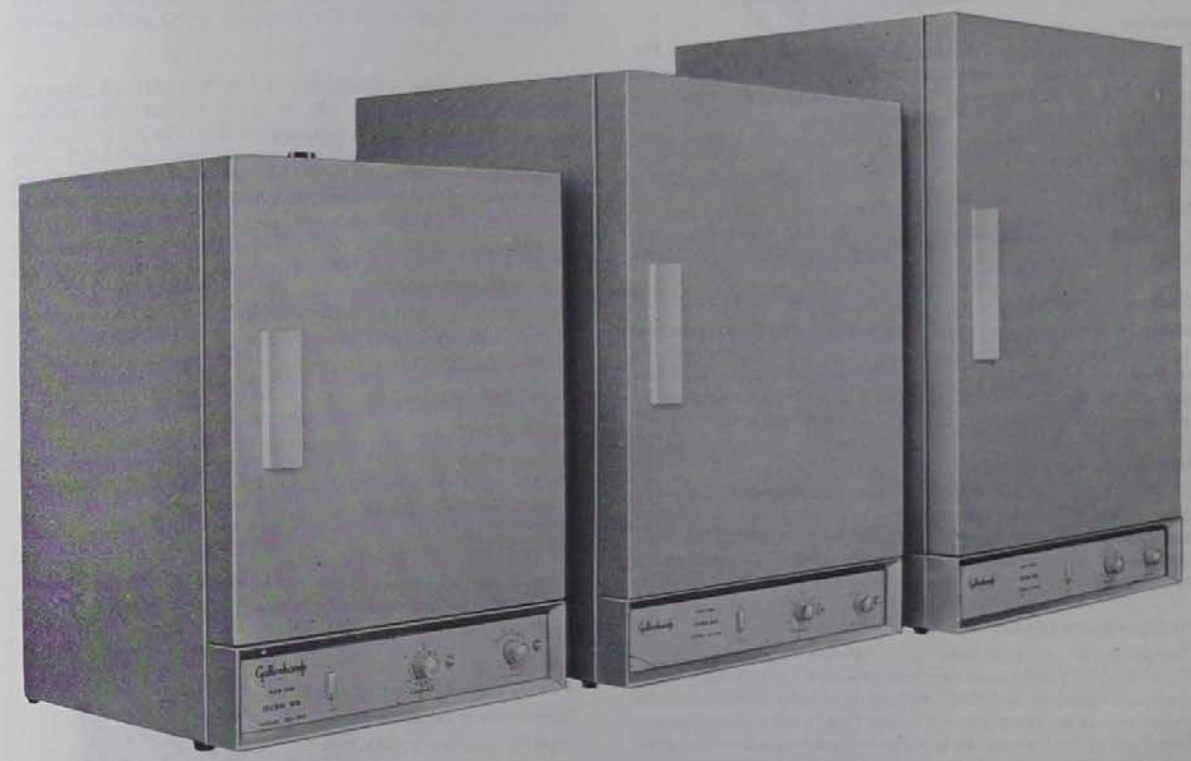
- **Capacities 60, 105 and 195 litres**
- **Optional hydraulic or solid state thermostat**

See INC-250-010V to INC-300-230L

Gallenkamp BS OVENS, 250°C

To BS 2648 and BS 3421

Modern heating, drying and sterilising ovens, scientifically designed to conform to the performance requirements of BS 2648 for electrically heated laboratory ovens and BS 3421 for electrically heated sterilising ovens



- Accurate temperature control by direct reading COMPENSTAT solid state thermostat
- Safety thermostat for additional protection
- Available in three sizes up to 210 litres capacity
- Fan convection ensures temperature uniformity even at full load
- Unitised controls and printed circuit simplify maintenance and servicing
- Efficient insulation for cool exteriors and operating economy
- Recessed panel reduces possibility of inadvertent alteration of controls
- Stainless steel interior designed for easy cleaning

Gallenkamp BS OVENS

DESIGN

Exterior

The exterior of the oven is easily cleaned and is finished in a hard light grey stoved enamel. The door gasket is of woven fibre and the door has a plugged hole for fitting a dial thermometer OVE-320-526D. An adjustable door catch enables the door to be opened and closed easily but, being spring-loaded, holds the door firmly when shut. An alternative version is available with a 250 × 250 mm double glazed window fitted in the door.

Interior

The oven liner is of corrosion resistant stainless steel to BS 971, EN 58B with fixed shelf runners and removable baffle at the rear which guards the fan and heaters. There are no electrical connections within the working space. There are no inlets in the base and the electrical controls and circuits are therefore protected from spillage.

Shelves

The steel wire grid shelves are electroplated with chromium and nickel.

Basket shelves

Basket shelves with grid sides 70 mm high are available as optional extras. These are of similar construction and finish to the ordinary shelves and slide directly on to the shelf runners. They are convenient for pre-loading of small articles which can then be inserted quickly into the oven with minimum heat loss.

Heating and air circulation

Air drawn from the centre of the oven is recirculated to the top and bottom of the workspace by a rear mounted fan. A sheathed stainless steel heater surrounds the fan and is shielded from the workspace by the baffle. The fan motor bearings require no lubrication.

Temperature control

Temperature is accurately and reliably controlled by a COMPENSTAT solid state thermostat which has a direct reading scale calibrated 40 to 250°C. An indicator lamp lights when the oven reaches set temperature. In addition, a safety thermostat is fitted which may be set to any desired interval above the oven operating temperature. In the event of incorrect setting or failure of the COMPENSTAT, the safety thermostat takes over control and a warning lamp indicates the fault condition.

Ventilation

An adjustable ventilator in the top of the oven may be opened to allow air drawn in by the fan to flow through the oven for fume or moisture extraction, or be closed when ventilation is not required. The ventilator incorporates a clip to hold a mercury-in-glass thermometer and may be lifted out to provide a 28 mm diameter aperture for cables, tubing, etc.

Technical data

For definition of terms see page 466.

Performance when tested to British Standard 2648 'Performance requirements for electrically heated laboratory ovens (unloaded)'.

Size No.	1	2	3
At 100°C			
Temperature fluctuation	0·1°C	0·1°C	0·1°C
Temperature variation	1°C	1·5°C	2°C
Heating time to stability, min	35	45	50
Recovery, min	6	8	7
Ventilation rate, litres/h	2000	2000	2000
At 250°C			
Temperature fluctuation	0·1°C	0·1°C	0·1°C
Temperature variation	2·5°C	4°C	6°C
Heating time to stability, min	50	60	60
Recovery, min	20	20	20

Performance when tested to British Standard 3421 'Performance of electrically heated sterilising ovens (loaded) at ambient plus 140°C'.

Size No.	1	2
Temperature drift during 2h period	0·5°C	0·5°C
Temperature variation	3°C	4°C
Heating time to stability, min	135	120

Note: Oven size No. 3 does not conform to BS 3421. For large capacity oven/steriliser *See OVH-400*

Size No.	1	2	3
Power rating, maximum, kW	1	1·5	2
Shelf size (net usable), mm	380 × 340	480 × 440	580 × 440
No. of shelves supplied	3	3	4
No. of shelf positions	4	5	6
Interval between positions, mm	110	115	120
Size of basket shelves, internal, mm	330 × 330 × 70	430 × 430 × 70	530 × 430 × 70
Working volume, litres	66	140	210
Internal dimensions, height × width × depth, mm	455 × 405 × 355	605 × 505 × 455	760 × 605 × 455
Overall dimensions, height × width × depth, mm	800 × 570 × 690	955 × 670 × 795	1105 × 770 × 795
Mass, kg	56	78	94

Gallenkamp BS OVENS

OVENS, BS, *GALLENKAMP*, **fan convection,** 250°C maximum, as specified, to BS 2648 (and BS 3421 size Nos. 1 and 2 only). With stainless steel interior, COMPENSTAT solid state direct reading thermostat and independent safety thermostat. Fitted with load and safety thermostat indicator lamps. With shelves and instructions but **without** thermometer. For single phase supplies.

OVH-200-010H	Oven, size No. 1, 220–240V 50Hz	**£295·88**
OVH-200-030B	Oven, size No. 1, 110–120V 60Hz	**£302·63**
OVH-200-110D	Oven, size No. 2, 220–240V 50Hz	**£334·13**
OVH-200-130U	Oven, size No. 2, 110–120V 60Hz	**£349·88**
OVH-200-210W	Oven, size No. 3, 220–240V 50Hz	**£384·75**
OVH-200-230Q	Oven, size No. 3, 110–120V 60Hz	**£429·75**



OVH-240-502

OVENS, BS, *GALLENKAMP*, as OVH-200 but with double glazed window 250 × 250mm fitted in the door. With shelves and instructions but **without** thermometer. For single phase supplies.

OVH-220-010Q	Oven, size No. 1, 220–240V 50Hz	**£344·25**
OVH-220-030K	Oven, size No. 1, 110–120V 60Hz	**£351·00**
OVH-220-110M	Oven, size No. 2, 220–240V 50Hz	**£382·50**
OVH-220-130G	Oven, size No. 2, 110–120V 60Hz	**£398·25**
OVH-220-210Y	Oven, size No. 3, 220–240V 50Hz	**£433·13**
OVH-220-230C	Oven, size No. 3, 110–120V 60Hz	**£478·13**



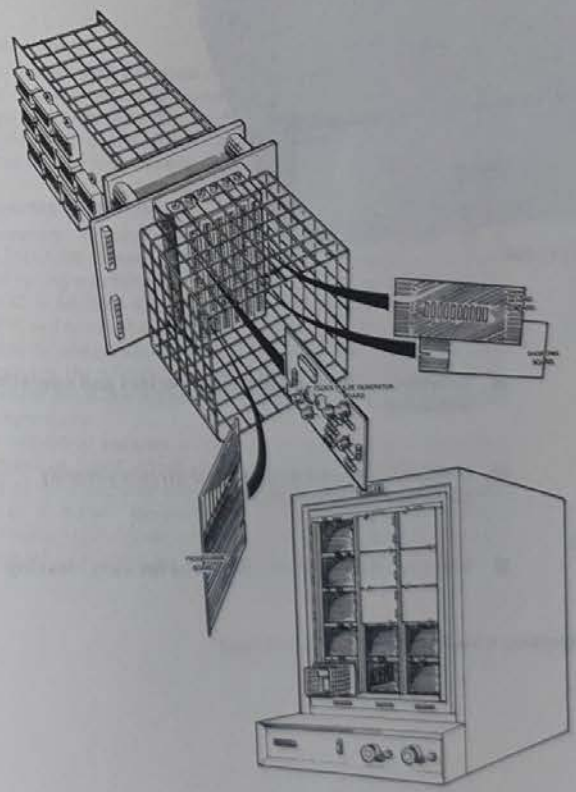
OVE-320-526

SPARE PARTS

OVH-240-150J	Shelf, size No. 1	**£3·09**
OVH-240-170D	Shelf, size No. 2	**£3·38**
OVH-240-190U	Shelf, size No. 3	**£5·29**

ACCESSORIES

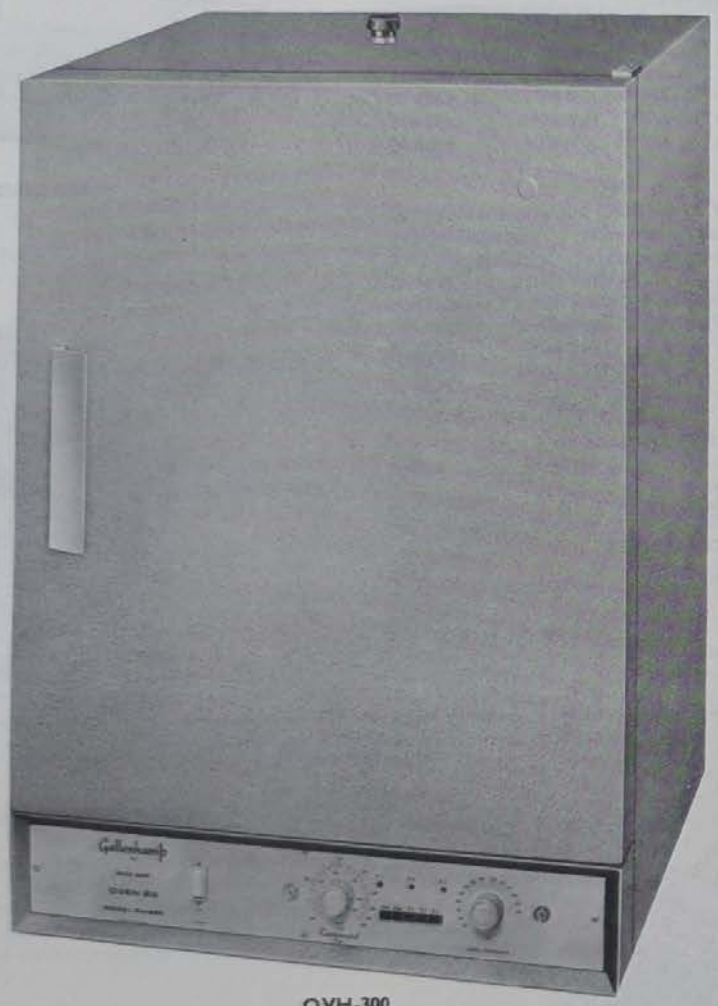
OVH-240-502E	Basket shelf, size No. 1	**£9·79**
OVH-240-512B	Basket shelf, size No. 2	**£11·14**
OVH-240-522V	Basket shelf, size No. 3	**£12·15**
	Floor stands	*See OVH-700-Q to OVH-740-L*
	Thermometers	*See THL-210-090H*
	Dial thermometer	*See OVE-320-526D*



The diagram illustrates one of the many special applications for which our BS ovens are used. In this case Declan (Stroud) Ltd of Stonehouse Gloucestershire fit a special front panel with 15 modular test stations each used for either life testing or ageing of microcircuits

Gallenkamp BS OVENS, 300°C

With COMPENSTAT solid state control and pushbutton preset temperature selection



OVH-300

- Accurate temperature control by direct reading COMPENSTAT solid state thermostat
- Safety thermostat for additional protection
- Conform to the performance requirements of BS 2648 and BS 3421
- Efficient insulation for cool exteriors and operating economy
- Unitised controls and printed circuit simplify maintenance and servicing
- Stainless steel interior designed for easy cleaning
- Fan convection ensures temperature uniformity even at full load

Gallenkamp BS OVENS

DESIGN

Exterior

The exterior of the oven is easily cleaned and is finished in a hard light grey stoved enamel. The door gasket is of woven fibre and the door has a plugged hole for fitting a dial thermometer OVE-320-526D. An adjustable door catch enables the door to be opened and closed easily but, being spring-loaded, holds the door firmly when shut.

Interior

The oven liner is of corrosion resistant stainless steel to BS 971, EN 58B with fixed shelf runners and a removable baffle at the rear which guards the fan and heaters. There are no electrical connections within the working space. There are no inlets in the base and the electrical controls and circuits are therefore protected from spillage.

Heating and air circulation

Air drawn from the centre of the oven is recirculated to the top and bottom of the workspace by a rear mounted fan. A sheathed stainless steel heater surrounds the fan and is shielded from the workspace by the baffle. The fan motor has bearings which require no lubrication.

Ventilation

An adjustable ventilator in the top of the oven may be opened to allow air drawn in by the fan to flow through the oven for fume or moisture extraction, or be closed when ventilation is not required. The ventilator incorporates a clip to hold a mercury-in-glass thermometer and may be lifted out to provide a 28mm diameter aperture for cables, tubing, etc.

Shelves

The steel wire grid shelves are electroplated with chromium and nickel.

Basket shelves

Basket shelves with grid sides 70mm high are available as optional extras. These are of similar construction and finish to the ordinary shelves and slide directly on to the shelf runners. They are convenient for pre-loading of small articles which can then be inserted quickly into the oven with minimum heat loss.

Temperature control

Temperature is accurately and reliably controlled by a GALLENKAMP direct reading COMPENSTAT solid state thermostat having two temperature scales ranged 40 to 170°C and 160 to 300°C. In addition there are three controls, two in the range 40 to 170°C and one in the range 170 to 280°C, which can be preset by the user to temperatures most commonly required. The range controls and the preset controls are selected by pushbuttons on the control panel. An indicator lamp lights when the oven reaches set temperature.

For additional security of oven contents, an adjustable safety thermostat is fitted which, in the event of incorrect setting or failure of the electronic controller, takes over and maintains the oven at a higher temperature (with a larger temperature differential). Under these circumstances a warning lamp indicates that the safety thermostat has taken over control.

Technical data

For definition of terms see page 466.

Size No.	1	2
At 200°C		
Temperature fluctuation	0·1°C	0·1°C
Temperature variation	2°C	4°C
Heating time to stability, min	45	60
Recovery, min	6	8
Ventilation rate, litres/h	2000	2000
At 300°C		
Temperature fluctuation	0·1°C	0·1°C
Temperature variation	4°C	7°C
Heating time to stability, min	60	75
Recovery, min	20	20
Power rating, maximum, kW	1·5	2
Shelf size (net usable), mm	380 × 340	480 × 440
No. of shelves supplied	3	3
No. of shelf positions	4	5
Interval between positions, mm	110	115
Size of basket shelves, internal, mm	330 × 330 × 70	430 × 430 × 70
Working volume, litres	66	140
Internal dimensions, height × width × depth, mm	455 × 405 × 355	605 × 505 × 455
Overall dimensions, height × width × depth, mm	800 × 570 × 695	955 × 670 × 805
Mass, kg	57	79

OVENS, BS, *GALLENKAMP,* **fan convection,** 300°C maximum, as specified, to BS 2648 and BS 3421. With stainless steel interior, direct reading COMPENSTAT solid state thermostat and independent safety thermostat. Fitted with load and safety thermostat indicator lamps. With shelves and instructions but **without** thermometer. For single phase supplies.

OVH-300-010W	Oven, size No. 1, 220–240V 50Hz	**£343·13**
OVH-300-030Q	Oven, size No. 1, 110–120V 60Hz	**£361·13**
OVH-300-110S	Oven, size No. 2, 220–240V 50Hz	**£381·38**
OVH-300-130M	Oven, size No. 2, 110–120V 60Hz	**£433·13**

SPARE PARTS

Shelves	*See OVH-240*

ACCESSORIES

Basket shelves	*See OVH-240*
Dial thermometer	*See OVE-320-526D*
Thermometers	*See THL-210-110E*
Floor stands	*See OVH-700-Q and OVH-740-L*

Gallenkamp OVEN/STERILISER, 250°C

A large capacity modern sterilising oven designed to conform to the performance requirements of BS 3421 'Performance of Electrically Heated Sterilising Ovens'

- **Accurate temperature control by direct reading COMPENSTAT solid state thermostat**
- **Safety thermostat for additional protection**
- **Capacity 210 litres**
- **Fan convection ensures temperature uniformity even at full load**
- **Stainless steel interior designed for easy cleaning**



OVH-400

DESIGN

The interior of the oven is of corrosion resistant EN 58B stainless steel, with six fixed shelf runners to accept both the nickel-chromium plated steel wire grid shelves and OVH-240-522V basket shelves. Interval between shelf positions is approximately 120mm. The door has a woven fibre gasket, an adjustable catch and a plugged hole to accept a dial thermometer OVE-320-526D.

OPERATION

Temperature control

Temperature is accurately and reliably controlled by a COMPENSTAT solid state thermostat which has a direct reading scale calibrated 40 to 250°C. An indicator lamp lights when the oven reaches set temperature.

In addition a safety thermostat is fitted which may be set to any desired interval above the oven operating temperature. In the event of incorrect setting or failure of the COMPENSTAT, the safety thermostat takes over control and a warning lamp indicates the fault condition.

Air circulation and ventilation

A removable rear baffle provides ducted recirculation of the air drawn in at the centre by the fan. The fan motor bearings require no lubrication.

An adjustable ventilator at the top of the oven regulates the passage of room air through the working space. The ventilator incorporates a thermometer clip and it may be lifted out to provide an aperture for tubing, wires, etc. There is no air inlet in the base of the oven and the electrical controls are therefore protected from spillage.

Technical data

For definition of terms see page 466.

Performance when tested to BS 3421 at ambient plus 140°C

Temperature drift during 2h period	0·5°C
Temperature variation	5°C
Heating time to stability, min	120
Power rating, maximum, kW	2·5
Shelf size (net usable), mm	580 × 440
Working volume, litres	210
Internal dimensions height × width × depth, mm	760 × 605 × 455
Overall dimensions height × width × depth, mm	1105 × 710 × 795
Mass, kg	102

OVEN/STERILISER, *GALLENKAMP*, **fan convection,** 250°C maximum, as specified, to BS 3421. With stainless steel interior, COMPENSTAT solid state direct reading thermostat and safety thermostat. Fitted with load and safety thermostat indicator lamps. With four shelves and instructions but **without** thermometer. For single phase supplies.

OVH-400-010X Oven/steriliser, 220–240V 50Hz **£393·75**
OVH-400-030Y Oven/steriliser, 110–120V 60Hz **£429·75**

SPARE PARTS

Shelves — *See OVH-240-190U*

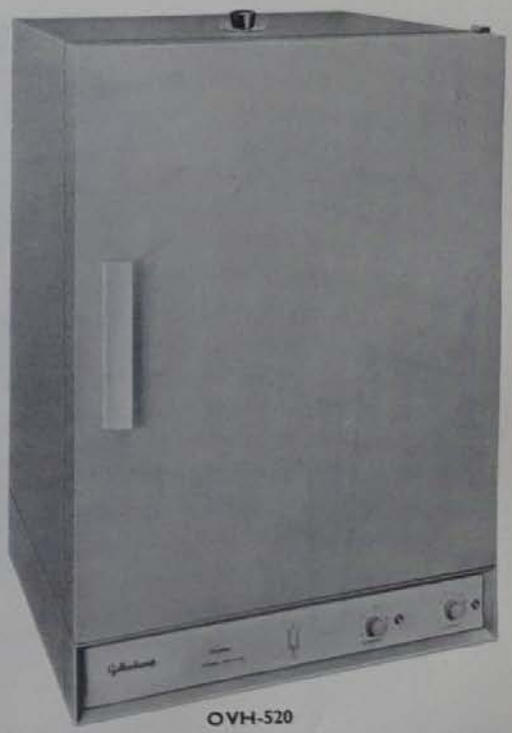
ACCESSORIES

Basket shelves — *See OVH-240-522V*
Dial thermometer — *See OVE-320-526D*
Floor stand — *See OVH-740-L*

Gallenkamp MOISTURE EXTRACTION OVEN, 250°C

A large capacity oven designed for the rapid, even drying of wet bulk laboratory and industrial samples such as sand, vegetable matter, tobacco, wood pulp, paper, etc.

- **Accurate temperature control by direct reading COMPENSTAT solid state thermostat**
- **Safety thermostat for additional protection**
- **Capacity 210 litres**
- **Forced ventilation and large heater for rapid throughput of heated air**
- **Liner of corrosion resistant stainless steel to BS 971, EN 58B**



OVH-520

DESIGN

The interior of the oven is of corrosion resistant EN 58B stainless steel, with six fixed shelf runners to accept both the nickel-chromium plated steel wire grid shelves and OVH-240-522V basket shelves. Interval between shelf positions is approximately 120mm. The door has a woven fibre gasket, an adjustable catch and a plugged hole to accept a dial thermometer OVE-320-526D. An alternative version is available with a 250 × 250mm double glazed window fitted in the door.

OPERATION

Temperature control

Temperature is accurately and reliably controlled by a COMPENSTAT solid state thermostat which has a direct reading scale calibrated 40 to 250°C. An indicator lamp lights when the oven reaches set temperature. In addition a safety thermostat is fitted which may be set to any desired interval above the oven operating temperature. In the event of incorrect setting or failure of the COMPENSTAT, the safety thermostat takes over control and a warning lamp indicates the fault condition.

Air circulation and ventilation

A removable rear baffle provides ducted recirculation of the air drawn in at the centre by the fan. The fan motor bearings require no lubrication.

The combination of the high powered heater and the mechanical ventilation system provides a rapid throughput of heated air. Provision is made for connecting the air outlet on the top of the oven to the duct of a moisture extraction system. An outlet adapter for 100mm internal diameter ducting is supplied.

Technical data

For definition of terms see page 466.

Performance unloaded at 110°C

Temperature fluctuation	1°C
Temperature variation	2°C
Heating time to stability, min	25
Maximum ventilation rate, litres/h	36000
Power rating, maximum, kW	2·75
Shelf size (net usable), mm	580 × 440
Working volume, litres	210
Internal dimensions, height × width × depth, mm	760 × 605 × 455
Overall dimensions, height × width × depth, mm	1105 × 770 × 795
Mass, kg	94

OVEN, MOISTURE EXTRACTION, *GALLENKAMP*, fan convection and ventilation, 250°C maximum, as specified. With stainless steel interior, COMPENSTAT solid state direct reading thermostat, safety thermostat and outlet adapter. Fitted with load and safety thermostat indicator lamps. With four shelves and instructions but **without** thermometer. For single phase supplies.

OVH-500-010G Oven, 220–240V 50Hz **£454·50**
OVH-500-030A Oven, 110–120V 60Hz **£490·50**

OVEN, MOISTURE EXTRACTION, *GALLENKAMP*, as OVH-500 but with double glazed window 250 × 250mm fitted in the door. For single phase supplies.

OVH-520-010P Oven, 220–240V 50Hz **£502·88**
OVH-520-030J Oven, 110–120V 60Hz **£538·88**

SPARE PARTS

Shelves — *See OVH-240-190U*

ACCESSORIES

Basket shelves — *See OVH-240-522V*
Dial thermometer — *See OVE-320-526D*
Floor stand — *See OVH-740-L*

Gallenkamp FLOOR STANDS

A range of rigid steel floor stands designed to provide a comfortable working height for *GALLENKAMP* ovens and incubators. With fixed support platform and convenient undershelf for samples, etc.

Supplied as a kit of parts with instructions for assembly.

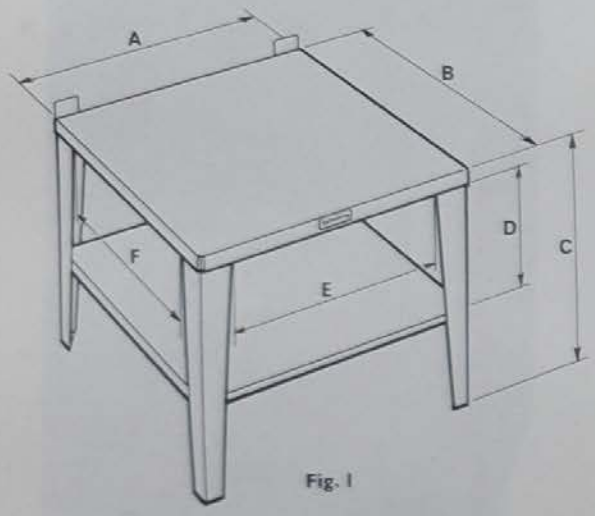


Fig. 1



List No.	Suitable for		Dimensions (refer to Fig. 1)					
	List No.	Size	A	B	C	D	E	F
OVH-700	INC-700 OVH-200 OVH-300	No. 1 No. 1 No. 1	580	580	710	365	400	400mm
OVH-720	INA-300 INC-700 OVB-300 OVH-200 OVH-300	Nos. 1 and 2 No. 2 Nos. 1 and 2 No. 2 No. 2	680	680	635	340	510	510mm
OVH-740	INC-700 OVH-200 OVH-400 OVH-500	No. 3 No. 3	780	680	560	290	620	510mm

OVH-700-Q	Floor stand	£39-04
OVH-720-C	Floor stand	£42-92
OVH-740-L	Floor stand	£46-69

Gallenkamp DRYING CABINET

For rapid and controlled drying of glassware or chromatography paper up to sheet size 580 × 680 mm, etc.

- **Maximum temperature 120°C**
- **Toughened glass doors**
- **Temperature control by direct reading thermostat**



OVL-220 with OVL-240

DESIGN

The heating elements, which are protected from spillage by baffles, are housed in the base compartment of the cabinet. Hot air convects rapidly through the cabinet interior and emerges through the adjustable ventilator at the top, carrying away with it moisture and other vapours.

The interior of the cabinet is lined with insulating board. Temperature is controlled by means of a hydraulic thermostat calibrated 30 to 120°C. An indicator lamp shows operation of the heater.

Technical data

Temperature fluctuation	±3°C
Temperature variation	8°C
Heating time to 100°C, min	30
Power rating, maximum, kW	1·8
Shelf size, mm	670 × 330
No. of shelves supplied	2
No. of shelf positions	4
Interval between positions, mm	150
Working volume, litres	170
Internal dimensions, height × width × depth, mm	720 × 670 × 370
Overall dimensions, height × width × depth, mm	1070 × 760 × 420
Mass, kg	52

DRYING CABINET, *GALLENKAMP*, **120°C maximum,** as specified, with direct reading hydraulic thermostat and load indicator lamp, toughened glass doors, adjustable ventilator, one each 12·5 and 25 mm mesh wire shelves and instructions. For a.c. single phase supplies.

OVL-220-010W	Drying cabinet, 220–240V	**£240·75**
OVL-220-030Q	Drying cabinet, 110–120V	**£243·00**

SPARE PARTS

OVL-240-050T	Shelf, 12·5 mm mesh	**£4·05**
OVL-240-070N	Shelf, 25 mm mesh	**£4·05**

ACCESSORIES

Rack, with clips for suspending six sheets of chromatography paper, to fit within the top of the cabinet.

OVL-240-504G	Rack	**£19·58**
OVL-240-509T	Clips, spare for OVL-240-504G.	Pack of 12 **£4·61**

Exhaust fan, for fitting in place of the top ventilator to increase the rate of removal of moisture or fumes. Outlet takes 76 mm bore tubing for connecting to ducting of extraction systems. For single phase supplies.

OVL-240-520Y	Exhaust fan, 220–240V 50Hz	**£55·13**
OVL-240-530F	Exhaust fan, 110–120V 60Hz	**£56·25**

Gallenkamp

DRYING CABINETS

Suitable for drying drained laboratory glassware, etc.

- Aluminium construction white stoved enamel finish
- Sliding glass doors
- Three wire grid shelves
- Maximum temperature approximately 100°C



OVL-350

Technical data

Size	1	2
Overall dimensions, height × width × depth, mm	510 × 790 × 330	750 × 1000 × 350
Power rating, maximum, W	750	1500

DRYING CABINETS, as specified, with heater in base, indicator lamp, ON-OFF switch, shelves and energy regulator control. For 220–240V a.c. single phase supplies.

OVL-350-010Q Drying cabinet, size 1 **£57·48**
OVL-350-210Y Drying cabinet, size 2 **£103·13**

Gallenkamp INCUBATORS

- Fan and gravity convection models, temperature range up to 100°C
- Cooled models, temperature range approximately 0 to 45°C
- Alternative controls
- Time/temperature cycling facilities



See INA-300 to INF-820

Gallenkamp VACUUM OVENS, 150°C

For accelerated batch drying or for preventing decomposition of heat sensitive materials
With uses in chemical, biological, pharmaceutical and other fields



OVL-600

DESIGN

The oven comprises an anodised aluminium alloy vacuum chamber with a self-aligning door fitted with an observation window. Surrounding the chamber is a glass reinforced plastics outer case which remains cool at operating temperatures.

A thermometer, range 30 to 150°C, is fitted below the lower shelf and is visible through the window.

Heating is by built-in heaters controlled by a direct reading thermostat. A load indicator lamp shows operation of the heaters.

To leave the vacuum chamber free from obstruction, the vacuum fittings are all mounted on the door and comprise a vacuum dial gauge and two diaphragm valves with insulated handles which remain cool at operating temperatures. The valves are for vacuum line connection and air bleed respectively and the nozzles of both point downwards to avoid kinking of flexible connecting tubes. The nozzles are serrated and accept 6·5mm bore vacuum tubing.

- **Temperature control within 0·5°C**
- **Two sizes available**
- **All controls built-in**
- **Diaphragm vacuum valves**
- **Glass fibre reinforced plastics case**

OVEN, VACUUM, *GALLENKAMP,* **150°C maximum,** as specified, with glass reinforced plastics outer case, direct reading thermostat, load indicator lamp, door with observation window, mercury in glass thermometer, vacuum dial gauge and two diaphragm vacuum valves. With two shelves and instructions. For a.c. single phase supplies.

OVL-600-010E	Oven, size No. 1, 220–240V	**£310·50**
OVL-600-030V	Oven, size No. 1, 110–120V	**£321·75**
OVL-600-110A	Oven, size No. 2, 220–240V	**£380·25**
OVL-600-130R	Oven, size No. 2, 110–120V	**£391·50**

SPARE PARTS

OVL-620-050B	Thermometer	**£3·49**
OVL-620-130D	Door gasket, size No. 1	**£10·41**
OVL-620-170X	Door gasket, size No. 2	**£12·15**

ACCESSORIES

Tubing	See TWR-460-150P
Vacuum pump	See PYB-670-N

Technical data

For definition of terms, see page 466.

Size No.	1	2
Temperature range	Ambient +5°C to 150°C	
Time to heat to 150°C, min	45	60
Temperature fluctuation	Within 0·5°C	
Vacuum and gauge range	0 to 760mm of mercury	
Power rating, maximum, W	800	1150
Shelf size, mm	250 × 300	330 × 450
No. of shelves supplied	2	2
Distance between shelves, mm	120	140
Internal dimensions, diameter × maximum depth, mm	305 × 325	370 × 500
External dimensions, height × width × depth, mm	500 × 470 × 570	630 × 560 × 680
Mass, kg	28	44

Gallenkamp NON-INJECTION HUMIDITY OVEN, 60°C

WITH SALT TRAY HUMIDIFIER

APPLICATIONS

Conditioning samples prior to electrical or mechanical tests

Absorption and permeability measurements on packaging and other materials

Shelf life tests on components, packaging, etc. under simulated temperate or tropical conditions

Corrosion tests on mechanical assemblies

- Humidity control by saturated salt solutions
- Accurate temperature control by direct reading COMPENSTAT solid state thermostat
- Safety thermostat for additional protection
- High level controls unaffected by spillage
- Fan convection ensures temperature and humidity uniformity
- Built-in cooling coil and solenoid valve
- Stainless steel liner and shelves
- Glass inner door for observing samples
- Water tight rim seal on inner door



OVR-200

Technical data

For definition of terms, see page 466.

Temperature range	Approximately ambient to 60°C
Temperature fluctuation	±0·1°C
Temperature variation	±0·5°C
Recovery time at 60°C, min	30
Humidity range	0 to 95% r.h. at all temperatures
Mass of salt required, kg	3
Drift over 72 hours	Not more than 1°C and 2% r.h.
Reproducibility	±0·5°C and ±2% r.h.
Power rating, maximum, kW	1
Shelf size, mm	580 × 440
No. of shelves	3
No. of shelf positions	5
Interval between positions, mm	120
The removable base can be used as a shelf	
Working volume, litres	190
Internal dimensions, height × width × depth, mm	675 × 605 × 455
Overall dimensions, height × width × depth, mm	1070 × 785 × 805
Mass, kg	100

DESIGN

Exterior

The exterior surfaces of the oven are finished in a light grey stoved enamel which is easily cleaned. The outer door is fitted with a magnetic gasket seal.

Interior

The oven liner is of corrosion resistant stainless steel to BS 971 EN 58B. All seams are welded.

Five fixed shelf runners are fitted to the liner and, at the rear, a removable stainless steel baffle guards the heater, fan and cooling coil and provides ducted air circulation through the oven working space.

The bottom shelf is a plain sheet of stainless steel and serves to guide the ducted air between itself and the tray containing salt solution situated beneath it. Exchange of moisture between the solution and the circulating air produces rapid equilibrium of oven humidity.

Other shelves are of perforated stainless steel to allow a flow of air throughout the working space.

An inner glass door is fitted to permit viewing of samples under test without upsetting the humidity of the interior. The rim of this inner door has a seal and a low power subsidiary heater to minimise condensation on and around the door. A trough with drain tube collects any drips which may fall when the glass door is opened.

Insulation

The space between the outer case and the liner is lagged with a closed cell polyurethane foam insulation, formed *in situ*. This insulation adds to the robustness of the overall design and forms a seal to minimise seepage of corrosive salt solutions and water vapour to the outer case should the liner be accidentally punctured.

The outer surfaces of the liner are coated with a polyurethane compound which bonds with the insulation to ensure a high degree of sealing.

Temperature control

Temperature is controlled by a direct reading COMPENSTAT solid state thermostat and an independent safety thermostat is fitted. A stainless steel sheathed heater mounted round the motor driven fan ensures rapid temperature response and minimum fluctuation. An indicator lamp, which lights when the oven reaches set temperature, a mains switch and a safety thermostat indicator lamp are fitted.

All controls and circuitry are housed at the top of the oven and are therefore protected from spillage of water or salt solutions. A transparent cover is fitted to protect the controls from accidental alteration.

A cooling coil and solenoid valve are incorporated for use when tests are to be carried out at or near ambient temperature. When switched into operation, the solenoid valve shuts while the heater is at maximum power and opens when heater power reduces to a level where cooling is required. This alternating system conserves water and reduces drift in operating temperature should the temperature of the cold water supply vary. At higher operating temperatures, the solenoid valve can be switched out of operation.

Humidity control

Humidity control is based on the fact that the relative humidity of air in contact with saturated salt solutions reaches known equilibrium values at given temperatures. The large area salt tray and the circulating air ensure that the atmosphere within the oven reaches equilibrium rapidly.

OVEN, HUMIDITY, NON-INJECTION, *GALLENKAMP*, **60°C maximum,** as specified. With COMPENSTAT solid state thermostat, independent safety thermostat, cooling coil, solenoid valve, stainless steel liner, three perforated shelves, base-shelf, polypropylene salt tray, inner glass door and instructions. For single phase supplies.

OVR-200-010W	Oven, 220–240V 50Hz	**£932·63**
OVR-200-030Q	Oven, 110–120V 60Hz	**£943·88**

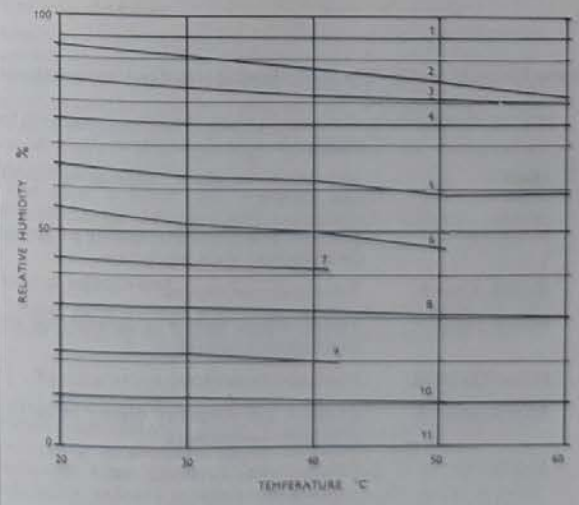
SPARE PARTS

OVR-220-030C	Salt tray	**£10·91**
OVR-220-070N	Shelf	**£8·66**

ACCESSORIES

Floor stand	*See OVH-740-L*
Wet and dry bulb hygrometer	*See HYT-470-050W*
Thermohygrograph	*See HYT-800-070K*

TEMPERATURES AND RELATIVE HUMIDITIES NORMALLY ATTAINABLE IN 20°C ambient temperature



Material to be placed in tray to obtain indicated values of relative humidity shown in graph

Curve No.	Material
1	Distilled water
2	Potassium nitrate – saturated solution
3	Potassium chloride – saturated solution
4	Sodium chloride – saturated solution
5	Sodium nitrite – saturated solution
6	Sodium dichromate – saturated solution
7	Potassium carbonate – saturated solution
8	Magnesium chloride – saturated solution
9	Potassium acetate – saturated solution
10	Lithium chloride – saturated solution
11	Silica gel – dried

For details of salts suitable for other relative humidities see:
Journal of Scientific Instruments, **25**, 1948, 73.
Measurement of Humidity, *Notes on Applied Science No. 4*, HMSO.

Gallenkamp HUMIDITY OVEN, 100°C

TO BS 3898 'LABORATORY HUMIDITY OVENS (INJECTION TYPE)' WITH STEAM INJECTION HUMIDIFIER

For climatic and durability tests of electrical and electronic apparatus materials and components, for accelerated weathering tests of surface coatings and packing materials, for simulated tropical and extreme tropical conditions and for various botanical and zoological investigations

- **Temperature control to within ±0·5°C**
- **Up to nearly 100% relative humidity at all operating temperatures**
- **Insulated stainless steel humidity chamber**
- **Welded steel outer case with castors for easy movement**
- **Air circulation by powerful centrifugal fan**
- **Adjustable safety thermostat**

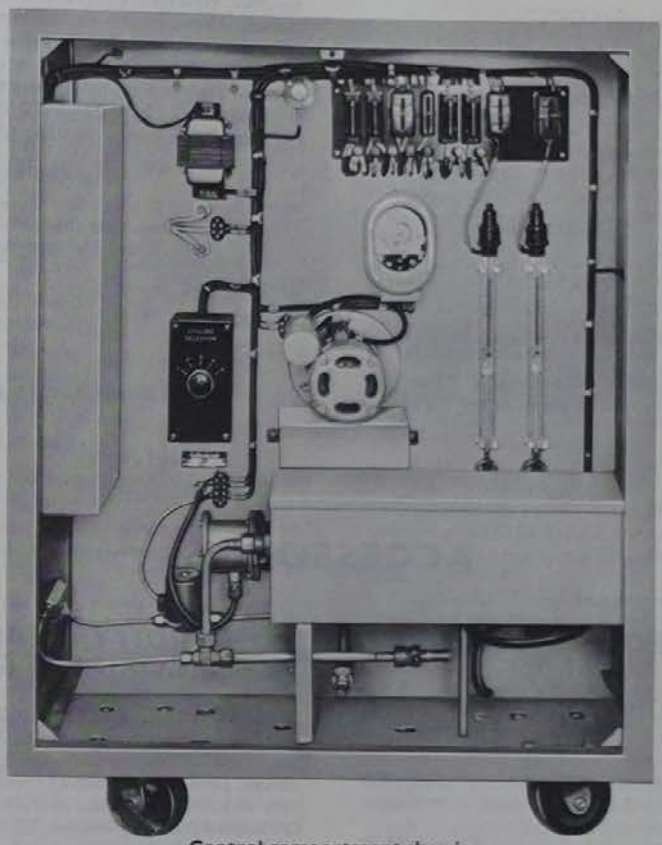


OVR-400 with OVR-580

Suitable for many of the dry heat, damp heat, tropical exposure and life tests specified in the following standard test methods:

BS 2011	Basic climatic and durability tests for components for radio and allied electronic equipment.
DEF 133	Climatic, shock and vibration testing of service equipment.
DEF 1234	General requirements for packaging supplies for the services.
DEF 5011	Climatic and durability testing of service electronic components.
DTD 919B	Electroplating of aluminium, steel and copper with silver and nickel.
DTD 1085C	Climatic testing of airborne instruments and equipment.
DTD 1086C	Climatic testing of ground instruments and equipment.
IEC 68, 2nd Edition	Basic environmental testing procedures for components for electronic equipment.
ISAT	Intensified standard alternating trials, series A & B.
K 114, Issue 2	Climatic and durability testing of service telecommunication equipment.
K 1007, Issue 3	Semiconductor devices.
MIL-E-5272C	Environmental testing of aeronautical and associated equipment.
MIL-STD-202B	Methods 103 and 106
RCS 11, Issue 5	Climatic and durability testing of service electronic components.
RIC 11	Climatic and durability tests for components for radio and other electronic equipment.

Gallenkamp HUMIDITY OVEN



Control compartment showing programme controller OVR-720

PERFORMANCE AND CONSTRUCTION OF BASIC HUMIDITY OVEN

Humidity chamber

Constructed from stainless steel and insulated with glass fibre, the humidity chamber is fitted with runners for 24mm grid wire shelves. Circulating air is ducted across the heater to top and bottom of the chamber. For rapid, accurate response, the bulbs of the controlling contact thermometers are placed close to the fan, within the air duct. Drainage is provided for accumulated condensate.

The door is fitted with a heated, double glazed window 300 × 300 mm for viewing of samples under test. The door closes to make the whole chamber substantially airtight.

Control equipment

A lift-out panel permits easy access to all control equipment and circuits including the connections to the front panel controls.

(1) Temperature control systems

Oven temperature is controlled to ±0·5°C by means of a dry bulb contact thermometer range 0 to 110°C. Protection from overheating is provided by an adjustable snap-action safety thermostat which can be preset in the range 20 to 100°C. The energy regulator in the heater circuit may be adjusted to provide the optimum average heating for the operating temperature.

(2) Humidity control system

Humidity is controlled by a second contact thermometer, the bulb of which is sleeved with a cotton wick which dips into a constant level water trough. This wet bulb thermometer is set at a temperature less than the nominal oven temperature by the depression equivalent to the required relative humidity. It is not possible to state actual figures for the humidity regulation obtained, as the percentage variations depend on working temperatures, but the wet bulb depression can be maintained to 0·5°C or better, when the controls are correctly set. External conditions can affect the working conditions at the lower end of the temperature range. Provision is made to reduce the control sensitivity when wider range temperature cycling is required.

Steam is produced in a small boiler and is introduced near the fan to ensure that it is rapidly dispersed throughout the chamber. The boiler is fed with water from a constant level cistern and is heated by an immersion heater. An integral safety thermostat is fitted. The system of direct steam injection is capable of giving practically 100% relative humidity at all temperatures. The minimum conditions obtainable depend on ambient humidity and temperature, but since the oven can be effectively sealed, low values of humidity can be obtained by using drying agents, the refrigeration accessory OVR-900 or the air injection fan OVR-860.

Technical data

Temperature range	0 to 100°C*
Temperature variation	±0·5°C
Humidity rating, r.h. maximum	above 95%
minimum	see note below
Power rating, maximum, kVA	3
Door opening, mm	710×710
Working volume, litres	390
Internal dimensions, height × width × depth, mm	710×810×685
Overall dimensions, height × width × depth, mm	1090×1220×790
Mass, kg	190

* For operation near or below ambient temperatures refrigeration equipment must be fitted.

Note: The minimum r.h. depends on ambient and operating temperatures. Low r.h. values can be obtained by the use of desiccants or salt solutions.

OVEN, HUMIDITY, *GALLENKAMP,* **100°C maximum,** as specified. With stainless steel humidity chamber, wet and dry bulb contact thermometers, ducted centrifugal fan, steam injection system, sheathed heater, safety thermostat, condensate drain and heated double glazed window in door. With instructions but **without** shelves. For single phase supplies.

OVR-400-010G Oven, 220–240V 50Hz **£2334·38**
OVR-400-030A Oven, 110–120V 60Hz **£2356·88**

SPARE PARTS

OVR-420-050D Contact thermometer **£21·49**
Insulating sleeve, PVC, placed over the bulb of the contact thermometer to increase the differential to between 2 and 3°C.
OVR-420-170Q Insulating sleeve **£0·45**
OVR-420-190K Wicks Pack of 10 **£1·07**

ACCESSORIES

MISCELLANEOUS FITTINGS

SHELF, wire mesh, two can be used in the oven.
OVR-440-E Shelf **£46·13**

EXTENSION LEGS, 300mm long to raise the oven above the floor in order that a large draining tray can be used in the absence of a suitable floor drain.
OVR-460-N Extension legs Set of 4 **£55·69**

PANEL, with bushings, for making electrical connections to equipment inside the oven. Comprises a detachable metal panel 130×130mm fitted with four bushings rated at 5000V 30A, and suitable for frequencies up to 200MHz. Must be ordered with the humidity oven.
OVR-490-P Panel **£65·25**

Note that other bushings can be fitted and that cables can alternatively be taken through the ventilation aperture.

REMOTE CONTROL KNOB, for operating the controls of equipment under test inside the oven. Comprises an 8mm diameter rod in a plain bearing fitted at one end with a control knob. The other end projects inside the oven and can be coupled through a suitable driving link to the equipment under test. The knob is fixed to the end wall opposite to the control compartment approximately in the centre. Must be ordered with the humidity oven.
OVR-520-K Remote control knob **£6·02**

TREATMENT OF WATER SUPPLY TO HUMIDITY OVEN

In hard water areas it is advisable to supply the boiler with deionised or distilled water to prevent the deposition of chalk.

HUMIDITY MEASURING AND RECORDING EQUIPMENT

HYGROMETER, RECORDING, wet and dry bulb with synchronous electric motor giving 24 hour rotation. The recorder charts are 300mm diameter with range 0 to 100°C. With water trough, piping for connecting trough to oven water system, wet bulb wick, mains cable and instructions.

OVR-580-010L Hygrometer, 220–240V 50Hz **£321·75**
OVR-580-030F Hygrometer, 110–120V 60Hz **£471·38**

SPARE PART

OVR-590-050P Wicks Pack of 5 **£7·99**



WET AND DRY BULB HYGROMETER

See HYT-470-050W

THERMOHYGROGRAPH

See HYT-800-070K

Gallenkamp HUMIDITY OVEN

PROGRAMME CONTROL SYSTEMS

The systems must be ordered with the humidity oven

■ SIMPLE TIME CONTROLLER

Either or both air heater and boiler can be switched on and off at adjustable times. The oven can thus be cycled between controlled conditions and approximately ambient conditions once every 24 hours.

TIME SWITCH, as specified, with 24 hour dial and one pair of contact arms.

OVR-700-010F Time switch, 220–240V 50Hz **£39·38**
OVR-700-030W Time switch, 110–120V 60Hz **£39·38**

■ GENERAL PURPOSE PROGRAMME CONTROLLER

Provides the following programmes:

1. Continuous control by wet and dry bulb contact thermometers time switch and spray cooling inoperative.
2. As 1 but with time switch producing automatic cycling between controlled conditions and approximately ambient once every 24 hours.
3. As 2 but with water spray operating during cooling period.
4. Heating by boiler only with time switch producing automatic cycling between any temperature and approximately ambient temperature with near 100% r.h. throughout. Spray cooling inoperative.
5. Heating by air heater only and time switch producing automatic cycling between any temperature and approximately ambient once every 24 hours.

These programmes are suitable for general damp heat and simulated tropical exposure tests including the following standard methods:

Dry heat tests to: BS 2011, DEF 133, DEF 5011, DTD 1086C, RCS 11 and RIC 11.

Damp heat or accelerated damp heat tests to: BS 2011, DEF 133, DEF 5011, IEC 68, K 114, K 1007 method A, RCS 11 and RIC 11.

Humidity tests to: DTD 919B, MIL-STD-202B method 103A and MIL-E-5272C procedure 3.

Tropical exposure and life tests to: DEF 133, DTD 1085C, DTD 1086C, K 114 and RCS 11.

Other tests: K 1007 method B and MIL-E-5272C procedure 1.

PROGRAMME CONTROLLER, general purpose, as specified including OVR-840 water spray cooler, OVR-700 time switch and five-position switch.

OVR-720-010X Programme controller, 220–240V 50Hz **£138·38**
OVR-720-030Y Programme controller, 110–120V 60Hz **£138·38**

■ PROGRAMME CONTROLLER for K 1007 and MIL-STD-202

By the addition of an extra contact thermometer, a time switch with two contact arms, a water spray cooler, a relay and a switchbox, the oven can be made to reproduce automatically the cycle specified in specification K 1007 method C and MIL-STD-202B method 106A.

PROGRAMME CONTROLLER, K 1007 and MIL-STD-202B, as specified including additional contact thermometer, time switch, water spray cooler, relay and switchbox.

OVR-740-010A Programme controller, 220–240V 50Hz **£138·38**
OVR-740-030R Programme controller, 110–120V 60Hz **£138·38**

PROGRAMME CONTROLLER, providing the combined facilities of the OVR-720 general purpose programme controller, and OVR-740 programme controller for K 1007 and MIL-STD-202B.

OVR-760-010J Programme controller, 220–240V 50Hz **£219·38**
OVR-760-030D Programme controller, 110–120V 60Hz **£219·38**

■ PROGRAMME CONTROLLER for ISAT test schemes

By the addition of extra contact thermometers, a 3-pole changeover time switch and selector switches the oven can be made to reproduce the A and B test schedules of the Ministry of Supply Intensified Standard Alternating Trials (ISAT).

PROGRAMME CONTROLLER for ISAT test schedules as specified including contact thermometers, time switch and selector switches.

OVR-780-010S Programme controller, 220–240V 50Hz **£274·50**
OVR-780-030M Programme controller, 110–120V 60Hz **£274·50**

SPARE PARTS

OVR-790-050W Thermometer, fixed contact, 115°F **£10·13**
OVR-790-070Q Thermometer, fixed contact, 167°F **£12·15**

ACCESSORY

Hygrometer, recording, as OVR-580 but with 7-day chart.

OVR-790-506F Hygrometer, 220–240V 50Hz **£429·75**
OVR-790-516C Hygrometer, 110–120V 60Hz **£429·75**

ACCELERATED COOLING AND DRYING EQUIPMENT

COOLER, WATER SPRAY, for increasing the cooling rate of the oven and for maintaining standard saturated conditions during cooling periods. Comprises an atomising spray connected to the water system through a filter and a solenoid valve which is controlled by the wet bulb contact thermometer. An isolating switch enables the oven to be used without spray cooling.

OVR-840-010P Cooler, 220–240V 50Hz **£51·75**
OVR-840-030J Cooler, 110–120V 60Hz **£51·75**

FAN, AIR INJECTION, for reducing the relative humidity in the oven rapidly and for maintaining relative humidities close to the theoretical minimum for the ambient conditions. A centrifugal fan blows room air into the control compartment. An isolating switch is fitted.

OVR-860-010B Fan, 220–240V 50Hz **£56·25**
OVR-860-030S Fan, 110–120V 60Hz **£56·25**

Gallenkamp

REFRIGERATION EQUIPMENT

For operating the oven at temperatures below ambient or for dehumidifying. The oven is not suitable for operation below 0°C.



OVR-400 with refrigeration equipment

Ambient temperature, °C	20	25	30	35	40	43
Minimum working temperature, °C	0	3	6	9	11	13

The refrigerator is mounted on the top of the oven. In use it is run continuously and temperature control is provided by the dry bulb contact thermometer in conjunction with the oven heater. Excess pressure and overload protection devices are built in.

REFRIGERATION EQUIPMENT, as specified, for operation in locations where the ambient temperature does not exceed 35°C. Must be ordered with the humidity oven.

OVR-900-010M Refrigeration equipment, 220–240V 50Hz **£474·75**

OVR-900-030G Refrigeration equipment, 110–120V 60Hz **£474·75**

REFRIGERATION EQUIPMENT, as specified, for operation in locations where the ambient temperature does not exceed 50°C. Must be ordered with the humidity oven.

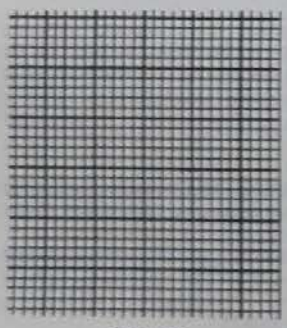
OVR-920-010V Refrigeration equipment, 220–240V 50Hz **£478·13**

OVR-920-030P Refrigeration equipment, 110–120V 60Hz **£478·13**

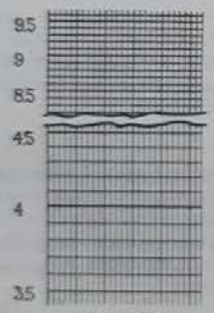
PAPERS

GRAPH PAPER

Ruled on A4 size (297 × 210mm) paper unless otherwise specified



PBH-200
PBH-220



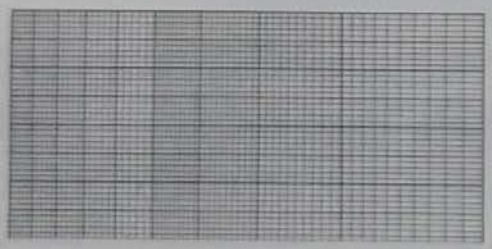
PBH-250

GRAPH PAPER, linear millimetre and centimetre rulings. Ruled area 280 × 190mm, printed on one side only with plain margins. In pad of 50 sheets.

PBH-200-L Graph paper Pack **£0·88**

GRAPH PAPER, linear millimetre and centimetre rulings. Ruled width 700mm, total width 750mm, printed on one side only. In 10m roll.

PBH-220-U Graph paper Pack **£2·59**



PBH-290

GRAPH PAPER, logarithmic, one cycle × linear millimetre and centimetre rulings. Ruled area 180 × 180mm, printed on one side only. In pad of 25 cartridge quality sheets.

PBH-250-W Graph paper Pack **£1·05**

GRAPH PAPER, logarithmic, as PBH-250-W but one cycle × one cycle.

PBH-270-Y Graph paper Pack **£1·09**



PBH-330

GRAPH PAPER, logarithmic, as PBH-250-W but three cycle × linear millimetre and centimetre rulings and ruled area 250 × 180mm.

PBH-290-R Graph paper Pack **£1·13**

GRAPH PAPER, isometric grid, 5mm equilateral triangle rulings. Ruled area 258 × 206mm, total area 286 × 222mm, printed on one side only. In pad of 50 sheets.

PBH-330-F Graph paper Pack **£1·35**

GRAPH NOTEBOOK

GRAPH NOTEBOOK comprising 80 A4 size (297 × 210mm) pages with linear millimetre and centimetre rulings on left hand pages and feint ruled lines with margin on right hand pages, with semi-stiff cover.

PBH-380-Q Graph notebook **£0·50**

GLAZED SAMPLING PAPER

PAPER, GLAZED SAMPLING, in sheets 500 × 380mm.

PBH-610-010P Paper, glazed sampling, black
Pack of 25 sheets **£2·40**

PBH-610-030J Paper, glazed sampling, white
Pack of 25 sheets **£2·40**

ABSORBENT PAPER

PAPER, ABSORBENT, *BENCHKOTE*, in sheets 570 × 460mm, backed with polythene film to prevent liquids penetrating right through and to give the material wet strength and durability. Recommended as a disposable covering for benches, animal cages, humidity cabinets, etc. either to localise spillage or for the collection of falling particles. Particularly useful in radiochemical and bacteriological laboratories.

PBH-690-Y Paper, absorbent Pack of 50 sheets **£6·22**

PAPER, ABSORBENT, *BENCHKOTE*, as PBH-690-Y but in 50m roll.

PBH-710-030B Paper, absorbent, 460mm wide **£11·11**
PBH-710-050S Paper, absorbent, 920mm wide **£20·90**

PAPER, asbestos *See Asbestos*
PAPER, chromatographic *See Chromatography*
PAPER, filter *See Filter papers*
PAPER, sieve analysis *See Sieves*

TEST PAPERS

TEST PAPERS, chemical, in pack of 10 books each of 20 leaves 67 × 12·5mm.

Indicator	Application	Colour change
Cobalt chloride	Moisture	Pink–blue
Lead acetate	Hydrogen sulphide	White–black
Starch iodide	Oxidising agents	White–blue

PBK-210-030L Test papers, cobalt chloride Pack **£0·59**
PBK-210-070W Test papers, lead acetate Pack **£0·52**
PBK-210-110N Test papers, starch iodide Pack **£0·61**

TEST PAPERS, pH, in pack of 10 books each of 20 leaves 65 × 10mm.

Indicator	pH range	Colour change
Red litmus	5 to 8	Red–blue
Blue litmus	5 to 8	Blue–red
Neutral litmus	–	To red or blue

PBK-260-030W Test papers, red litmus Pack **£0·52**
PBK-260-050Q Test papers, blue litmus Pack **£0·54**
PBK-260-070K Test papers, neutral litmus Pack **£0·54**

TEST PAPERS, pH, range 1 to 11, in pack of 10 books each of 20 leaves 65 × 10mm, with reference chart on book cover showing colour change in steps of 1 pH.

PBK-320-F Test papers, 1 to 11 pH Pack **£0·74**

TEST PAPERS, pH, *WHATMAN-BDH*, 5m long × 10mm wide in reel dispenser with reference chart on side showing colour changes.

Indicator	pH range	Colour change
Red litmus	5 to 8	Red–blue
Blue litmus	5 to 8	Blue–red
Phenolphthalein	8·5 to 10	Colourless–red
Congo red	3 to 5	Violet–orange

PBK-370-030H Test paper, 1 to 14 pH Pack of 4 reels **£1·76**
PBK-370-050B Test paper, 1 to 4 pH Pack of 4 reels **£1·76**
PBK-370-070S Test paper, 4 to 6 pH Pack of 4 reels **£1·76**
PBK-370-090M Test paper, 6 to 8 pH Pack of 4 reels **£1·76**

PBK-370-110J Test paper, 8 to 10 pH Pack of 4 reels **£1·76**
PBK-370-130D Test paper, 10 to 12 pH Pack of 4 reels **£1·76**
PBK-370-150U Test paper, 12 to 14 pH Pack of 4 reels **£1·76**

PBK-370-230W Test paper, red litmus Pack of 4 reels **£1·76**
PBK-370-250Q Test paper, blue litmus Pack of 4 reels **£1·76**
PBK-370-270K Test paper, phenolphthalein Pack of 4 reels **£1·76**
PBK-370-290E Test paper, congo red Pack of 4 reels **£1·76**



PBK-370

pH MEASUREMENT

pH METERS *See PHJ-250-F*

COMPARATOR *See COH-300-Q*

NESSLERISER *See COH-550-L*

Technico ANDREASEN PARTICLE SIZE APPARATUS

For the determination of particle sizes in materials such as clays, minerals, ceramics, pulverised fuel, cement, etc., by the pipette sampling method as specified in BS 3406 Part 2

By agreement with Professor A. H. M. Andreasen of Copenhagen, we hold the sole rights of manufacturing and selling this apparatus in Great Britain, Northern Ireland, Eire, the Commonwealth, and North and South America.



PBW-200



PBW-220-508

Operation

A weighed quantity of powder is shaken with a definite volume of water or other liquid in which it can be dispersed, so that a homogeneous suspension is produced. By means of the pipette, using the 2-way stopcock, 10ml portions of the suspension are extracted from the bottom of the bottle after measured intervals of time, and are transferred to weighed dishes. The contents of the dishes are evaporated to dryness and weighed. Since the times taken by particles to fall through the test distance of 200mm in the suspension depends on their sizes, the particle size distribution in the powder can be determined from the masses of residue and the elapsed times.

References

H. Heywood, 'Measurements of the fineness of powdered materials', *Trans. Inst. of Mech. Engineers*, Dec. 1938.

George A. Lomis, 'Grain size of whiteware clays as determined by the Andreasen pipette', *Jour. Amer. Ceramic Soc.*, **21**, 1938, No. 11.

PARTICLE SIZE APPARATUS, Andreasen, *TECHNICO*, as specified, with bottle graduated 0 to 20cm fitted by 29/32 joint with standard 10ml pipette. With instructions.

PBW-200-W	Particle size apparatus	**£17·10**

SPARE PARTS

PBW-220-050Q	Bottle, with 29/32 socket	**£11·25**
PBW-220-090E	Pipette, with 29/32 cone	**£6·86**

ACCESSORY

Pipette, TECHNICO, 10ml capacity with 29/32 cone, modified for use with exceptionally fine materials using a sampling depth of 20mm.

PBW-220-508S	Pipette	**£10·97**

METTLER SEDIMENTATION CYLINDER

According to Professor Leschonski

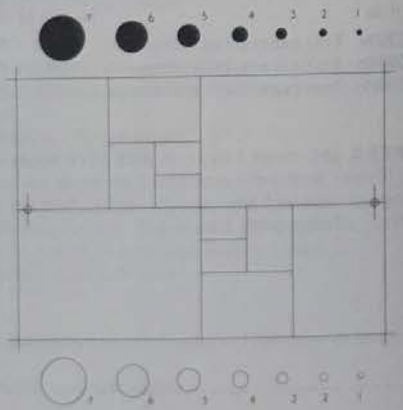
- **Suitable for particle size determinations between 1 and 50 μm**
- **Sample mass 0·1 to 2·5g**
- **Sedimentation height 200mm**

SEDIMENTATION CYLINDER, *METTLER*, as specified, comprising 400ml calibrated glass tube, synthetic rubber seals, PTFE sedimentation cup and a support frame. All metal parts are stainless steel. The calibrated glass tube is jacketed to allow circulation of water. Requires but **does not include** a suitable weighing system. (F)

PBW-500-V	Sedimentation cylinder	**£1241·46**

Weighing system — *See BFL-240-N*

EYEPIECE GRATICULE to BS 3625



For the determination of particle size of powders

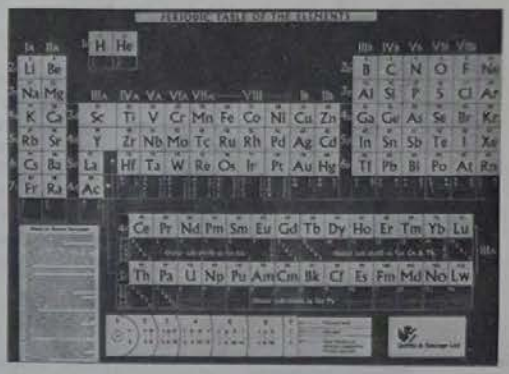
See MNH-370T

Paper sacks	*See Waste*
Parafilm	*See Sealing*
Pencils	*See Labels*
Petri dishes	*See Dishes*

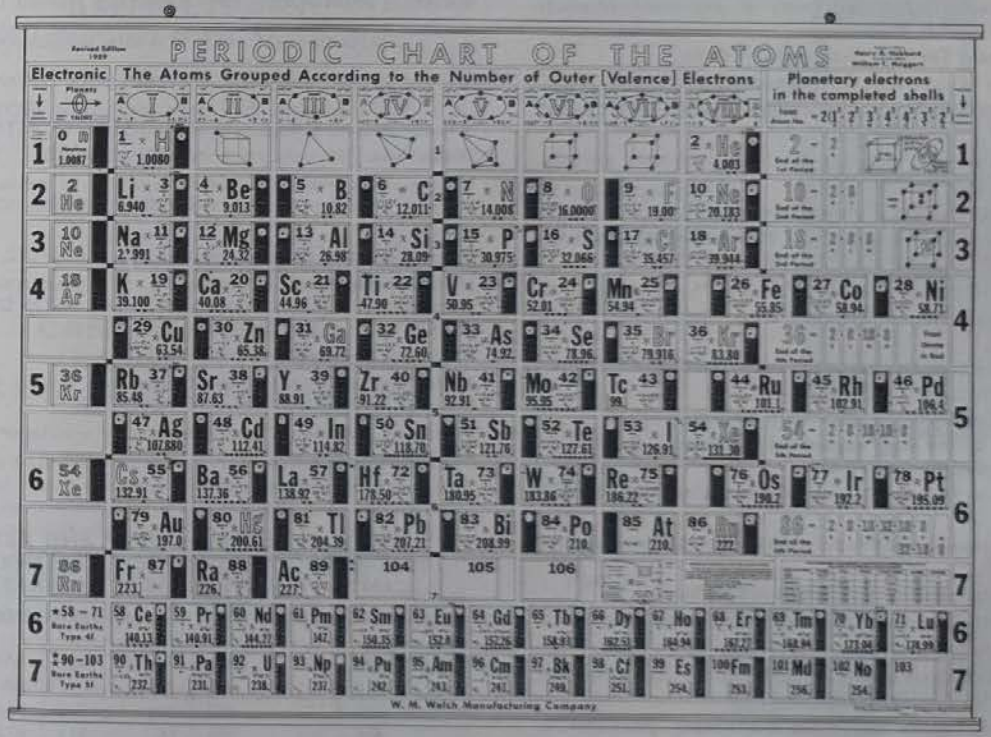
PERIODIC CHARTS

PERIODIC CHART, *GRIFFIN*, 1050 × 782 mm, printed on one side only for wall mounting. Lists the elements up to 103 Lw giving the symbol, atomic number and electron shell arrangement in each case and shows the group classifications. The chart also incorporates some explanatory notes on atomic structure.
PDK-250-Q Periodic chart **£2-45**

PERIODIC CHARTS, *GRIFFIN*, 298 × 208 mm, printed on both sides, for class distribution. One side printed similarly to PDK-250-Q and the reverse side lists the elements in alphabetical sequence giving name, symbol, atomic number and atomic mass, based on carbon-12.
PDK-280-S Periodic charts Pack of 50 **£3-38**



PDK-250



PDK-500

PERIODIC CHART, Meggers, originally designed by H. D. Hubbard of the American National Bureau of Standards. A large multi-coloured chart, 1·1 × 1·5 m wide, printed on heavy paper finished with matt plastics protective surface, with metal rims at top and bottom and eyelets for hanging. Clearly presents the principal facts of all known elements and their atoms; recently discovered transuranic elements are included. In each case atomic number, atomic weight and symbol are shown in large display type, and in most cases some 30 other items of information are given. The chart is supplied with a 48-page explanatory booklet containing further useful information. (F)
PDK-500-E Periodic chart **£11-48**

PETROLEUM TESTING

GALLENKAMP can provide much of the apparatus required for Institute of Petroleum (IP), American Society for Testing and Materials (ASTM) and similar methods of test of petroleum and its products.

In this section are listed specialised instruments and apparatus for petroleum testing. The items listed under any given heading are not necessarily an exhaustive list of all items required for the particular test. Most test methods also require routine apparatus – ovens, furnaces, beakers, flasks, hotplates, etc. – in addition to the special instrumentation. A footnote to all such entries indicates where the listed apparatus is incomplete for the test and we will be pleased to quote for the supplementary apparatus needed on receipt of details of the test to be performed.

Acidity (inorganic) of petroleum products, colour indicator titration method. Method: IP 182.

Asphaltenes precipitation with *n*-heptane. Method: IP 143.

Carbon residue (Ramsbottom) of petroleum products. Method: ASTM D524-IP 14.

Chromometer Saybolt. Method: ASTM D156.

Cloud point of petroleum oils. Method: ASTM D2500-IP 219.

Colour (ASTM) of petroleum products. Method: ASTM D1500-IP 196.

Copper corrosion, detection of, from petroleum products. Method: ASTM D130-IP 154.

Corrosive substances in grease. Method: IP 112.

Distillation of petroleum products. Methods: ASTM D86-IP 123, ASTM D216-IP 191, IP 195, ASTM D1078, DIN 51751.

Drop point of grease. Methods: IP 31, BS 894.

Dropping point of lubricating grease. Method: ASTM D566-IP 132.

Existent gum in fuels by jet evaporation. Method: ASTM D381-IP 131.

Flash point by the Abel apparatus. Method: IP 170.

Flash point by the Abel apparatus Petroleum (Consolidation) Act 1928 method. Method: IP 33.

Flash point by Pensky-Martens closed tester. Method: ASTM D93-IP 34.

Flash point (open) and fire point by Pensky-Martens apparatus. Method: IP 35.

Flash point by equilibrium method, Setaflash.

Flash point by Tag closed tester. Method: ASTM D56.

Freezing point of aviation fuels. Method: ASTM D2386-IP 16.

Heat of combustion of liquid fuels (calorific value). Methods: IP 12, ASTM D240, ASTM D2382.

Hydrocarbon types in liquid petroleum products by fluorescent indicator adsorption. Method: ASTM D1319-IP 156.

Lead in gasoline, gravimetric method. Method: ASTM D526-IP 96.

Neutral oil. Method: STPTC PC4 and GB5.

Olefinic plus aromatic hydrocarbons in petroleum distillates. Method: ASTM D1019-IP 145.

Oxidation stability of aviation fuels, potential residue method. Method: ASTM D873-IP 138.

Oxidation stability of motor gasoline, induction period method. Method: ASTM D525-IP 40.

Penetration, needle methods for bitumen and waxes. Cone methods for petrolatum and greases. Methods: ASTM D5-IP 49, ASTM D217-IP 50, ASTM D937-IP 179, IP 167, ASTM D1321.

Greaseworker, mechanical. Methods: ASTM D217-IP 50, IP 167.

Pour point of petroleum oils. Method: ASTM D97-IP 15.

Relative density and density. Methods: IP 59, IP 189, IP 190, ASTM D70, D941, STPTC V12, V14.

Sediment in crude and fuel oils by extraction. Method: ASTM D473-IP 53.

Smoke Point. Methods: IP 57, ASTM D1322.

Softening point of asphalt (bitumen) **and tar** in ethylene glycol. Method: ASTM D2398-IP 198.

Softening point of bitumen, ring and ball. Method: IP 58.

Sulphur in petroleum products, lamp method. Method: ASTM D1266-IP 107.

Vapour pressure, liquefied petroleum gases. Methods: IP 161, ASTM D1267.

Vapour pressure, Reid method. Methods: IP 69, ASTM D323.

Viscometer, Saybolt. Methods: ASTM D88, E102.

Viscometers, standard tar for viscosity of refined tar and viscosity cutback of bitumen and road oil. Methods: STPTC RT2, RT3, IP 72.

Viscosity, bitumen road emulsion. Method: IP 212, BS 434.

Viscosity Kinematic of transparent and opaque liquids and the calculation of dynamic viscosity. Methods: ASTM D945-IP 71, BS 188.

Viscosity, Redwood.

Water and sediment in crude and fuel oils by centrifuge. Methods: ASTM D1796-IP75, ASTM D91, D96.

Water in petroleum and bitumen by distillation. Method: ASTM D95-IP 74.

INDEX OF NUMBERS OF IP AND ASTM TEST METHODS FOR WHICH GALLENKAMP CAN SUPPLY SPECIALISED APPARATUS

IP NUMBERS				ASTM NUMBERS			
IP	Page	IP	Page	ASTM	Page	ASTM	Page
12	510	112	496	D		D	
14	495	123	497	5	512	566	505
15	496	131	506	56	511	873	511
16	510	132	505	70	513	937	512
31	505	138	511	86	497	941	512
33	506	143	495	88	516	945	517
34	507	145	511	91	517	1019	511
35	509	154	496	93	507	1078	497
40	511	156	511	95	517	1266	514
49	512	161	515	96	517	1267	515
50	512	167	512	97	496	1319	511
53	513	170	506	130	496	1321	512
57	513	179	512	156	495	1322	513
58	514	182	495	216	505	1403	513
59	513	189	513	217	512	1500	496
69	515	190	513	240	510	1796	517
71	517	191	505	323	515	2382	510
72	516	195	497	381	506	2386	510
74	517	196	496	445	517	2398	514
75	517	198	514	473	513	2500	496
96	511	212	516	524	495		
107	514	219	496	525	511	E	
				526	511	102	516

ACIDITY (INORGANIC) OF PETROLEUM PRODUCTS

Colour indicator titration method. Method: IP 182.

FLASK, two-neck, borosilicate glass, 500ml with two 19/26 sockets, heating tube, stopcock. Complete with 250W heater winding terminating in a connector block.

PEB-200-P Flask, 230–250V **£18·56**

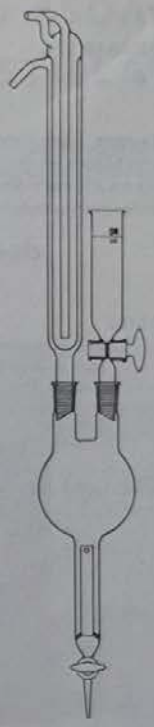
REFLUX CONDENSER, borosilicate glass, length 300mm, with 19/26 cone.

PEB-210-Y Reflux condenser **£9·06**

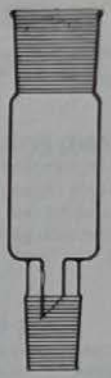
TAP FUNNEL, with mark at 50ml and 19/26 cone.

PEB-220-B Tap funnel **£4·73**

This method requires items of general apparatus in addition to that listed above.



PEB-200 to PEB-220 (Heater winding not illustrated)



PEB-300

ASPHALTENES

Precipitation with *n*-heptane. Method: IP 143.

EXTRACTOR, borosilicate glass, with 24/29 cone and 34/35 socket.

PEB-300-H Extractor **£4·16**

Basin, evaporating, capacity 100ml *See BHT-370-050N*
Flask, conical, borosilicate glass, 250ml *See QFY-430-B*
Condenser, Davies, double surface, borosilicate glass, 20cm jacket with 34/35 cone *See QCH-670-W*



PEB-350

CARBON RESIDUE (RAMSBOTTOM)

of petroleum products. Method: ASTM D524-IP 14.

HEATING BLOCK, electrically heated, with accurate temperature control. Comprises a solid cylindrical metal block with five wells. The block is mounted in a well lagged case. An automatic indicating temperature controller which is mounted on a supporting frame above the heating block operates from a thermocouple in a block. For single phase supplies. (F)

PEB-350-010P Heating block, 220–240V 50Hz **£998·80**
PEB-350-030J Heating block, 110–120V 60Hz **£998·80**



PEB-360

COKING BULBS, borosilicate glass.

PEB-360-L Coking bulbs Pack of 10 **£5·96**

CONTROL BULB, comprising stainless steel bulb and thermocouple for checking compliance of heating block with required test performance. (F)

PEB-370-E Control bulb **£39·60**

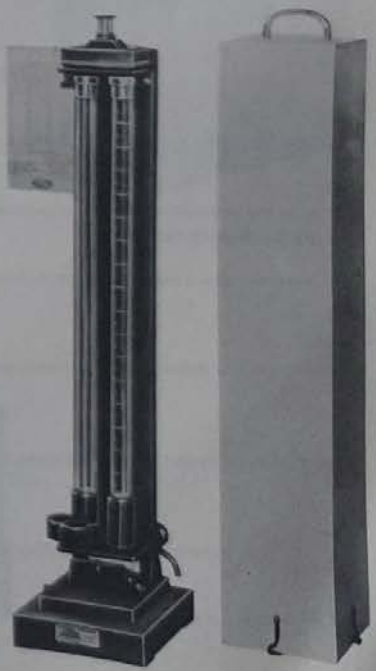
This method requires items of general apparatus in addition to that listed above.

CHROMOMETER SAYBOLT.

Method: ASTM D156.

CHROMOMETER, SAYBOLT, with daylight lamp built into the base of the instrument and three-position turret for discs (¼, 1 and 2). Complete with three standards, conversion table, frosted mirror and carrying case. For a.c. single phase supplies. (F)

PEB-480-010J Chromometer, 220–240V **£462·00**
PEB-480-030D Chromometer, 110–120V **£462·00**



PEB-480

CLOUD POINT

of petroleum oils. Method: ASTM D2500-IP 219. ASTM D97-IP15

CLOUD AND POUR POINTS BATH, six-test, comprising cylindrical copper tank, 230mm diameter, depth 165mm, on three feet, with loose copper cover fitted with six pockets and cork discs to take standard test jars, and central thermometer tubulure. **Without** test jars, gaskets or thermometers.

PEB-570-L Bath **£73·13**

SPARE PARTS AND ACCESSORIES

PEB-580-030S Cork ring gasket, for test jar Pack of 10 **£0·68**

PEB-580-050M Cork disc for test bath pockets. Pack of 10 **£0·73**

Test jar, borosilicate glass, internal diameter 32mm, overall length 120mm, with mark at 54mm from the bottom, fitted with cork.

PEB-580-504W Test jar **£0·53**

Thermometers, IP Cloud and Pour

See THT-260-030C to THT-260-150P



PEB-570 with accessories



PEB-700 with test jars



PEB-770

COLOUR (ASTM)

of petroleum products. Method: ASTM D1500-IP 196.

COLOUR COMPARATOR, for determining the colour of a wide variety of petroleum products such as lubricating oils, diesel oils and petroleum waxes. The metal housing contains a light source with daylight and opal filters, and front mounted angled optical eyepiece which splits the field of view into two sections, one accepting light transmitted by the sample and the other light passed by the colour standards. Sixteen colour standards are mounted in a rotating turret, and the reference number of the standard viewed appears in an illuminated window near the eyepiece. Supplied complete with case which acts as a stand for the comparator. For 220–240V a.c. single phase supplies. **Without** test jars.

PEB-700-V Colour comparator **£313·50**

SPARE PART

PEB-710-010L Lamp, colour temperature 2750°K, 220–240V **£0·83**

ACCESSORIES

PEB-710-504J Sample container, for referee work **£0·88**

Cloud and Pour test jar, for routine work

See PEB-580-504W

COPPER CORROSION

Detection of, from petroleum products. Method: ASTM D130-IP 154.

COPPER CORROSION ASSEMBLY, comprising thermostatic water bath with capacity for 8 corrosion bombs or rack for 24 cylindrical test tubes. Supplied with pack of 24 copper strips, vice for holding 4 copper strips and flat viewing test tubes. **Without** bombs, cylindrical test tubes or thermometer. For single phase supplies. (F)

PEB-770-010P Copper corrosion assembly, 220–240V 50Hz **£392·70**

PEB-770-030J Copper corrosion assembly, 110–120V 60Hz **£392·70**

SPARE PARTS

PEB-780-030C Test tube, flat. (F) **£2·48**

PEB-780-050T Copper strips. (F) Pack of 24 **£14·03**

PEB-780-070N Vice for 4 strips. (F) **£57·75**

ACCESSORIES

Low pressure bomb and cap, stainless steel, with sulphur free gasket.

PEB-780-504G Low pressure bomb. (F) **£77·55**

PEB-780-514D Rack, for 24 cylindrical test tubes. (F) **£26·40**

Test tubes, 150 × 25mm *See TES-630-190M*

Thermometer, IP 64C *See THT-298-450D*

CORROSIVE SUBSTANCES IN GREASE

Method: IP 112.

Beaker, 100ml *See BNB-340-030Q*

Copper strips *See PEB-780-050T*



PEB-780

Gallenkamp ASDA
AUTOMATIC STANDARD DISTILLATION APPARATUS

The ASDA apparatus is a fully automated instrument designed to perform standard distillation tests to ASTM, IP, DIN and other internationally recognised specifications



Suitable for the following standard test methods:

ASTM D86-IP 123 Groups 1, 2, 3 and 4
IP 195
ASTM D1078
DIN 51751

and similar specifications.

- **Available optionally with flat bed chart recorder or print-out**
- **High degree of automation and grouped controls minimise operator fatigue and human error**
- **Simple programming procedure**
- **Self resetting timers**
- **Automatic sequencing after start button pressed**
- **Optional bath cooling systems**
- **Narrow temperature range modules available**
- **Dry point detector available**

Suitable for the following products:

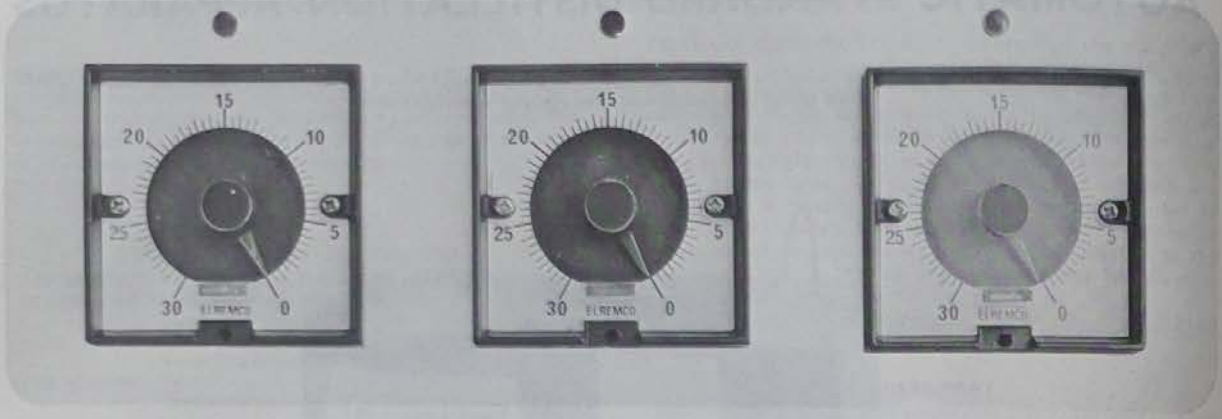
Solvents and naphthas
Gasolines
Fuel oils
Gas and heating oils
Aviation and fuel kerosenes
Diesel fuel
Derv and TVO

and other organic liquids with boiling vapour temperatures up to 400°C.

- **Non-sag low voltage heater**
- **Adjustable height flask heater assembly**
- **Platinum thermometer with stainless steel sheath**
- **Photoelectric first drop detection and meniscus following**
- **Receiver compartment at front with sliding door access**
- **Large doors and panels provide ready access to all internal assemblies**
- **Control circuits with pull out modules**
- **Solid state electronics on printed circuit boards for reliability and ease of servicing**

Gallenkamp

Gallenkamp ASDA



START to IBP | IBP to FHA | FHA to END POINT

GENERAL DETAILS

The distillation flask is heated in a draught shield fitted with a safety drain and a low voltage heater, the height of which can be adjusted to suit the flask simply by rotating a knob. The condenser tube is mounted in a polyurethane foam insulated stainless steel water bath, the temperature of which is controlled by an adjustable solid state COMPENSTAT thermostat. The condenser terminates in a receiver compartment which contains the first drop detector, receiver tilt mechanism, no receiver cutout and meniscus follower. The temperature of this compartment may be controlled by using one of the cooling outfit accessories listed, see page 503.

CHOICE OF MODELS

Four models are available giving options of chart or digital print readout and wide or narrow temperature ranges.

The first three models present the results of a distillation as a graph on a purpose-made chart. The fourth model gives a printed set of volume recovered/boiling vapour temperature figures.

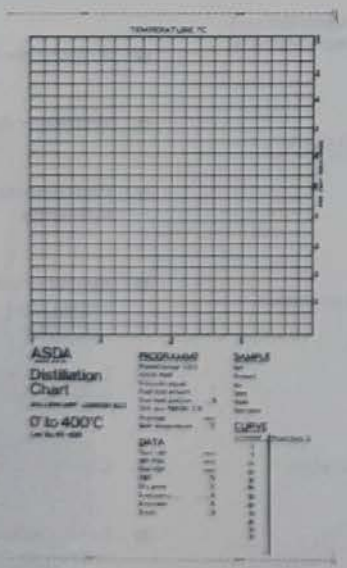
Chart recorder models may be adapted to other temperature ranges, after purchase, using alternative temperature range modules, see page 504.

CHART RECORDER MODELS

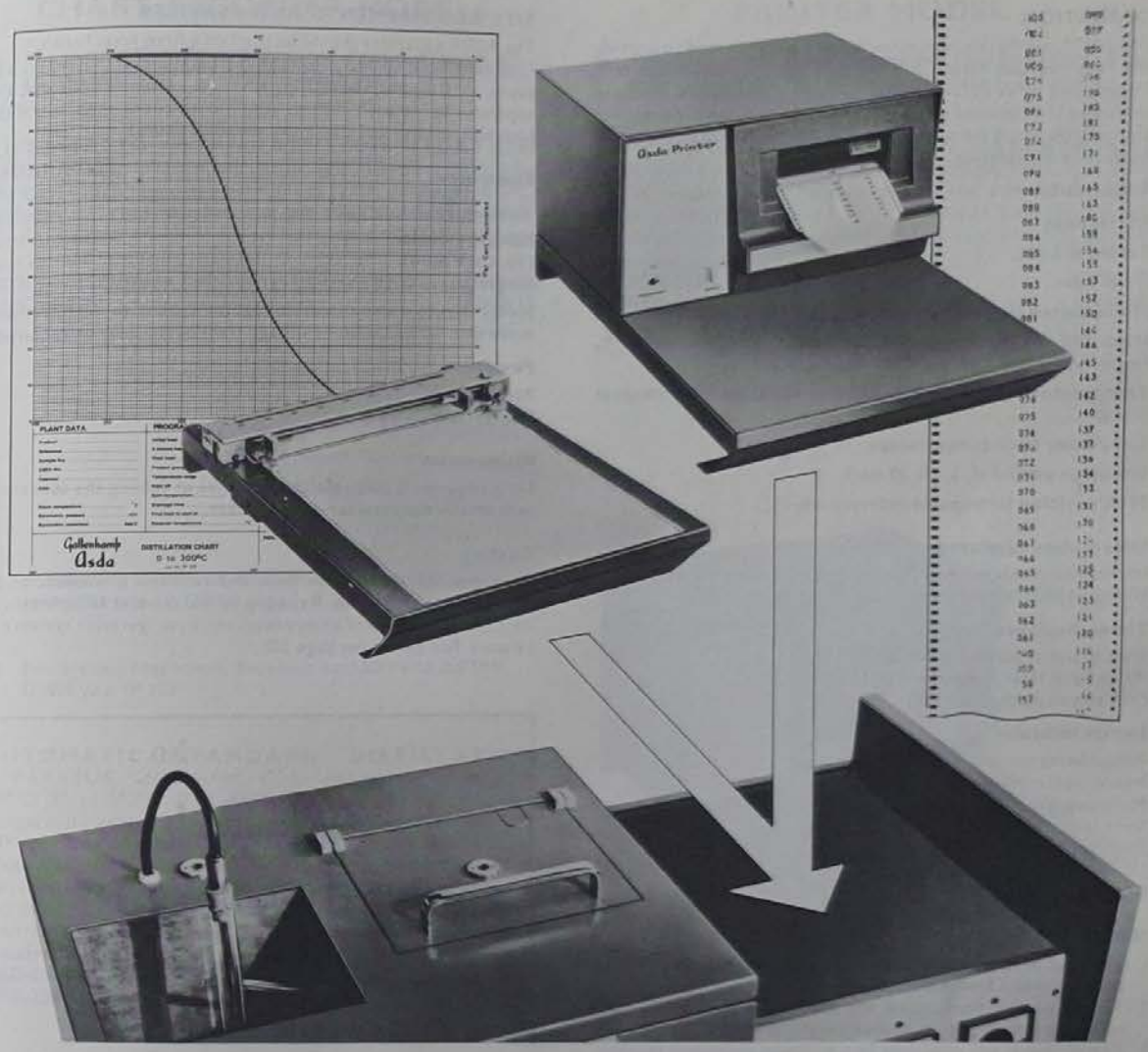
- **Flat bed recorder enables notes to be made on chart during test**
- **Distillation curves may be compared rapidly by superimposition of charts or special purpose masks**

The flat bed recorder accepts chart rolls and sheets 25cm wide ruled in °C or °F and % recovered. Readability of the charts is better than 0·5°C on wide ranges and 0·2% f.s.d. on narrow ranges. The pen is automatically placed on the chart at IBP and raised at Heat Off or the end of the drainage period.

The recorder incorporates an interval marker which makes a series of marks in the left hand margin of the chart. It is totally independent of the volume/temperature mechanism and uses a separate pen. The intervals between marks, which are made every 15 seconds, are a useful guide to operation and show very clearly whether or not a constant recovery rate has been maintained.



Gallenkamp ASDA



PRINTER MODEL

- **Results printed on paper strip and suitable for immediate reporting or for manual transfer into data processing systems**

- **Two print-out programmes are provided, with selection by switch, to give temperature data at:**

  A. IBP, every 5ml up to FHA, every 1 ml up to Heat Off and every 1 ml throughout the drainage period.

  B. IBP, every 1 ml up to the Heat Off and every 1 ml throughout the drainage period.

The accuracy of print-out on either programme is to the nearest 1°C between 0 and 400°C at the millilitre points specified. Although outside the limits of recording accuracy required by ASTM/IP specifications, (i.e. to the nearest 0·5°C at recovery volumes), results of this accuracy are widely acceptable for many applications within the petroleum and associated industries.

A manual print command pressbutton is fitted so that intermediate values of vapour temperature and volume recovered can be recorded as required.

Continued overleaf

Gallenkamp ASDA

OPERATION

The ASDA distillation apparatus is easily programmed to provide the required test results for the particular sample under test. Programme cards PED-440-270X provide a convenient means of recording the required settings. The following summary describes the controls which the operator sets and the indicators from which he derives information:

Controls to set:

Initial heat

5 minute heat

Final heat

Mode switch (automatic or manual)

Heat Off (final boiling point, dry point, temperature or % recovery)

Temperature range (0 to 300°C, 0 to 400°C, or other range as fitted)

Condenser bath temperature

Drainage period (0, 5, 10, 20 min)

FHA position (anticipated recovery less 7%)

Information displayed

Information displayed in addition to the printed record or graph of boiling vapour temperature/% sample recovered:

Times displayed for:

Start to Initial Boiling Point (IBP)
IBP to Final Heat Adjustment (FHA)
FHA to end point (Heat Off)

Lamps indicate:

Period being timed
Heater control operating
Mains supply ON or OFF
Start (test running)
Stop (test terminated)
Condenser bath thermostatting
Drainage period

Notes

1. The rate of recovery is fixed and automatically controlled at between 4 and 5 ml/min for a 100 ml receiver.
2. Timers on the front panel are automatically reset to zero when the start button is pushed for the next test.
3. Temperatures are measured by a platinum resistance thermometer which is compensated to agree with IP thermometer readings. This thermometer is stainless steel sheathed for strength.
4. The operator has a choice of four methods of test termination (Heat Off), viz. final boiling point, dry point, preselected temperature and preselected recovery.
5. At the end of every test the heater compartment (draught shield) is cooled by a powerful air blower and the meniscus follower returns to zero at the stage appropriate to the Heat Off programme selected.

OVERALL DIMENSIONS

	H.	W.	D.
Asda apparatus (Chart), mm, PED-200, PED-230, PED-260	550	1000	460
Asda apparatus (Printer), PED-350	700	1000	460
Asda apparatus (Chart), with cooling outfit PED-650	550	1000	570
Asda apparatus (Printer), with cooling outfit PED-650	700	1000	570
Refrigerator, PED-670	250	350	450

SITE REQUIREMENTS AND SERVICES

The ASDA apparatus should be sited on a **firm** level bench.

In conditions of high ambient temperature or humidity, e.g. above 30°C and/or above 70% r.h., it is recommended that the apparatus be installed in an air conditioned room, especially if the bath and receiver compartment are to be cooled.

Electricity

Voltage/Frequency

220–240 V 50 Hz
110–120 V 60 Hz
Single phase with earthed (grounded) neutral.

Note: Should mains supply voltage be subject to fluctuations of more than 10% a constant voltage transformer may be required.

Power

Asda: 2·5 kW
Refrigerator: 500 W

Mains water

Only required if user selects this means of cooling the condenser bath and/or the receiver compartment.

Cooling

In general, cooling of the bath and receiver is needed for all products except gas oils. If cooling by mains water or by means of ice cubes is insufficient or inconvenient, a refrigeration system can be used. For details see page 503.

No.

Gallenkamp

Asda REGD. PROGRAMME CARD

PRODUCT

REFERENCE

CONTROL SETTINGS

Initial Heat .....
5 Minute Heat .....
Final Heat .....
Mode .....
Temperature Range .....
Heat Off .....
Bath Temperature .....
Drainage Time .....
Final Heat to start at .....
Receiver Temperature .....
Zero Set Point Offset .....
Recorder Chart Range .....
Printer Programme .....

Handle samples in accordance with standard method
Clean condenser immediately before use

Gallenkamp ASDA

CHART RECORDER MODELS

■ **For testing Gasolines, Kerosenes, Fuel and Diesel oils to ASTM D86-IP 123 Groups 1, 2, 3 and 4**

AUTOMATIC STANDARD DISTILLATION APPARATUS, *GALLENKAMP ASDA*, temperature ranges 0 to 300°C (32 to 572°F) and 0 to 400°C (32 to 752°F), readability 0·5°C. With flat bed recorder. Requires but **does not include** flasks, receivers, heater boards and chart rolls. For single phase supplies with earthed (grounded) neutral.

PED-200-010P	Asda, 220–240V 50Hz	**£3920·63**
PED-200-030J	Asda, 110–120V 60Hz	**£3988·13**

■ **For testing Gasolines, Kerosenes, Fuel and Diesel oils to ASTM D86-IP 123 Groups 1, 2, 3 and 4**

■ **For testing Naphthas, Solvents and SBPs to ASTM D1078 and IP 195**

AUTOMATIC STANDARD DISTILLATION APPARATUS, *GALLENKAMP ASDA*, temperature ranges 0 to 300°C (32 to 572°F), 0 to 400°C (32 to 752°F) and 5 narrow temperature ranges which can be any combination of 10, 20 or 50°C spans within the range 50 to 400°C. Readability 0·5°C on wide ranges and 0·2% f.s.d. narrow ranges. With flat bed recorder. Requires but **does not include** flasks, receivers, heater boards and chart rolls. For single phase supplies with earthed (grounded) neutral. **When ordering, narrow temperature ranges required must be stated.**

PED-230-010R	Asda, 220–240V 50Hz	**£4286·25**
PED-230-030L	Asda, 110–120V 60Hz	**£4353·75**

■ **For testing Solvents and SBPs to ASTM D1078 and IP 195**

AUTOMATIC STANDARD DISTILLATION APPARATUS, *GALLENKAMP ASDA*, with 10 narrow temperature ranges which can be any combination of 10, 20 or 50°C spans within the range 50 to 400°C, readability 0·2% f.s.d. With flat bed recorder. Requires but **does not include** flasks, receivers, heater boards and chart rolls. For single phase supplies with earthed (grounded) neutral. **When ordering, narrow temperature ranges required must be stated.**

PED-260-010T	Asda, 220–240V 50Hz	**£4415·63**
PED-260-030N	Asda, 110–120V 60Hz	**£4483·13**

Note: PED-200, PED-230 and PED-260 require accessory PED-750 for automatic detection of dry point.

PRINTER MODEL

■ **For testing Gasolines, Kerosenes, Fuel and Diesel oils generally to ASTM D86-IP 123 Groups 1, 2, 3 and 4**

AUTOMATIC DISTILLATION APPARATUS, *GALLENKAMP ASDA*, temperature ranges 0 to 300°C and 0 to 400°C, readability to the nearest 1°C and 1ml. With digital printer. Requires but **does not include** flasks, receivers, heater boards and print rolls. For single phase supplies with earthed (grounded) neutral.

PED-350-010S	Asda, 220–240V 50Hz	**£3999·38**
PED-350-030M	Asda, 110–120V 60Hz	**£4066·88**



RECOMMENDED OUTFITS

For an initial working outfit we recommend the purchase of the following items selected according to requirements:

1. Basic ASDA apparatus	PED-200 or PED-230 or PED-260 or PED-350
2. Working Kit	PED-410-S and/or PED-420-L
3. Charts	Ten rolls of each Chart or Print Roll PED-490 range
4. Stand-by Spares Kit	PED-540-M
5. Maintenance Kit	PED-590-A
6. Multirange Meter	EHL-640-A
7. Decade resistance box	PED-610-C
8. Cooling Outfit	PED-650 or PED-670

Gallenkamp ASDA

INITIAL WORKING ACCESSORIES

GLASSWARE AND HEATER BOARDS

WORKING KIT, ASTM D86-IP 123, comprising: twelve 125ml distillation flasks; five 100ml receivers; five sets of heater boards, hole diameters 32, 38 and 50mm; one carton each corks, 11mm and 17mm small end diameters; two thermometers, −10 to 110°C; one pack programme cards and pullthrough assembly comprising nylon tubing and cloth.

PED-410-S	Working kit	**£69·75**

WORKING KIT, ASTM D1078 and IP 195, comprising: twelve 200ml distillation flasks; five 100ml receivers; five sets of heater boards, hole diameters 32, 38 and 50mm; one carton each corks, 11 and 21mm small end diameters; two thermometers, −10 to 110°C; one pack programme cards and pullthrough assembly comprising nylon tubing and cloth.

PED-420-L	Working kit	**£87·98**

SPARE PARTS

PED-440-030L	Receiver, 100ml, glass with metal foot	**£5·40**
PED-440-050F	Flask, 125ml, ASTM D86-IP 123	**£1·40**
PED-440-070W	Flask, 200ml, ASTM D1078 and IP 195	**£3·88**
	Heater boards, asbestos, 150 x 150mm with centre and fixing holes	
PED-440-150B	Heater board, 32mm hole	**£1·22**
PED-440-170S	Heater board, 38mm hole	**£1·22**
PED-440-190M	Heater board, 50mm hole	**£1·22**
PED-440-270X	Programme cards	Pack of 10 **£0·84**
	Corks, 11, 17 and 21mm small end	*See CSD-460*
	Nylon tubing	*See CBA-394-030S*
	Cloth	*See CMC-480-B*
	Thermometer −10 to 110°C	*See THL-340*

ACCESSORIES

Stoppers, silicone rubber, sizes 17 and 21 for flask necks *See SYH-700*

Stoppers, silicone rubber, sizes 36 and 51, used as a pair for flask sidearms *See SYJ-350*

Silicone rubber stoppers although not specified in ASTM and IP tests have been found to be more effective than cork for many applications.

CHART AND PRINT ROLLS

Charts are printed with Recovery and Temperature axes and with a data column for completion by the operator.

Chart rolls are 250mm wide and perforated every 300mm across the rolls for easy removal from the recorder and to enable individual sheets to be used with the recorder if required.

CHART ROLLS, wide range, scaled with temperature range as shown and 0 to 100% recovery. Approximately 100 charts/roll.

PED-490-030W	Chart roll, 0 to 300°C	**£3·09**
PED-490-050Q	Chart roll, 32 to 572°F	**£3·09**
PED-490-070K	Chart roll, 0 to 400°C	**£3·13**
PED-490-090E	Chart roll, 32 to 752°F	**£3·13**

CHART ROLL, narrow range, scaled in 10, 20 and 50°C spans and 0 to 100% recovery. For use with narrow temperature range ASDAS PED-230 and PED-260.

PED-490-270C	Chart roll	**£3·13**

PRINT ROLL, plain blank paper, for use with ASDA apparatus PED-350 only. Approximately 200 tests/roll.

PED-490-310Q	Print roll	**£1·74**

SPARES KIT including heater assembly, heater elements, lamps, photocells, fuses, relays, recorder pens and other parts which could be required during the first 6 to 12 months of operation.

PED-540-M	Spares kit	**£110·25**

SPARE PARTS

PED-550-030T	Heater assembly, complete	**£25·88**
PED-550-050N	Heater element, spare for PED-550-030T	**£2·25**
PED-550-110V	Exciter lamp for photocell	**£0·48**
PED-550-150J	Photocell	**£4·84**
PED-550-190U	Pens, ink filled, for recorder	Pack of 5 **£15·98**

MAINTENANCE KIT, comprising tools, lubricants and assorted screws, nuts and washers and thermometer test lead.

PED-590-A	Maintenance kit	**£20·48**

RESISTANCE BOX, decade, for calibrating temperature recorder or printer.

PED-610-C	Resistance box	**£190·13**

Multirange meter for general servicing *See EHL-640-A*

INSTRUCTIONS MANUAL, additional copy.

PED-620-S	Instructions manual	**£5·23**

ILLUMINATED VIEWING SCREEN

for comparing charts



See LCF-390-U

Gallenkamp ASDA

COOLING OUTFITS

In general, **cooling of the bath and receiver is needed for all products except gas oils.** Provision is made for three cooling methods depending on local facilities and requirements.



part PED-670

FOR COOLING BY MAINS COLD WATER

The condenser baths of the basic models are fitted with inlet and drain tubes so that, if necessary, cooling water can be supplied between tests.

FOR COOLING BY EXTERNAL COLD WATER CIRCULATOR OR ICE CUBES IN CONDENSER BATH (See Fig. A)

Comprises a receiver compartment cooler which has a built-in pump to draw a coolant supply from the condenser bath.

Air from the receiver compartment is circulated through a heat exchanger in the cooler. Its temperature is maintained at 15°C by the action of a contact thermometer which controls the flow of coolant to the heat exchanger.

The condenser bath must be cooled with ice cubes or an independently pumped coolant source which must have a heat extraction rate of about 250kcal/h in ambient temperatures up to 35°C.

COOLING OUTFIT, *GALLENKAMP*, as specified. For single phase supplies.

PED-650-010R	Cooling outfit, 220–240V 50Hz	**£361·13**
PED-650-030L	Cooling outfit, 110–120V 60Hz	**£367·88**

FOR COOLING BY REFRIGERATOR (See Fig. B)

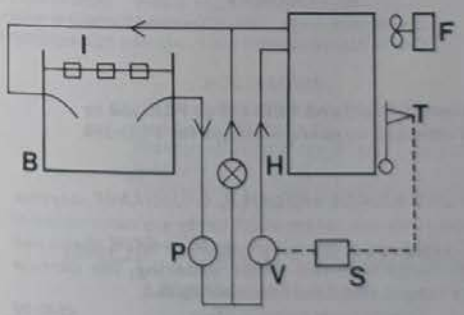
Outfit comprises a cooling outfit PED-650 and a bench mounting refrigeration unit. The sealed refrigeration compressor is automatically energised when the bath heater COMPENSTAT thermostat is set to a low temperature.

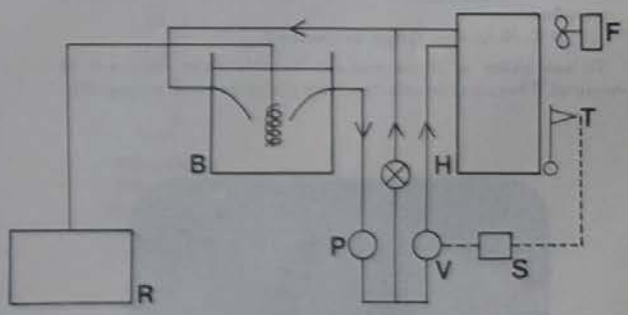
This outfit is designed to maintain the condenser bath below 1°C with the receiver compartment at 15°C in ambient temperatures up to 35°C.

In locations where the natural ambient temperature exceeds 35°C the ASDA apparatus and refrigerator must be used in an air conditioned room.

COOLING OUTFIT, *GALLENKAMP*, **refrigerated,** as specified. For single phase supplies.

PED-670-010D	Cooling outfit, 220–240V 50Hz	**£660·38**
PED-670-030U	Cooling outfit, 110–120V 60Hz	**£682·88**





Test specification	Condenser bath temperature °C	Receiver compartment temperature °C
ASTM D86-IP 123		
Group 1	0 to 1	13 to 18
Group 2	0 to 4	13 to 18
Group 3	0 to 4	13 to 18
Group 4	0 to 60	Within ±3°C of ambient temperature

Test specification	Condenser bath temperature °C	Receiver compartment temperature °C
ASTM D1078 and IP 195		
50 to 70°C	0 to 10	10 to 20
70 to 150°C	25 to 30	20 to 30
>150°C	35 to 50	20 to 30
DIN 51751	0 to 5	13 to 18

Continued overleaf

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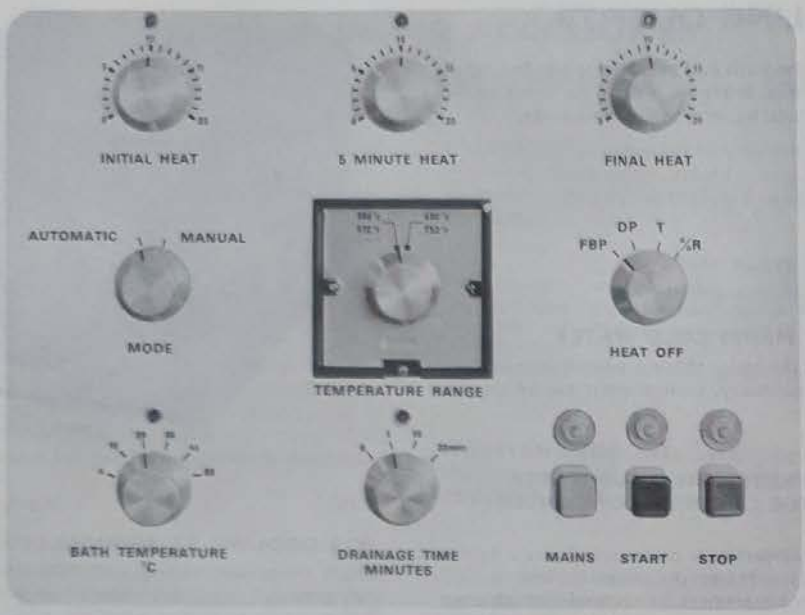
Gallenkamp ASDA



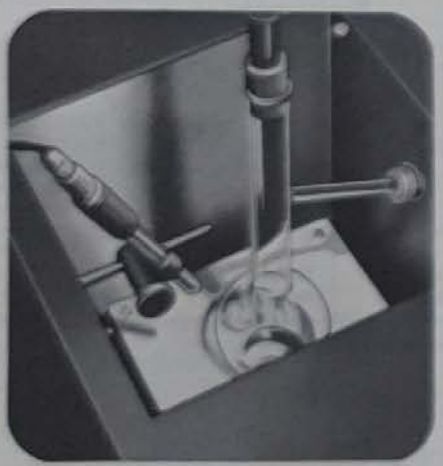
TEMPERATURE RANGE MODULES

These modules enable the user to re-match his ASDA apparatus to his work load should this change subsequent to the initial purchase, for example, when narrow boiling range products have to be tested in addition to wide range products. They are intended for permanent installation and **must not be considered as plug-in replacements.**

The two modules available are for use with models fitted with flat bed recorders. These modules use the standard platinum thermometer.

PED-710-R: ranges 0 to 300°C, 0 to 400°C and 5 narrow ranges as specified.
PED-720-K: 10 narrow ranges as specified.

To use either of these modules suitable chart rolls will be required. These may be selected from the range listed on page 502.



■ **To convert PED-200 and PED-260 to PED-230**

TEMPERATURE RANGE MODULE, *GALLENKAMP*, **combined wide and narrow ranges,** provides 0 to 300°C (32 to 572°F), 0 to 400°C (32 to 752°F) and 5 narrow ranges which can be any combination of 10, 20 or 50°C spans within the total range 50 to 400°C. **When ordering, the narrow temperature ranges required must be stated.**

PED-710-R Temperature range module **£409·50**

ACCESSORIES

Charts, wide range — *See PED-490-030W to 090E*
Charts, narrow range — *See PED-490-270C*

■ **To convert PED-200 and PED-230 to PED-260 to provide alternative narrow ranges for PED-260**

TEMPERATURE RANGE MODULE, *GALLENKAMP*, **narrow range,** provides 10 narrow ranges which can be any combination of 10, 20 or 50°C spans within the total range 50 to 400°C. **Does not provide wide range facilities. When ordering, the narrow temperature ranges required must be stated.**

PED-720-K Temperature range module **£540·00**

ACCESSORY

Charts, narrow range — *See PED-490-270C*

DRY POINT DETECTOR

A plug-in photoelectric device for monitoring the base of the flask to terminate the test at the Dry Point specified in ASTM D86-IP 123, ASTM D1078 and IP 195. When this detector is used the light beam from the lamp beneath the heater compartment passes through the heater support and the flask to the photocell.

DRY POINT DETECTOR, *GALLENKAMP*, comprising lamp and photocell assemblies and control module.

PED-750-M Dry point detector **£182·25**



PED-910

DISTILLATION OF PETROLEUM

Manual apparatus for ASTM D86-IP 123, ASTM D216-IP 191, ASTM D1078, IP 195 and similar tests.

DISTILLATION APPARATUS, manual, gas heated, for ASTM D86-IP 123 and similar methods, comprising heater for natural (methane) gas, shield, flask support, heater boards with 32, 38 and 50mm diameter holes, condenser and cooling bath. Requires but **not supplied** with distillation flask, receiver and thermometer. (F)

PED-910-B	Distillation apparatus	**£123·75**

DISTILLATION APPARATUS, manual, as PED-910-B but electrically heated. With variable autotransformer for heater control. For a.c. single phase supplies. (F)

PED-930-010H	Distillation apparatus, 220–240V	**£264·00**
PED-930-030B	Distillation apparatus, 110–120V	**£264·00**

SPARE PARTS

PED-940-050L	Heater board, 32mm hole. (F)	**£2·48**
PED-940-070F	Heater board, 38mm hole. (F)	**£2·48**
PED-940-090W	Heater board, 50mm hole. (F)	**£2·48**
PED-940-210P	Heater, 220–240V. (F)	**£8·25**
PED-940-230J	Heater, 110–120V. (F)	**£8·25**

ACCESSORIES

Flask for ASTM D216-IP 191	*See FHD-240-030W*
Flask for ASTM D86-IP 123	*See PED-440-050F*
Flask for ASTM D107 and IP 195	*See PED-440-070W*
Receivers	*See CYP-850-E*
Thermometers	*See THT-260-430J and THT-260-530F*



PEH-360
PEH-370
THT-298-250



PEH-300
with stand

DROP POINT OF GREASE

Methods: IP 31, BS 894.

DROP POINT OF GREASE APPARATUS, Ubbelohde apparatus comprising one each IP 40C and IP 41C thermometers fitted with sleeve and case, two metal cups, 600ml glass beaker, with cover and test tube with cork.

PEH-300-Q	Drop point apparatus	**£60·50**

SPARE PARTS

PEH-320-030Q	Metal cups	Pack of 5 **£8·80**
PEH-320-070E	Thermometer assembly, comprising IP 40C thermometer fitted with sleeve.	**£15·40**
PEH-320-090V	Thermometer assembly, comprising IP 41C thermometer fitted with sleeve.	**£15·40**
PEH-320-150G	Thermometer assembly	**£15·40**
	Test tube, borosilicate glass, 110 x 25mm.	**£1·04**
	Stands	*See STA-440 et seq.*

DROPPING POINT OF LUBRICATING GREASE

Method: ASTM D566-132.

TEST TUBE, borosilicate glass, diameter 12mm, length 100mm, with three indentations 19mm from bottom, fitted with corks bored to take thermometer. **Without** thermometer, beaker or stand.

PEH-360-U	Test tube	**£0·81**
PEH-370-N	Cup, plated brass	**£1·65**

ACCESSORIES

Beaker, borosilicate glass, tall form 400ml	*See BNB-340-090V*
Thermometer, IP 62F	*See THT-298-230R*
Thermometer, IP 62C	*See THT-298-250L*
Stands	*See STA-440 et seq.*



PEH-440

EXISTENT GUM IN FUELS

by jet evaporation. Method: ASTM D381-IP 131.

HEATING BLOCK, five-place, aluminium mounted in a stove enamelled steel outer case with electrically operated steam superheater built into the base. Air temperature in the block is controlled at 155 ±5°C and the steam superheater is controlled at 232 ±3°C. Complete with air pressure regulator and pressure gauge. For a.c. single phase supplies. (F)

PEH-440-010A	Heating block, 220–240V	**£1221·00**
PEH-440-030R	Heating block, 110–120V	**£1221·00**

This method requires items of general apparatus in addition to that listed above.

FLASH POINT BY THE ABEL APPARATUS

Method: IP 170.

FLASH POINT APPARATUS, Abel, complete with oil-cup, cover fitted with stirrer, heating vessel consisting of a water jacket in which the oil cup is located and an electric heater. The test lamp mounted on the cup cover is for coal or methane gas. Complete with test timing pendulum and wooden carrying case. **Without** thermometers. For 220–240V 50Hz single phase supplies.

PEH-600-P	Flash point apparatus	**£280·50**

ACCESSORIES

Thermometers, IP 74F and IP 75F
See THT-300-030B and THT-302-050S
Thermometers, IP 2F and IP 2C
See THT-260-130V and THT-260-150P



PEH-600

FLASH POINT BY THE ABEL APPARATUS

Petroleum (Consolidation) Act 1928 method. Method: IP 33.

FLASH POINT APPARATUS, Abel, in accordance with Petroleum (Consolidation) Act 1928, with test jet for coal gas or methane and electric sample heating element, stirrer, one each thermometers PEH-660-030K and PEH-660-050E, pendulum and suspension hook in hardwood case. With Government certification. For 220–240V a.c. supplies.

PEH-640-K	Flash point apparatus	**£412·50**

SPARE PARTS

PEH-660-030K	Thermometer, Abel oil-cup, with collar, scale span 50 to 150°F, subdivided in 1°F, Government certified. (The serial number stamped on instrument must be quoted unless thermometer is ordered with new instrument.) Thermometer	**£50·60**
PEH-660-050E	Thermometer, Abel water bath, with collar, scale span 90 to 190°F, subdivided in 1°F, Government certified. (The serial number stamped on instruments must be quoted unless thermometer is ordered with new instrument.) Thermometer	**£50·60**

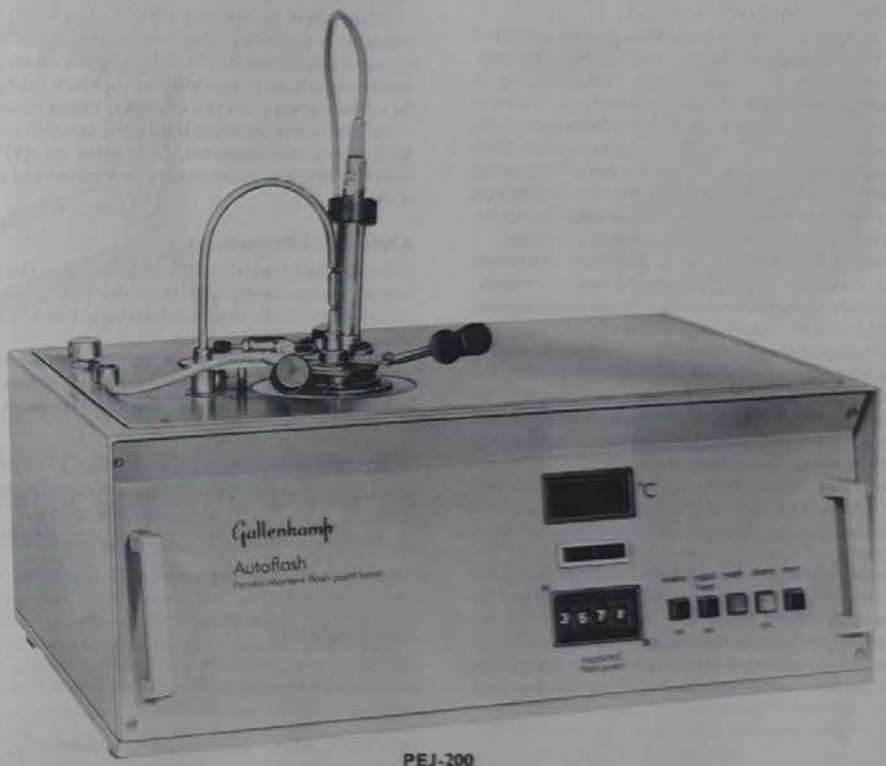
ACCESSORIES

Thermometer, Abel oil-cup, °F	See THT-278-030Q
Thermometer, Abel oil-cup, °C	See THT-278-050K
Thermometer, Abel oil-cup, IP 74F	See THT-302-030B
Thermometer, Abel water bath, °F	See THT-278-130M
Thermometer, Abel water bath, °C	See THT-278-150G
Thermometer, Abel water bath, IP 75F	See THT-302-050S

Gallenkamp AUTOFLASH

AUTOMATIC FLASH POINT APPARATUS

For determination of flash points by the Pensky-Martens closed cup method to ASTM D93-IP34



PEJ-200

- Simple operation – pushbutton controls
- Digital display of sample temperature
- Positive electrical detection of flash
- Heating rate controlled within specified limits
- Search facility for unknown or contaminated samples
- Determines flash points up to 400°C
- Constant sample stirring speed
- Automatic resetting after flash point – no unnecessary delay between end of one test and start of next
- Consistently repeated test flame dipping cycles
- Audible signal at end of test

Gallenkamp AUTOFLASH

(continued)

DESCRIPTION

The apparatus is housed in a single compact case in which the electronic systems are separated from the heating and testing systems by a steel partition.

The Pensky-Martens flash cup is located in an electrically heated block which has a self-emptying water cooling system controlled by a solenoid valve.

The sample stirrer is driven by a constant speed motor and another motor actuates the shutter mechanism. The operation of these motors is controlled to give stirring and flame dipping procedures as specified in ASTM D93-IP 34.

A digital switch is used to set the apparatus for the expected sample flash point temperature and for the test mode to be used. With the mode switch at P (Programmed) flame dipping is automatically initiated 20°C below the set temperature. With the mode switch set to S (Search) the flame dipping cycle occurs at the appropriate temperature intervals for the temperature set from ambient to flash point. This facility is extremely useful for testing unknown or contaminated samples. The digital switch also selects the appropriate dipping interval and when to terminate the test if a flash point is not detected in the expected temperature range.

Sample temperature is measured by a platinum resistance thermometer and displayed in large, easy-to-read, numbers. Control circuits provide that the sample heating rate is maintained within the specified limits of 5 to 6°C per minute.

A rapid heat facility is also fitted. When this is used, the sample is initially heated at a high rate which is automatically reduced to the standard rate before the flame dipping cycles commence. This rapid heat procedure is not covered by the test specifications but it is very useful for plant control and similar purposes when samples with high flash point temperatures have to be tested.

A thermocouple in the vapour space above the sample detects the occurrence of a flash. This locks the temperature indicator at the flash point temperature, energises an audio alarm (if switched on) and starts the supply of cooling water to the heater block. The same test termination procedure is initiated if a flash has not been detected by the time the sample has heated to 30°C above the expected flash temperature.

All operations are electronically controlled. The elimination of mechanical systems reduces maintenance to a minimum. The electronic circuits are on plug-in boards to simplify checking and servicing.

ACCURACY

Because the temperature programme control, dipping cycle and flash detection are all within the standard specification requirements, human error is largely eliminated and the results obtained are of high accuracy and repeatability.

OPERATION

The cleaned test cup is charged with sample to a filling mark and its lid put on. The cup is inserted into the heating block, the plug to the resistance thermometer and flash thermocouple is connected and the stirrer drive/test flame assembly is swung into position. The test flame is lit and its size adjusted.

The operator then sets the switch for the expected flash point of the sample and the test mode, presses the Power Supply, Rapid Heat, Search and Alarm switches as required, and finally presses the Start switch. Thereafter the whole test proceeds automatically.

AUTOMATIC CYCLE

Standard Procedure

After the Start switch has been pressed, the sample is heated with the requirements of test specification ASTM D93-IP 34, unless the Rapid Heat switch has also been pressed.

At a temperature of 20°C below the expected flash point set by the operator, the stirrer stops and the test flame is dipped into the cup. If no flash occurs, the stirrer restarts and the test continues with repeat dipping cycles every 1°C for expected flash points set up to 104°C and every 3°C for set values above 104°C.

When a flash is detected, a 'FLASH' sign is lit, the temperature indicator is stopped at the flash temperature, the internal alarm sounds (if switched on), the heater is switched off and cooling water is admitted to cool the heating block ready for the next test. As a safety precaution the cup cover closes automatically.

If a flash is not detected before the sample temperature reaches 30°C above the expected flash point or 430°C (whichever is lower), the test is automatically terminated and a 'NO FLASH' sign is lit.

Alternative Procedures

If the **Rapid Heat** switch is also operated the sample is initially heated more rapidly and then the heat input is automatically reduced so that the sample is heating at 5 to 6°C per minute before the first flame dipping cycle.

If the **Mode** switch is set to 'Search' the test flame cycle is initiated every 1°C or 3°C depending on the expected flash point temperature set, between initial and flash point temperatures.

SERVICES

Electricity	220–240V 50Hz or 110–120V 60Hz. Maximum power rating 600 W.
Gas	Coal gas, natural gas (methane) or propane.
Water	Cooling water at 20°C or less.

DIMENSIONS

	H.	W.	D.
Overall dimensions	350	510	395 mm

AUTOFLASH, *GALLENKAMP,* **automatic Pensky-Martens flash point testing apparatus** with digital readout in °C. Includes cup and cover and all necessary controls and mechanisms. Supplied with special tools, lubricant and full instructions for installation, operation and maintenance. For single phase supplies.

PEJ-200-010B	Autoflash, 220–240V 50Hz	**£1490·63**
PEJ-200-030S	Autoflash, 110–120V 60Hz	**£1516·75**

SPARE PARTS

PEJ-230-030U	Thermocouple	£9·62
PEJ-230-050X	Fuses, 220–240V	Pack of 10 £2·76
PEJ-230-070Y	Fuses, 110–120V	Pack of 10 £2·76
	Spares kit for 12 months' operation, comprising two thermocouples, numerical indicator unit, resistance thermometer, probe plug and socket, flexible drive, stirrer motor, shutter motor, heater, lamp bulbs, microswitch and gas tubing.	
PEJ-230-170E	Spares kit, 220–240V	£140·63
PEJ-230-190V	Spares kit, 110–120V	£140·63
	Fuse 2A	See ECF-540-250T

ACCESSORIES

PEJ-230-504B	Maintenance kit	£52·88



PEJ-540



PEJ-570 with PEJ-590

FLASH POINT BY PENSKY-MARTENS CLOSED TESTER

Manual apparatus. Method: ASTM D93-IP 34.

FLASH POINT APPARATUS, Pensky-Martens, *SETA*, gas heated, with gas test jet. Comprises cast iron air bath with stainless steel top plate, mounted on an upright, which is also a gas manifold feeding a needle valve controlled Meker burner, and the adjustable test and pilot flames. An additional control valve supplies gas for an open flash clip PEJ-640. There is a ring support for the lid when not in use. The cup lid is clamped in position but easily removable. Supplied complete with gas burner and thermometer collar but **without** thermometer.

PEJ-540-010S	Flash point apparatus, coal gas	**£110-00**
PEJ-540-030M	Flash point apparatus, LPG	**£132-00**

FLASH POINT APPARATUS, Pensky-Martens, *SETA*, electrically heated, with gas test jet. Comprises cast iron air bath fitted with side and base heaters. A variable transformer mounted in the bottom compartment ensures smooth and easy control of the temperature rise. Provision is made for accelerated cooling by means of an air connection to the interior of the cylindrical stainless steel baffle surrounding the heater units. Total loading 550 W. Supplied with one thermometer collar but **without** thermometer. For a.c. supplies.

PEJ-570-010U	Flash point apparatus, 200–250 V	**£154-00**
PEJ-570-030X	Flash point apparatus, 110–130 V	**£154-00**

MOTOR UNIT, geared, complete with flexible drive for attaching to Pensky-Martens flash point apparatus PEJ-540. Recommended for routine work where it obviates tedious hand operation. For single phase supplies.

PEJ-590-010G	Motor unit, 220–240 V 50 Hz	**£66-00**
PEJ-590-030A	Motor unit, 110–120 V 60 Hz	**£66-00**

SPARE PARTS

PEJ-610-030C	Thermometer collar	**£0-88**
PEJ-610-090H	Heating elements for PEJ-570	Pair **£26-40**

ACCESSORIES

Thermometers, IP 15F to IP 16C
See *THT-270-130X* to *THT-270-250E*

FLASH POINT (OPEN) AND FIRE POINT BY PENSKY-MARTENS APPARATUS

Method: IP 35.

CLIP, with gas test jet, for use with flash point apparatus PEJ-540 and PEJ-570.

PEJ-640-N	Clip	**£52-80**

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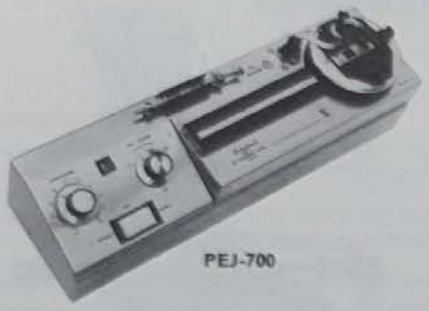


PEJ-700

FLASH POINT BY EQUILIBRIUM METHOD, SETAFLASH

FLASH POINT APPARATUS, *SETA FLASH* **TESTER, closed cup, range 0 to 110°C,** for rapid flash point checking of flammable products at pre-estimated temperatures. Requires 2ml of sample and accuracies to within 1°C are possible. Designed for field use and complete with built-in LPG tank having a fuel capacity for about 1000 applications of the test flame. Overall dimensions 410×120×130mm, mass 6kg; power rating 50W. Includes thermometer range 0 to 110°C. Requires but **not supplied** with either power pack PEJ-710-030 for 100–250V 50–60Hz supplies or battery lead PEJ-710-050 for 12V d.c. supplies.

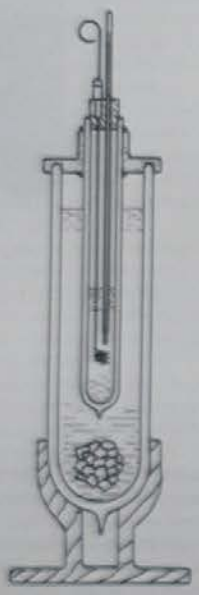
PEJ-700-K	Flash point apparatus	**£165·00**

ACCESSORIES

PEJ-710-030R	Power pack, for 100–250V 50–60Hz supplies.	**£27·50**
PEJ-710-050L	Battery lead, with clips	**£8·80**
PEJ-710-090W	Carrying case, with shoulder strap	**£11·00**
PEJ-710-110T	LPG refills, large size, for fuel tank Pack of 6	**£3·17**
	This item can be exported by deck cargo Sea Freight only.	
PEJ-710-150H	Adapter, for mains gas supply	**£3·58**
PEJ-710-170B	Thermometer, Fahrenheit, range 32 to 230°F.	**£5·50**



PEJ-830



PEL-230

FLASH POINT APPARATUS, *SETA FLASH* **TESTER, closed cup** as PEJ-700-K but with thermometer for **temperature range 100 to 280°C.** Overall dimensions 420×160×170mm, mass 8kg; power rating 100W. Requires but **not supplied** with either power pack PEJ-750-030M or battery lead PEJ-710-050L for 12V d.c. supplies.

PEJ-740-F	Flash point apparatus	**£247·50**

ACCESSORIES

PEJ-750-030M	Power pack for 100–250V 50–60Hz supplies.	**£55·00**
PEJ-750-090R	Carrying case, with shoulder strap	**£13·20**
PEJ-750-170T	Thermometer, Fahrenheit, range 212 to 536°F.	**£5·50**
	Battery lead with clips	*See PEJ-710-050L*
	LPG refills	*See PEJ-710-110T*
	Adapter for mains gas supply	*See PEJ-710-150H*

FLASH POINT BY TAG CLOSED TESTER

Method: ASTM D56.

FLASH POINT APPARATUS, Tag, closed cup comprising flash point cup and cover mounted in liquid bath with temperature control by variable autotransformer which is housed in the base of the instrument. Complete with thermometers: ASTM 9C, −5 to 110°C and 57C, −20 to 50°C. For a.c. single phase supplies. (F)

PEJ-830-010B	Flash point apparatus, 220–240V	**£198·00**
PEJ-830-030S	Flash point apparatus, 110–120V	**£198·00**



FREEZING POINT OF AVIATION FUELS

Method: ASTM D2386-IP 16.

FREEZING POINT APPARATUS, comprising unsilvered vacuum flask in protective stand and a clear jacketed sample tube with stopper, packing gland and stirrer. **Without** thermometer. (F)

PEL-230-J	Freezing point apparatus	**£107·25**

ACCESSORY

Thermometer, IP 14C	*See THT-270-050H*

HEAT OF COMBUSTION OF LIQUID FUELS

(calorific value). Methods: IP 12, ASTM D240, ASTM D2382.

See GALLENKAMP Autobomb CBA-300 et seq.

HYDROCARBON TYPES IN LIQUID PETROLEUM PRODUCTS

by fluorescent indicator adsorption. Method: ASTM D1319-IP 156.

ADSORPTION APPARATUS, comprising mountings for two columns, three ultraviolet discharge tubes, electric vibrator and zone measuring devices. Complete with two standard columns. For a.c. single phase supplies. (F)

PEL-280-010R	Adsorption apparatus, 220–240V	**£792·00**
PEL-280-030L	Adsorption apparatus, 110–120V	**£792·00**

COLUMN, standard, adsorption, standard wall glass tubing, with spherical cup S29 (28/12) and vinyl tubing connecting separator and analyser sections. Overall length approximately 1700mm.

PEL-300-W	Column, standard	**£10·91**

COLUMN, truebore, adsorption, precision bore glass tubing, with spherical cup S29 (28/12) and spherical joint S13 (12/2) in analyser section. Overall length approximately 1700mm.

PEL-310-P	Column, truebore	**£15·75**

Joint clips, S13 and S29 *See QTL-800-H and QTL-820-Q*



PEL-280



PEL-300
PEL-310



PEL-370-030

LEAD IN GASOLINE

Gravimetric method. Method: ASTM D526-IP 96.

The apparatus used for this method is identical to that specified for Acidity (inorganic) of petroleum products, IP 182. For details see page 495.

This method requires items of general apparatus in addition to that listed above.

NEUTRAL OIL

Method: STPTC PC4 and GB5.

RECEIVERS, separating funnel, STPTC, *TECHNICO* Class A.

Schedule No.	V4d	V4e
Stem capacity, ml	3	1

PEL-370-030K	Receiver, V4d	**£11·67**
PEL-370-050E	Receiver, V4e	**£10·70**

This method requires items of general apparatus in addition to that listed above.



PEL-420



PEL-460

OLEFINIC PLUS AROMATIC HYDROCARBONS

in petroleum distillates. Method: ASTM D1019-IP 145.

SULPHONATION FLASK, *TECHNICO,* **standard,** with ground stopper, capacity to zero graduation about 45ml, neck graduated 0 to 100% in 2% divisions.

PEL-420-A	Sulphonation flask	**£2·93**

This method requires items of general apparatus in addition to that listed above.

OXIDATION STABILITY OF AVIATION FUELS

Potential residue method. Method: ASTM D873-IP 138.

OXIDATION STABILITY OF MOTOR GASOLINE

Induction period method. Method: ASTM D525-IP 40.

OXIDATION STABILITY APPARATUS comprising two oxidation bombs, stainless steel with sealing rings, caps, gaskets and bomb stems with needle valves and connections for pressure recording gauge. With two glass sample containers and covers, two pen pressure recording gauge with 100 × 250mm diameter recording charts scaled 0 to 2001bf/in² in 5lb divisions, two flexible tubes for coupling the gauge nozzles to the bombs and recorder ink. A pressure gauge with fine adjustment valve, flexible tubing for connecting bomb to oxygen cylinder for filling, oxidation water bath for two bombs with condenser and automatic temperature control and thermometer IP 24C range 95 to 103°C are supplied. (F)

PEL-460-010P	Oxidation stability apparatus, 220–240V 50Hz	**£759·00**
PEL-460-030J	Oxidation stability apparatus, 110–120V 60Hz	**£759·00**

SPARE PARTS

PEL-480-010B	Gaskets for bomb	Pack of 10 **£1·65**
PEL-480-050M	Container with cover	**£4·95**

Gallenkamp

PENETRATION

Needle methods for bitumen and waxes. Cone methods for petrolatum and greases. Methods: ASTM D5-IP 49, ASTM D217-IP 50, ASTM D937-IP 179, IP 167, ASTM D1321.



PEL-550

PENETROMETER, standard manual model, with rack and pinion adjustment of needle or cone tip. On heavy base with adjusting feet and inset spirit level. The head may be swung to one side for testing samples in a water bath. Readout is on a 150mm diameter dial graduated 0 to 400 in intervals of 0·1 mm. With 47·5g plunger and one each 50g and 100g masses. **Without** needles or cones.

PEL-550-R	Penetrometer	**£99·00**

PENETROMETER, standard automatic model, as PEL-550-R but with solid state timer for 5, 8, 10 and 12 seconds free fall, after which the electromagnetic head is locked. **Without** needles or cones. For single phase supplies.

PEL-570-010A	Penetrometer, 220–240V 50Hz	**£220·00**
PEL-570-030R	Penetrometer, 110–120V 60Hz	**£220·00**



PEL-610

PENETROMETER, universal manual model, as PEL-550-R but with **geared drive** having coarse and fine controls and with readout on 110mm diameter covered dial fitted with automatic zero reset. **Without** needles or cones.

PEL-590-M	Penetrometer	**£137·50**

PENETROMETER, universal automatic model, as PEL-590-M but with solid state timer for 5, 8, 10 and 12 seconds free fall, after which the electromagnetic head is locked. **Without** needles or cones. For single phase supplies.

PEL-610-010L	Penetrometer, 220–240V 50Hz	**£258·50**
PEL-610-030F	Penetrometer, 110–120V 60Hz	**£258·50**

ACCESSORIES

PEL-630-504S	Adjustable mirror, with clamp	**£16·50**
	Sample container, 55mm diameter × 35mm deep to ASTM D5-IP 49.	
PEL-630-514P	Sample containers	Pack of 10 **£1·65**
	Sample container, 55mm diameter × 57mm deep to ASTM D5-IP 49.	
PEL-630-518H	Sample containers	Pack of 10 **£1·76**
PEL-630-524M	Transfer dish, ASTM D5-IP 49.	**£6·60**
	Sample container, 102mm diameter × 63mm deep to ASTM D937-IP 179.	
PEL-630-528E	Sample container	**£7·70**
	Test specimen container, 25mm diameter × 32mm deep, open both ends, to ASTM D1321.	
PEL-630-534J	Specimen container	**£5·50**
	Thermometer, IP 38C	*See THT-286-350D*



PEL-690 PEL-710

NEEDLES AND CONES

PENETRATION NEEDLE, to ASTM D5-IP 49.

PEL-650-J	Needle	**£2·75**

PENETRATION NEEDLE FOR WAXES, to ASTM D1321.

PEL-670-S	Needle	**£15·40**

PENETRATION CONE, to ASTM D217-IP 50, for penetration of greases to a limiting value of 400 and petrolatum to ASTM D937-IP 179.

PEL-690-E	Cone	**£30·25**

PENETRATION CONE, to IP 167, for penetration of semi-fluid greases having penetrations greater than 350.

PEL-710-G	Cone	**£41·80**

PENETRATION CONE, quarter scale, to ASTM D1403, for penetration of lubricating grease.

PEL-720-W	Cone	**£40·70**

ACCESSORY

PEL-730-504K	Plunger for use with PEL-720-W	**£19·80**

GREASEWORKER, MECHANICAL

Method: ASTM D217-IP 50, IP 167.

GREASEWORKER, electric motor driven, with two greaseworkers. The machine is driven by a motor through a reduction gear to give a speed of 60 strokes per minute. The motor has overload protection and a no-volt trip starter. A five figure counter indicates the number of strokes. For single phase supplies.

PEL-760-010X	Greaseworker, 220–240V 50Hz	**£646·80**
PEL-760-030Y	Greaseworker, 110–120V 60Hz	**£646·80**



PEL-760

POUR POINT

of petroleum oils. Method: ASTM D97-IP 15.

The apparatus required for this test is identical to that for the Cloud Point to ASTM D2500-IP 219.

RELATIVE DENSITY AND DENSITY

Methods: IP 59, IP 189, IP 190, ASTM D70, D941, STPTC V12, V14.

See Density bottles and Pyknometers on page heading Density.

This method requires items of general apparatus in addition to the necessary density bottle/pyknometer.

SEDIMENT IN CRUDE AND FUEL OILS

by extraction. Method: ASTM D473-IP 53.

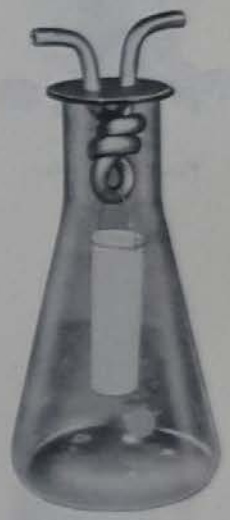
EXTRACTOR, for determination of sediment in oils comprising tinned condenser, fused alumina extraction thimble and 1000ml borosilicate glass wide mouth conical flask. (F)

PEL-810-V	Extractor	**£33·00**

SPARE PARTS

PEL-820-030F	Thimble, fused alumina. (F)	£3·63
	Flask, 1000ml	See FHB-480-0900

This method requires items of general apparatus not listed above.



PEL-810

SMOKE POINT

Method: IP 57, ASTM D1322.

SMOKE POINT LAMP, comprising lamp body with 50mm scale, candle socket with micrometer screw for raising or lowering the candle and candle consisting of an oil container, wick tube and wick. Complete, mounted on a stand. (F)

PEL-860-J	Smoke point lamp	**£148·50**

SPARE PART

PEL-870-010W	Wicks	Pack of 12 £2·48



PEL-860

Gallenkamp



PEL-910
PEL-950 is similar

SOFTENING POINT OF ASPHALT (bitumen) AND TAR

in ethylene glycol. Method: ASTM D2398-IP 198.

SOFTENING POINT APPARATUS, comprising a 600ml beaker with a metal cover from which the ring support is suspended, four standard shouldered rings, four steel balls and ball centring guide. **Without** thermometer. (F)

PEL-910-N Softening point apparatus **£35·48**

ACCESSORIES

PEL-920-010D Ring, shouldered **£1·82**
PEL-920-050X Balls, ¼in. dia. Pack of 12 **£1·65**
Thermometers IP 89F and 89C
See THT-310-030G and THT-310-050A

SOFTENING POINT OF BITUMEN, RING AND BALL

Method: IP 58.

SOFTENING POINT APPARATUS, similar to PEL-910-N but with four standard tapered rings in place of the shouldered rings. (F)

PEL-950-Y Softening point apparatus **£35·48**

ACCESSORIES

PEL-960-010V Ring, tapered **£1·65**
Balls, ¼in. dia. *See PEL-920-050X*
Thermometer IP 60C and 61C
See THT-298-050T and THT-298-150P

SULPHUR IN PETROLEUM PRODUCTS

Lamp method. Method: ASTM D1266-IP 107.

ASSEMBLY, 5-test unit, comprising framework, two manifolds for supplying air, and needle valves for each circuit. The absorbers are supported in movable blocks on a stainless steel platform. Two scrubbers for incoming air and three manometer type pressure regulators are supported at the rear. **Without** glassware.

PEM-200-U Assembly **£385·00**

GLASSWARE, for PEM-200-U, comprising five each of flasks, standard burners, chimneys, absorbers, splash bulbs, and three pressure regulators, two scrubbers and two levelling bulbs.

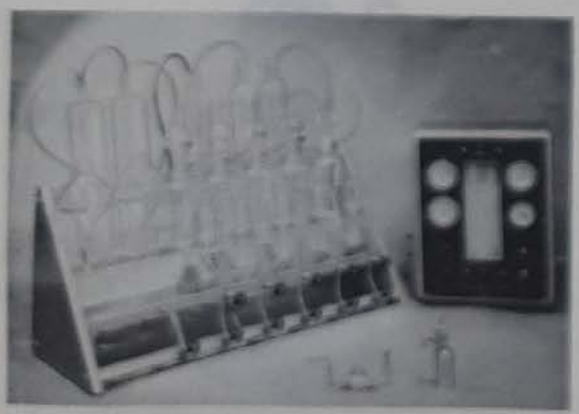
PEM-220-G Glassware Set **£247·50**

ACCESSORIES

PEM-230-504R Flask, for aromatic samples **£4·13**
PEM-230-514X Burner, for aromatic samples **£4·13**
PEM-230-518G Burner, for LPG samples **£4·13**
Sampling bomb, 100ml, single valve model, for LPG samples
PEM-230-528D Sampling bomb **£52·80**
Auxiliary regulating valve for LPG samples, with tubing
PEM-230-534Y Regulating valve **£41·80**

SYNTHETIC AIR UNIT, for supplying a 70% CO_2 30% O_2 gas mixture to the lamp sulphur apparatus using gases from commercial cylinders. The pressure is controlled by two single stage regulating valves. Built-in flowmeters with an illuminated panel are provided and a thermostatically controlled heater prevents the CO_2 freezing. **Without** gas cylinders. For single phase a.c. supplies.

PEM-250-010F Air unit, 220–240V **£577·50**
PEM-250-030W Air unit, 110–120V **£577·50**



PEM-200 with accessories

VAPOUR PRESSURE

Liquefied petroleum gases. Methods: IP 161, ASTM D1267.

VAPOUR PRESSURE BOMB, LPG type to IP 161. The main chamber has a bleed valve and the 20% relative capacity liquid chamber has a filling valve. Each section is tested to 70kgf/cm² hydrostatic pressure.

PEM-290-D	Pressure bomb	**£321·50**

VAPOUR PRESSURE BOMB, LPG type to IP 161, as PEM-290 but with liquid chamber 33⅓% relative capacity.

PEM-310-F	Pressure bomb	**£327·80**

ACCESSORY for PEM-290-D and PEM-310-F

PEM-330-504J	Sampling connector, 900mm long	**£16·50**

PRESSURE GAUGES, test gauge quality to IP 161, for LPG bombs.

PEM-340-030V	Pressure gauge, 0 to 120 lbf/in²	**£41·80**
PEM-340-050P	Pressure gauge, 0 to 350 lbf/in²	**£41·80**
PEM-340-070J	Pressure gauge, 0 to 600 lbf/in²	**£41·80**

THERMOSTATIC WATER BATH for **4 LPG** or **6 Reid** vapour pressure bombs. With immersion heater, temperature controller, drain tap, and constant level. Stirring is by an air bubbler. The top compartment has a hinged cover for easy access. Finished in stove enamel and mounted on castors. Power consumption 3kW max. For a.c. single phase supplies only.

PEM-360-010N	Water bath, 220–240V	**£550·00**
PEM-360-030H	Water bath, 110–120V	**£550·00**



PEM-310 with PEM-340

VAPOUR PRESSURE

Reid method. Methods: IP 69, ASTM D323.

VAPOUR PRESSURE BOMB, *SETA,* **Reid immersion sampling type to IP 69.** Comprising air chamber, gasoline chamber with one opening, bayonet coupling and Neoprene gasket.

PEM-410-U	Pressure bomb	**£77·00**

VAPOUR PRESSURE BOMB, *SETA,* **Reid pressure sampling type to IP 69.** Comprising air chamber, gasoline chamber with two openings, the lower section being connected through a gate valve and fitted with a needle valve.

PEM-430-G	Pressure bomb	**£110·00**

SPARE PART for PEM-410-U and PEM-430-G

PEM-440-010T	Gaskets	Pack of 10 **£9·99**

PRESSURE GAUGES, test gauge quality to IP 69. Chromium plated case with plastics front, and carrying handle.

PEM-460-030W	Pressure gauge, 0 to 5 lbf/in²	**£41·80**
PEM-460-050Q	Pressure gauge, 0 to 15 lbf/in²	**£41·80**
PEM-460-070K	Pressure gauge, 0 to 30 lbf/in²	**£41·80**
PEM-460-090E	Pressure gauge, 0 to 45 lbf/in²	**£41·80**
PEM-460-110B	Pressure gauge, 0 to 60 lbf/in²	**£41·80**
PEM-460-130S	Pressure gauge, 0 to 100 lbf/in²	**£41·80**
PEM-460-150M	Pressure gauge, 0 to 250 lbf/in²	**£41·80**

Thermostatic bath — See PEM-360



PEM-430 with PEM-460

VISCOMETER, SAYBOLT

Method: ASTM D88, E102.



PEM-510 with thermometer

VISCOMETER, Saybolt, two-tube, temperature range 21 to 100°C. Comprising viscometer bath with motor driven stirrer and coil for cooling water or steam heating. The bath is electrically heated, with a three-heat switch and contact thermometer 0 to 100°C and relay for accurate temperature control. Complete with two Saybolt universal viscometers, two oil receiving flasks, 60ml, oil strainer, oil pipette with filler, two thermometer holders, chained cork stoppers and flask centring plate. The flask platform is illuminated for accurate observation. **Without** thermometers. For single phase supplies. (F)

PEM-510-010J	Viscometer, 220–240V 50Hz	**£726·00**
PEM-510-030D	Viscometer, 110–120V 60Hz	**£726·00**

SPARE PARTS

PEM-520-030T	Contact thermometer, 0 to 100°C. (F)	**£20·63**
PEM-520-050N	Oil receiving flask, 60ml. (F)	**£4·13**

VISCOMETERS, STANDARD TAR

for viscosity of refined tar and viscosity cutback of bitumen and road oil. Methods: STPTC RT2, RT3, IP 72.



PEM-570 with thermometer

VISCOMETER, Standard tar, comprising electrically heated water bath with three legs and run-off cock and fitted with viscometer cup with 10mm run-out orifice and ball valve with support. The water bath cover has integral stirrer blades and thermometer pocket. **Without** thermometer or receiver. For single phase supplies. (F)

PEM-570-010N	Viscometer, 220–240V 50Hz	**£156·75**
PEM-570-030H	Viscometer, 110–120V 60Hz	**£156·75**

ACCESSORIES

Receiver, 100ml	*See CYL-300-090A*
Energy regulator for heater control	*See EFP-400-D*
Stopwatch	*See TKM-480-S*
Thermometers IP 8F and 8C	*See THT-264-030B and THT-264-050S*

VISCOSITY BITUMEN ROAD EMULSION

Method: IP 212, BS 434.



PEM-610 with thermometers

VISCOMETER, Engler, comprising electrically heated water bath on three legs with levelling feet, stirrer and double walled cover, viscometer cup with jet in the centre of its base, hardwood jet valve and cup cover with thermometer socket. **Without** receiver or thermometers (two required). For single phase supplies. (F)

PEM-610-010B	Viscometer, 220–240V 50Hz	**£132·00**
PEM-610-030S	Viscometer, 110–120V 60Hz	**£132·00**

ACCESSORIES

Receiver, 200ml	*See FHM-640-170W*
Energy regulator for heater control	*See EFP-400-D*
Stopwatch	*See TKM-480-S*
Thermometer	*See THT-302-150X*

VISCOSITY KINEMATIC

of transparent and opaque liquids and the calculation of dynamic viscosity. Methods: ASTM D445-IP 71, BS 188.

Viscometers	*See KHB-300 or KHB-670*
Viscometer baths	*See KHC-220 Series*

VISCOSITY, REDWOOD

VISCOMETER, Redwood No. 1, electrically heated, for light oils of viscosity not exceeding 2000 Redwood No. 1 seconds at the temperature of test. Comprises copper water bath with immersion heater, drain cock, stirrer with thermometer collar, silver plated oil cup with agate jet, ball valve, thermometer clip and spirit level and light alloy combined draught shield and stand, fitted with levelling screws. The cup is standardised against a cup calibrated by the National Physical Laboratory and a works' certificate of test is issued. Complete with 50ml receiving flask. **Without** thermometers. For a.c. single phase supplies. (F)

PEM-660-010M Viscometer, 220–240V **£234·30**
PEM-660-030G Viscometer, 110–120V **£234·30**



PEM-660 with thermometers

SPARE PART

Flask, 50ml *See FHM-600-130Q*

ACCESSORIES

Stopwatch *TKM-480-S*
Thermometers *See THT-264-030B to THT-264-250K*
Energy regulator for heater control *See EFP-400-D*

FLOW CUPS and STAND
See VHA-580-030P et seq.

ROTATING CYLINDER VISCOMETER
See VHA-500-L et seq.

UNIVERSAL TORSION VISCOMETER
See VHA-200-M et seq.

WATER AND SEDIMENT IN CRUDE AND FUEL OILS

by centrifuge. Methods: ASTM D1796-IP 75, ASTM D91, D96.

CENTRIFUGE, electrically driven, with four-place head, totally enclosed in a spun steel guard which has a detachable cover held in place by three spring clips. Maximum speed 1500rev/min. The four-place head can accommodate 100ml cone-shaped centrifuge tubes PEM-770-A. For a.c. single phase supplies. With head and buckets but **without** glassware.

PEM-750-010L Centrifuge, 220–240V **£237·38**
PEM-750-030F Centrifuge, 110–120V **£237·38**

CENTRIFUGE TUBE, cone-shaped, glass, 100ml graduated, to ASTM D1796-IP 75, ASTM D91, and D96 (203mm).

PEM-770-A Centrifuge tube **£2·61**



PEM-750

WATER IN PETROLEUM AND BITUMEN

by distillation. Method: ASTM D95-IP 74, BS 756.

Dean and Stark apparatus *See WES-300-G et seq*

THERMOMETERS, IP and ASTM
See THT-260-030C et seq.

Gallenkamp

Griffin pH METER

- Exceptionally low drift and high stability
- Fully portable
- pH and redox facilities
- Complete with robust combination glass and reference electrode
- Facility for connection to chart recorder





PHJ-270-542 with pH meter



PHJ-270-528

Complete with combination electrode and powered by an internal 9V PP6 battery. Suitable for use in either schools or industry and enables accurate pH and redox measurements to be made. Two field effect transistors are employed in a bridge circuit, to attain exceptionally low drift and high stability; warm-up time is very short. Simple to operate having only two controls, a function selector and a SET BUFFER/ZERO mV control.

A conveniently positioned standard coaxial socket accepts the combined glass and reference electrode, and a pair of colour-coded 4mm sockets allows separate electrodes to be used.

Housed in a robust steel case with rubber feet and inclined fascia, bearing the scale, selector and zero controls and 4mm sockets for connection to a chart recorder.

Although primarily designed for combination electrodes with E_o at pH 7, it may be used with electrodes having E_o at most other values.

Technical data

pH range	0 to 14 pH, linear scale, ×0·2 pH between pH 2 and pH 12
Redox range	0 to 1400mV, linear scale, ×20mV between 200mV and 1200mV
Input requirements	Accepts electrodes having E_o at most pH values
Input connections	Standard coaxial socket and a pair of colour-coded 4mm sockets spaced at 19mm
Output connections	Pair of colour-coded 4mm sockets spaced at 19mm. For use with external meter or chart recorder with input impedance >500kΩ
Meter type	Moving coil, 80mm scale length
Warm up and thermal drift	Negligible
Battery voltage drift and consumption	Negligible
Mass	2·2kg
Dimensions	105×170×240mm, height × width × depth
Function facilities:	
OFF	
BATTERY TEST	To monitor battery voltage
pH	Measurement position
ZERO mV	Zero adjustment position
mV	Redox measurement position
Electrode type	Combination glass and reference of robust design with a polypropylene protective skirt and cup
Range	0 to 14pH
Temperature range	10 to 70°C
E_o	pH 7
Connection	1m lead terminating in a standard coaxial plug

pH METER, *GRIFFIN*, as specified, with combination glass and reference electrode and instructions. **Without** battery.

PHJ-250-F pH meter **£60-08**

SPARE PARTS

PHJ-270-010L Combination glass and reference electrode **£12-99**

ACCESSORIES

Combination glass and reference electrode as PHJ-270-010L but with toughened glass membrane and range 0 to 11 pH, temperature range 0 to 50°C. With instructions.

PHJ-270-504J Combination glass and reference electrode **£13-03**

Platinum electrode, unscreened, spade type, having 1m lead with 4mm plug. With instructions.

PHJ-270-516C Platinum electrode **£12-04**

Calomel reference electrode, with porous ceramic plug liquid junction and having 1m lead with 4mm plug. With instructions.

PHJ-270-524D Calomel reference electrode **£12-09**

Soil electrode, similar to PHJ-270-504J but with spear-shaped toughened glass membrane to enable direct readings on soil samples to be made without the need for extraction with distilled or deionised water.

PHJ-270-528S Soil electrode **£12-99**

Carrying case, to provide an easily portable pack for field work. With storage space for electrodes and buffer solutions.

PHJ-270-542B Carrying case **£9-98**

Battery, 9V PP6 See BAT-340-0900

Buffer powders See BMIX-870

EIL PORTABLE MODEL 3030

A battery operated instrument of high stability suitable for field and laboratory use

Technical data

Ranges	0 to 8 pH, 6 to 14 pH 0 to 800 mV, 600 to 1400 mV
Subdivisions	0·1 pH
Discrimination	0·05 pH
Accuracy	±0·1 pH or ±10 mV
Stability	Drift typically less than 0·003 pH/day
Temperature compensation	0 to 100°C automatic
Dimensions	185 × 140 × 85 mm
Mass	1·4 kg



PHK-290

pH METER, *EIL* **Model 3030, portable,** as specified, with combination electrode, buffer powder, temperature compensator, 9V battery and carrying case complete with washbottle, beaker and buffer solution container.

PHK-290-N pH meter **£156·20**

SPARE PARTS

PHK-310-030G	Combination electrode	**£13·75**
PHK-310-070R	Temperature compensator, EIL 3031	**£13·20**
	Battery, 9V, PP9	*See BMT-540-130L*
	Buffer powders	*See PHM-870*
	pH Test papers	*See PBK-320 et seq.*

EIL MODEL 7020

A direct reading, large scale, general purpose pH meter for use in industrial and educational laboratories

Technical data

Ranges	0 to 14 pH 1400–0–1400 mV
Indicator accuracy	±1% f.s.d.
Indicator scale length	220 mm, approximately
Temperature compensation	0 to 100°C manual 0 to 100°C automatic with temperature compensator accessory
Recorder output	0·7–0–0·7 mA into up to 5kΩ
Isopotential	Set at 7 pH
Dimensions	320 × 115 × 220 mm high
Mass	4·5 kg



PHK-460 with accessories

pH METER, *EIL* **Model 7020,** as specified, with combination electrode, electrode holder, buffer powders, potassium chloride and manual temperature compensation. For 220–250 V 50 Hz single phase supplies.

PHK-460-S pH meter **£176·00**

SPARE PARTS

Combination electrode	*See PHM-220-H*
Buffer powders	*See PHM-870*

ACCESSORIES

Temperature compensator for automatic compensation of sample temperature changes.

PHK-460-030S Temperature compensator, EIL 7021 **£17·05**

EIL MODEL 7050

A versatile instrument for pH and pIon measurements. With expanded scale facilities and calibrated offset feature for precise pH and selective ion measurements



PHK-550

pH METER, EIL Model 7050, as specified, with electrode stand and holder, combination pH/all purpose electrode. For single phase supplies.

PHK-550-010X	pH meter, 180–265 V 50–60 Hz	**£396·00**
PHK-550-030Y	pH meter, 100–125 V 50–60 Hz	**£396·00**

SPARE PARTS

Combination electrode	*See PHM-230-M*
Buffer powders	*See PHM-870*

ACCESSORY

Temperature compensator, for automatic compensation of sample temperature changes.

PHK-570-030R	Temperature compensator, EIL 3921	**£19·25**

Technical data

Ranges	Normal 0 to 14 pH 0 to 1400 mV Expanded 14 switched ranges providing 2 pH and 200 mV spans Two 2-decade scales providing 'p' (linear) and 'conc' (logarithmic) presentation. Scale shift facility allows 4 decades to be displayed
Indicator accuracy	±0·5% f.s.d.
Indicator scale length	200 mm
Stability	Drift typically less than 0·0005 pH/°C
Temperature compensation	−20 to 120°C manual (or automatic with temperature compensator accessory)
Isopotential	Variable in range 0 to 20 pH
Recorder output	0 to 100 mV from a source resistance of approximately 100Ω
Dimensions	360 × 265 × 180 mm high
Mass	6·5 kg

EIL MODEL 7060

A wide range digital pH/mV meter with easily readable seven-segment planar display. With adjustable base which enables the instrument to be set at angles up to 30°



PHK-660

pH METER, EIL Model 7060, digital readout, as specified, with combination pH electrode, electrode holder, electrode support rod, input shorting plug. For single phase supplies.

PHK-660-010N	pH meter, 220–240 V 50–60 Hz	**£385·00**
PHK-660-030H	pH meter, 110–115 V 50–60 Hz	**£385·00**

SPARE PARTS

Combination electrode	*See PHM-230-M*
Buffer powders	*See PHM-870*

ACCESSORY

Temperature compensator, for automatic compensation of sample temperature changes.

PHK-660-030Q	Temperature compensator	**£55·00**

Technical data

Ranges	0·00 to 13·99 pH −1999 to +1999 mV Automatic sign indication, no polarity switching
Relative accuracy	±0·01 pH, ±1 mV or 0·1% of reading whichever is greater
Temperature compensation	0 to 100°C manual (or automatic with temperature compensator accessory)
Slope correction	80 to 100% Nernst value
Input impedance	$10^{12}\Omega$
Input current	Less than 5×10^{-12} A
Drift	Less than 100 μV/°C
300 × 180 × 90 mm high	× Dimensions
Mass	5 kg

PYE UNICAM MODEL PW 9418

A direct reading, large scale, general purpose pH meter for use in industrial and educational laboratories

Technical data

Range	0 to 14 pH ±700mV
Meter	190mm scale with subdivisions of 0·1 pH and 10mV
Drift	Less than ±0·02 pH/24 hours
Temperature compensation	Manual 0 to 100°C Automatic −10 to 150°C with temperature compensator accessory
Slope correction	80 to 103% of Nernst value
Output	±700μA into 10kΩ maximum circuit resistance
Input impedance	$10^{12}\Omega$
Dimensions	320×170×210mm high
Mass	3·2kg



PHL-370

pH METER, *PYE UNICAM* **Model PW 9418/10,** as specified, complete with combination glass and reference electrode, integral electrode stand and holder, jack plug and coaxial adapter but **without** temperature compensator or buffer powders. For 200–240V 50–60Hz single phase supplies. (F)

PHL-370-J pH meter **£166·10**

SPARE PART

Combination electrode *See PHM-260-X*

ACCESSORIES

Temperature compensator for automatic compensation of sample temperature changes.

PHL-390-030J Temperature compensator, PYE PT 100 **£23·10**

Electrodes *See PHM-230-M to PHM-740-L*

Buffer powders *See PHM-870*

PYE UNICAM MODEL PW 9410

A digital pH meter of advanced specification and very simple operational design

Technical data

Ranges	0·00 to 19·99 pH
Drift	Typically within plus or minus one digit at constant temperature
Temperature coefficient	0·002 pH per °C
Input impedance	$10^{12}\Omega$
Temperature compensation	Manual 0 to 100°C
Slope correction	80 to 100% of Nernst value
Earthed solutions	Suitable for use with earthed or isolated solutions
Dimensions	210×280×89mm high
Mass	2·1kg



PHL-440

pH METER, *PYE UNICAM* **Model PW 9410/10** as specified, complete with type 401 E7 combined glass and reference electrode, electrode holder and stand and coaxial adapter for metal electrodes. **Without** buffer powders. For 100–120V and 200–240V 50–60Hz single phase supplies.

PHL-440-W pH meter **£232·10**

SPARE PART

Combined electrode type 401 E7 *See PHM-260-X*

ACCESSORY

Buffer powders *See PHM-870*

Gallenkamp

PYE UNICAM MODEL PW 9409

A digital research pH meter of high accuracy and suitable for Karl Fischer titrations



PHL-490

Technical data

Ranges	0·00 to 19·99 pH, 6·000 to 7·999 pH −1999 to +1999 mV, −199·9 to +199·9 mV Both mV ranges may be extended by ±100 mV with the asymmetry control	
Drift	Better than ±1 digit	
Input impedance	$10^{12}\Omega$	
Temperature compensation	Manual 0 to 100°C Automatic −10 to 150°C by means of PT100 temperature compensator	
Slope correction	80 to 103% of Nernst value	
Earthed solutions	Suitable for use with earthed or isolated solutions	
Output	Normal range	10 mV per pH with zero at 0 pH 10 mV per 100 mV with zero at 0 mV
	Expanded range	100 mV per pH with zero at 6 pH 100 mV per 100 mV with zero at 0 mV
Karl Fischer titration output	Approx. 10 μA	
Power supply	100–120 V or 200–240 V 50–60 Hz nominal 10 VA	
Dimensions	300 × 280 × 110 mm high	
Mass	2·5 kg	

pH METER, *PYE UNICAM* **Model PW 9409/10** as specified, complete with type 401 E7 combined glass and reference electrode PHM-260-X, electrode holder and stand, coaxial adapter for metal electrodes and plugs for output sockets. **Without** temperature compensator or buffer powders. For 100–120 V and 200–240 V 50–60 Hz single phase supplies.

PHL-490-K pH meter **£338·80**

SPARE PART

Combined electrode type 401 E7 — *See PHM-260-X*

ACCESSORIES

Temperature compensator, PYE PT 100 — *See PHL-390-030/*

Buffer powders — *See PHM-870*



OTHER APPARATUS FOR pH MEASUREMENT

Lovibond Comparator — *See COH-300 et seq.*

Lovibond Nesslerizer — *See COH-550 et seq.*

Test Papers — *See PBK-320 et seq.*

pH ELECTRODES

Suitable for use with EIL and PYE UNICAM pH meters

All the combination electrodes in this range are of the E_o7 type which give zero output at pH 7. Because the filling of E_o7 electrodes is virtually neutral (pH 7), internal chemical attack, over long storage periods and when used at high temperatures, is negligible. Moreover, temperature compensation is more easily and accurately achieved than with electrodes having other E_o values.

COMBINATION ELECTRODES, combined glass bulb and silver/silver chloride reference.

Type No.	pH range	Temperature range °C	Stem diameter mm	Length mm	Features
EIL 1160-200	0 to 14	−5 to 100	12	138	Fully screened
PYE 401 E7	0 to 12	10 to 70	12	120	Spherical membrane
PYE 405 E7	0 to 12	10 to 70	12	130	Cylindrical membrane
PYE 401 M5E7	0 to 11	10 to 70	5	120	Miniature pattern
PYE 450 E7	0 to 12	10 to 70	18	105	Sheathed in polythene

PHM-230-M Combination electrode, EIL 1160-200 **£13·75**
PHM-260-X Combination electrode, PYE 401 E7 **£13·20**
PHM-280-A Combination electrode, PYE 405 E7 **£16·39**
PHM-300-C Combination electrode, PYE 401 M5E7 **£16·17**
PHM-320-L Combination electrode, PYE 450 E7 **£17·05**

GLASS BULB ELECTRODES

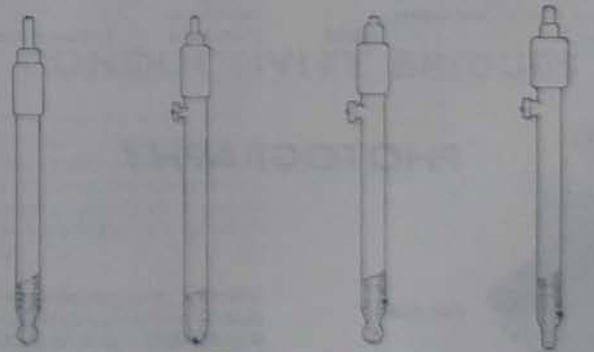
Type No.	pH range	Temperature range °C	Stem diameter mm	Length mm	Features
EIL 1070-060	0 to 14	0 to 100	12	138	Silver/silver chloride filled. Can be steam sterilised.
PYE 201 E7	0 to 12	10 to 70	12	120	—

PHM-490-A Glass bulb electrode, EIL 1070-060 **£9·90**
PHM-520-S Glass bulb electrode, PYE 201 E7 **£9·90**

REFERENCE ELECTRODES, with porous ceramic tip.

Type No.	Temperature range °C	Stem diameter mm	Length mm	Features
EIL 1371-200	−5 to 135	12	138	Silver/silver chloride electrode. Refillable. Calomel electrode with plug tip.
PYE 303	0 to 70	12	120	

PHM-710-J Reference electrode, EIL 1371-200 **£8·80**
PHM-740-L Reference electrode, PYE 303 **£8·80**



PHM-260 **PHM-280** **PHM-520** **PHM-740**

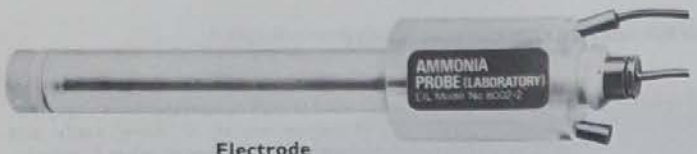
BUFFER POWDERS

For the standardisation of pH meters. Each pack of sachets makes up to 5 litres of buffer solution. With instructions.

Nominal value, pH	4	7	9
pH at 25°C	4·01 ±0·02	7·00 ±0·04	9·19 ±0·02

PHM-870-010C Buffer powder, 4 pH Pack of 50 sachets **£6·66**
PHM-870-030T Buffer powder, 7 pH Pack of 25 sachets **£6·66**
PHM-870-050N Buffer powder, 9 pH Pack of 50 sachets **£6·66**

ION SELECTIVE AND GAS SENSING PROBES



Electrode
Part PHR-530



Electrode
Part PHR-560

The following range of EIL sensors can be used to detect inorganic species in aqueous solution as specified. Must be used in conjunction with a precision expanded scale pH/pIon meter such as PHK-550. (A sensitivity of not less than 3 pH over 200mm scale length is required.)

SODIUM ELECTRODE

For determination of sodium ion activity in a wide range of aqueous and non-aqueous solutions.

Concentration range 1 to 10^{-5} M.

Interfering cations Li^+, K^+, Rb^+, Cs^+, NH_4^+, $N(C_2H_5)_4^+$, Ag^+ and Tl^+.

Temperature range 0 to 80°C. Minimum sample size 10ml.

Applications include determination of sodium in boiler water, neutral water, biological fluids, serum, skin, foods and soils.

SODIUM ELECTRODE KIT, *EIL* **1048-2,** glass, with silver/silver chloride reference electrode.

PHR-450-B Sodium electrode kit **£41·80**

CHLORIDE ELECTRODE

For determination of chloride ion activity in both aqueous and non-aqueous solutions. The response of the electrode will be affected by redox equilibria.

Concentration range 1 to 10^{-6} M.

Interfering ions S^{2-}, I^-, Br^-.

Temperature range 0 to 100°C. Minimum sample size 1 ml.

Applications include determination of chloride in boiler water, biological fluids, natural waters, pharmaceuticals, foods, soap and pesticides.

CHLORIDE ELECTRODE KIT, *EIL* **8004-2,** solid state, with reference electrode, reference filling solution, and holder.

PHR-480-D Chloride electrode kit **£60·50**

AMMONIA ELECTRODE

For determination of dissolved ammonia in aqueous solutions and is therefore particularly useful in determination of total nitrogen after Kjeldahl digestion.

Concentration range 1 to 10^{-6} M.

Interfering materials – volatile amines.

Temperature range 0 to 50°C. Minimum sample size 1 ml.

Applications include determination of free ammonia in natural water, boiler water, biological fluids, soils, effluents and sewage.

AMMONIA ELECTRODE PROBE, *EIL* **8002-2,** gas sensing, with reference electrode, filling solution, membranes, and holder.

PHR-530-H Ammonia electrode probe **£132·00**

SULPHUR DIOXIDE ELECTRODE

For determination of dissolved sulphur dioxide, sulphite and bisulphite in aqueous solutions.

Concentration range 5×10^{-2} M to 5×10^{-6} M.

Interfering materials – volatile acids.

Temperature range 0 to 50°C. Minimum sample size 1 ml.

Applications include determination of dissolved sulphur dioxide in food, beverages, effluents and in water quality monitoring.

SULPHUR DIOXIDE ELECTRODE PROBE, *EIL* **8010-2,** gas sensing, with reference electrode, internal filling solution and membranes.

PHR-560-J Sulphur dioxide probe **£132·00**

PHOTOGRAPHY



PIH-620



PIH-650

DISHES, photographic developing, stainless steel, 55mm deep. Dimensions given are for plate sizes.

PIH-620-030R	Dish, 250 × 200mm	**£10·01**
PIH-620-050L	Dish, 300 × 250mm	**£12·60**
PIH-620-070F	Dish, 380 × 300mm	**£23·06**

DISHES, photographic developing, high impact polystyrene, 55mm deep. Dimensions given are for plate sizes.

PIH-650-030T	Dish, 215 × 165mm	**£0·82**
PIH-650-050N	Dish, 300 × 250mm	**£1·33**
PIH-650-070H	Dish, 380 × 300mm	**£1·81**
PIH-650-090B	Dish, 500 × 400mm	**£2·42**

PHYSICAL CHEMISTRY

DIALYSIS TUBING, *VISKING*, transparent, seamless, viscose cellulose, 0·32mm thick. Supplied flat.

Inflated dia., mm	6	14	19	28
Flat width, mm	10	22	30	45
Inflated dia., mm	32	51	70	82
Flat width, mm	52	78	110	130

PJC-400-030R	Dialysis tubing, 6mm	Roll of 30m **£8·93**
PJC-400-050L	Dialysis tubing, 14mm	Roll of 30m **£3·69**
PJC-400-070F	Dialysis tubing, 19mm	Roll of 30m **£3·69**
PJC-400-090W	Dialysis tubing, 28mm	Roll of 30m **£3·69**
PJC-400-110T	Dialysis tubing, 32mm	Roll of 15m **£3·69**
PJC-400-130N	Dialysis tubing, 51mm	Roll of 15m **£6·66**
PJC-400-150H	Dialysis tubing, 70mm	Roll of 15m **£8·93**
PJC-400-170B	Dialysis tubing, 82mm	Roll of 15m **£8·73**

Griffin CONDUCTANCE BRIDGE

A mains operated instrument giving direct readings of conductance over the range 0·1 μS to 1S in eight overlapping ranges. The bridge circuit is fed at 1kHz from an internal oscillator and balance is detected by a small meter connected through an amplifier.

There are two controls only, a range selector and a bridge balance control, mounted together with a meter, fuse, mains switch indicator lamp and a pair of 4mm sockets at 19mm spacing for connection of a conductivity cell, on the inclined fascia panel of a robust metal case fitted with rubber feet. A cable wind is conveniently positioned at the rear for cable storage. Overall dimensions 240 × 170 × 105mm high, mass 2·5kg.



PJK-300

CONDUCTANCE BRIDGE, *GRIFFIN*, as specified, with instructions but **without** conductivity cell. For 240–250V 50Hz supplies.

PJK-300-A Conductance bridge **£51·75**

ACCESSORIES

Conductivity cells, with platinum plate electrodes sealed within a borosilicate glass cell, 15mm diameter, having two 3 to 4mm apertures at the top. Cell constant approximately 1·5, the exact value being inscribed. Overall length 400mm, with 2-core cable and 4mm plugs.

PJK-320-510J	Conductivity cell, bright platinum	**£7·88**
PJK-320-518Q	Conductivity cell, platinum black	**£7·88**

CONDUCTIVITY BRIDGES

Battery operated, with measurements made by an a.c. bridge, energised at low potential by a 1kHz oscillator. The combination of low potential and high frequency obviates errors due to polarisation within the conductivity cell. Using the cells provided, measurement is possible over the stated ranges in three switched steps. The range selector switch also has a test position at which the bridge calibration can be checked.



PJK-400

CONDUCTIVITY BRIDGE, *ELECTRONIC SWITCHGEAR* **MC-3,** range 0·1 to 10^5 μS/cm, as specified, with one beaker type conductivity cell, approximately 12ml capacity, constant 1·0, which plugs into the side of the bridge. Overall dimensions 240 × 190 × 90mm, mass 2kg. With one conductivity cell, cleaning brush, thermometer, plastics carrying case and EVER READY PP4 battery.

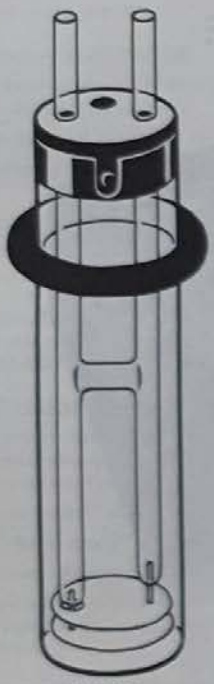
PJK-400-P Conductivity bridge **£90·75**

SPARE PARTS

PJK-410-010F	Conductivity cell, 12ml	**£17·60**
	Battery	See BMT-540-070D



PJK-480



PJK-630

CONDUCTIVITY BRIDGE, *ELECTRONIC SWITCHGEAR* **MC-1,** range 0·1 to $10^4\mu$S/cm, as specified, with two beaker type conductivity cells, one approximately 12ml capacity, constant 1·0, and the other approximately 25ml capacity, constant 0·1. Each cell has a removable plug to facilitate cleaning and a funnel-shaped entry to permit use with liquid sludges, wet soil samples and other similar materials. Temperature compensation facilities for dilute aqueous solutions (coefficient 2%/°C) are provided over the range 10 to $10^4\mu$S/cm. Outside this range or for other solutions, the compensation coefficient can be calculated from measurements made at two different temperatures. Overall dimensions 320×220×120mm, mass 3·6kg. With two conductivity cells, cleaning brush, thermometer, carrying case, EVER READY PP7 battery and instructions.

PJK-480-F	Conductivity bridge	**£137·50**

SPARE PARTS

PJK-490-030M	Conductivity cell, 12ml	**£18·70**
PJK-490-050G	Conductivity cell, 25ml	**£18·70**
	Battery	*See BMT-540-110R*

CONDUCTIVITY CELL, Ostwald, for general use with electrolytes of good conductivity, or where only small amounts of sample are available (Findlay, *Practical Physical Chemistry*, 7th edn, p. 160).

Comprises borosilicate glass tube 90mm long, upper 50mm is 30mm diameter and lower portion 15mm diameter. With insulating cap fitted with two bridged glass tubes supporting two platinum electrodes 10mm diameter and 25mm apart. Cell constant approximately 3·15.

PJK-600-W	Conductivity cell	**£28·07**

CONDUCTIVITY CELL, uncalibrated, borosilicate glass, with bright platinum disc electrodes, 22mm diameter, 3·5mm apart, supported by ebonite cover.

PJK-630-B	Conductivity cell	**£82·24**



PJM-500

MOLAR MASS APPARATUS, Washburn and Read, for determinations by elevation of the boiling point. With Cottrell pump (Findlay, *Practical Physical Chemistry, 1954*).

Comprises a boiling tube, with a short tungsten wire heater fused into the base, fitted by a 29/32 joint with a thermometer adapter having a cylindrical extension to shield the thermometer bulb. A side arm is fitted with a 200mm Liebig condenser by a 14/23 joint. A Cottrell pump rests inside the boiling tube and has three branches which terminate above the thermometer bulb. **Without** thermometer.

PJM-500-K	Molar mass apparatus	**£13·61**

SPARE PARTS

PJM-520-030K	Boiling tube	**£3·99**
PJM-520-050E	Thermometer adapter	**£2·25**
PJM-520-070V	Condenser	**£4·44**
PJM-520-090P	Cottrell pump	**£3·33**

ACCESSORY

	Thermometer	*See THP-340-L*

Technico PIPETTES

TECHNICO pipettes, unless otherwise stated, are manufactured from selected grades of soda-lime glass. Soda-lime glass is uniformly wetted on the surface by most aqueous solutions and so gives a consistent form of meniscus for accurate reading, and consistent drainage for accurate calibration and repeatable content or delivery.

Most TECHNICO pipettes offered conform to the appropriate British Standards which in turn are being increasingly aligned with International Standards. Where no British Standard or International Standard is published TECHNICO pipettes are manufactured to GALLENKAMP specifications which are based on the same principles as comparable British Standards.

Jets and flow times

Practically all TECHNICO pipettes are machine made for consistency with fire polished jets of uniform bore and regular taper. These jets are extremely resistant to chipping, and therefore provide much longer useful working lives than other types.

The flow times for all pipettes tend towards the shorter ends of specifications for fastest possible operation consistent with accuracy. For graduated pipettes, the 1976 Revision of BS 700 specifies much faster outflow times than previously specified.

Content or delivery

Most TECHNICO pipettes are calibrated for delivery (Ex) of the stated volume or, in the case of graduated pipettes, intermediate volumes.

Pipettes calibrated for content (In) are intended for withdrawing precise volumes from sample sources but may be used to deliver the calibrated volume, provided all traces on the inside wall of the pipette are washed out with suitable solvent and bulked with the main sample.

All pipettes are calibrated at the standard temperature of 20°C.

Inscriptions

All TECHNICO pipettes have inscriptions of high definition and indelible metallic amber stains are used to provide the permanent scale and inscription markings printed on most TECHNICO pipettes.

Colour coding

Practically all TECHNICO pipettes are colour coded to British Standard 3996. Colour coding is intended to facilitate the sorting of similar types of pipettes by unskilled personnel. It is not intended as a quick means of identifying particular capacities although of course it is helpful for this purpose.

Pipette capacities (and basis of subdivision for graduated types) are denoted by one or two coloured bands circumscribed near the upper extremity.

BS 3996 COLOUR CODING

One mark and bulb pipettes

Colour	White	Orange	Black	Green	Red	2 Black	Blue	Orange	Black	2 Red
Capacity, ml	0·005	0·01	0·02	0·05	0·2	0·5	1	2	3	4
Colour	White	Red	Green	Yellow	Blue	Black	White	Red	Yellow	
Capacity, ml	5	10	15	20	25	30	40	50	100	

Graduated pipettes

Colour	2 Green	Red	White	2 Orange	2 White	Black	Orange	Green
Capacity, ml	0·1	0·1	0·1	0·1	0·2	0·2	0·2	0·5
Subdivision, ml	0·001	0·005	0·01	0·05	0·002	0·01	0·1	0·005
Colour	2 Red	Yellow	Red	Black	Red	Blue	Orange	Green
Capacity, ml	0·5	1	1	2	5	5	10	25
Subdivision, ml	0·02	0·01	0·1	0·02	0·05	0·1	0·1	0·2

Where two bands of colour are printed on the pipette to denote its capacity, they are printed in equal widths. When a second band of the same colour is much narrower than the first it denotes that the pipette is a graduated pipette to BS 700 Type I, i.e. a delivery pipette with zero at the mouthpiece end of the scale and the maximum capacity mark above the jet.

A plain white band or a sandblast band denotes that the pipette is designed for blowout of the last drop.

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Gallenkamp

GENERAL PURPOSE PIPETTES

ONE MARK BULB PIPETTES

DATA SPECIFIED IN BS 1583, ONE MARK PIPETTES

Nominal capacity, ml	0·5	1	2	3	4	5	10	15	20	25	50	100
Class A tolerance, ±ml	0·005	0·007	0·01	0·015	0·015	0·015	0·02	0·025	0·03	0·03	0·04	0·06
Class B tolerance, ±ml	0·01	0·015	0·02	0·03	0·03	0·03	0·04	0·05	0·06	0·06	0·08	0·12
Class A delivery time, s	7 to 15	7 to 15	7 to 15	10 to 20	10 to 20	15 to 25	15 to 25	20 to 30	25 to 40	25 to 40	30 to 50	40 to 60
Class B delivery time, s	5 to 15	5 to 15	5 to 15	7 to 20	7 to 20	10 to 25	10 to 25	15 to 30	20 to 40	20 to 40	20 to 50	30 to 60



PMC-200
0·5 to 2ml



PMC-200
sizes above 2ml



PMC-240

PIPETTES, *TECHNICO,* **BS 1583 Class B.** Calibrated for delivery (Ex). Colour coded.

PMC-200-010G	Pipette, 0·5ml*	**£0·38**
PMC-200-020D	Pipette, 1ml*	**£0·43**
PMC-200-022W	Pipettes, 1ml	Pack of 10 **£3·11**
PMC-200-030A	Pipette, 2ml	**£0·43**
PMC-200-032T	Pipettes, 2ml	Pack of 10 **£3·11**
PMC-200-040U	Pipette, 2·5ml	**£0·56**
PMC-200-050R	Pipette, 3ml	**£0·43**
PMC-200-060X	Pipette, 4ml	**£0·43**
PMC-200-070L	Pipette, 5ml	**£0·49**
PMC-200-072H	Pipettes, 5ml	Pack of 10 **£3·57**
PMC-200-080Y	Pipette, 10ml	**£0·55**
PMC-200-082E	Pipettes, 10ml	Pack of 10 **£4·03**
PMC-200-090F	Pipette, 15ml	**£0·60**
PMC-200-100F	Pipette, 20ml	**£0·76**
PMC-200-102B	Pipettes, 20ml	Pack of 10 **£5·75**
PMC-200-110C	Pipette, 25ml	**£0·79**
PMC-200-112V	Pipettes, 25ml	Pack of 10 **£5·98**
PMC-200-120W	Pipette, 30ml†	**£0·94**
PMC-200-130T	Pipette, 40ml†	**£1·04**
PMC-200-140Q	Pipette, 50ml	**£0·98**
PMC-200-142M	Pipettes, 50ml	Pack of 10 **£7·36**
PMC-200-150N	Pipette, 100ml	**£1·31**
PMC-200-152J	Pipettes, 100ml	Pack of 10 **£10·81**

*** Straight pattern, without bulb.**
† Sizes not included in BS 1583.

PIPETTES, *TECHNICO,* **BS 1583 Class B.** Calibrated for delivery (Ex). With safety bulb in suction tube. Colour coded.

PMC-240-070G	Pipette, 5ml	**£0·85**
PMC-240-080D	Pipette, 10ml	**£0·92**
PMC-240-100A	Pipette, 20ml	**£0·99**
PMC-240-110U	Pipette, 25ml	**£1·06**
PMC-240-140L	Pipette, 50ml	**£1·27**

PIPETTES, *TECHNICO,* **BS 1583 Class A.** Calibrated for delivery (Ex). Colour coded.

PMC-280-010T	Pipette, 0·5ml*	**£1·04**
PMC-280-020Q	Pipette, 1ml*	**£1·39**
PMC-280-022M	Pipettes, 1ml	Pack of 10 **£11·50**
PMC-280-030N	Pipette, 2ml	**£1·39**
PMC-280-032J	Pipettes, 2ml	Pack of 10 **£11·50**
PMC-280-050H	Pipette, 3ml	**£1·44**
PMC-280-060E	Pipette, 4ml	**£1·52**
PMC-280-070B	Pipette, 5ml	**£1·52**
PMC-280-072U	Pipettes, 5ml	Pack of 10 **£12·42**
PMC-280-080V	Pipette, 10ml	**£1·67**
PMC-280-082R	Pipettes, 10ml	Pack of 10 **£13·80**
PMC-280-090S	Pipette, 15ml	**£1·67**
PMC-280-100S	Pipette, 20ml	**£1·84**
PMC-280-102X	Pipettes, 20ml	Pack of 10 **£15·18**
PMC-280-110P	Pipette, 25ml	**£1·86**
PMC-280-112L	Pipettes, 25ml	Pack of 10 **£15·41**
PMC-280-140G	Pipette, 50ml	**£1·96**
PMC-280-150D	Pipette, 100ml	**£2·30**

PIPETTES, *TECHNICO,* as PMC-280 but with works' certificate of examination stating the volume delivered and the delivery time for water.

PMC-310-010X	Pipette, 0·5ml*	**£1·55**
PMC-310-020L	Pipette, 1ml*	**£1·78**
PMC-310-030Y	Pipette, 2ml	**£1·84**
PMC-310-050C	Pipette, 3ml	**£1·84**
PMC-310-060W	Pipette, 4ml	**£1·90**
PMC-310-070T	Pipette, 5ml	**£1·96**
PMC-310-080Q	Pipette, 10ml	**£2·01**
PMC-310-090N	Pipette, 15ml	**£2·19**
PMC-310-100N	Pipette, 20ml	**£2·19**
PMC-310-110K	Pipette, 25ml	**£2·24**
PMC-310-140B	Pipette, 50ml	**£2·47**
PMC-310-150V	Pipette, 100ml	**£2·88**

PIPETTES, Class B, safety pattern with all glass syringe for filling. Calibrated for delivery (Ex).

PMC-370-020P	Pipette, 1ml	**£3·66**
PMC-370-030M	Pipette, 2ml	**£3·66**
PMC-370-070A	Pipette, 5ml	**£4·48**
PMC-370-080U	Pipette, 10ml	**£5·38**
PMC-370-110X	Pipette, 25ml	**£5·47**

*** Straight pattern, without bulb.**



PMC-280
PMC-310



PMC-370

Gallenkamp

GRADUATED PIPETTES

Description of types in BS 700

Type 1 graduated pipettes (adjusted for delivery from zero line to any graduation line)

Type 1 pipettes are the type preferred for use in general analytical chemistry for the delivery of measured quantities of a liquid. They can be used for 'titrations' when it is not required to know with a high degree of accuracy the volume of the titrant added.

Type 2 graduated pipettes (adjusted for delivery from any graduation line to jet)

Type 2 pipettes are also used in general analytical chemistry as 'transfer' pipettes, and may be used for such operations as serial dilutions.

Type 3 graduated pipettes (adjusted for delivery from zero line to jet)

Type 3 pipettes are mainly used in serology for the delivery of measured quantities of a liquid, where a high degree of accuracy is not important, and the solutions are often viscous.

Type 4 graduated blow-out pipettes (adjusted for delivery from zero line to jet)

Type 4 pipettes are used in the same manner as Type 3 pipettes, but can be used with any viscous liquid where the last drops in the jet are conveniently expelled by blowing.

DATA SPECIFIED IN BS 700 GRADUATED PIPETTES

Nominal capacity, ml	1	2	5	10	25
Class A tolerance (all types), ±ml	0·006	0·01	0·03	0·05	0·1
Class B tolerance (all types), ±ml	0·01	0·02	0·05	0·1	0·2
Type 1 delivery time, s Class A	7 to 10	8 to 12	10 to 14	13 to 17	15 to 21
Class B	5 to 7	6 to 9	7 to 10	9 to 13	11 to 16
Type 2 delivery time, s Class A	5 to 7	6 to 9	8 to 11	10 to 13	11 to 16
Class B	3 to 5	4 to 6	5 to 7	6 to 9	8 to 11
Type 3 delivery time, s	3 to 5	4 to 6	5 to 7	6 to 9	8 to 11
Type 4 delivery time, s	3 to 5	4 to 6	5 to 7	6 to 9	8 to 11

DATA SPECIFIED IN BS 773 OSTWALD-FOLIN PIPETTES

Nominal capacity, ml	0·2	0·5	1	2	3
Tolerance, ±ml	0·003	0·004	0·005	0·006	0·010
Delivery time, s	3 to 6	4 to 8	5 to 10	7 to 15	10 to 20

PIPETTES, *TECHNICO,* **BS 700 Class B Type 1.** Calibrated for delivery (Ex) from zero at the top of the scale to any scale division. Colour coded.

PMF-250-040B	Pipette, 1 × 0·01 ml	£0·58
PMF-250-042U	Pipettes, 1 × 0·01 ml	Pack of 10 £4·14
PMF-250-050V	Pipette, 2 × 0·02 ml	£0·58
PMF-250-052R	Pipettes, 2 × 0·02 ml	Pack of 10 £4·14
PMF-250-070P	Pipette, 5 × 0·05 ml	£0·58
PMF-250-072L	Pipettes, 5 × 0·05 ml	Pack of 10 £4·14
PMF-250-080M	Pipette, 10 × 0·1 ml	£0·58
PMF-250-082Y	Pipettes, 10 × 0·1 ml	Pack of 10 £4·14
PMF-250-110G	Pipette, 25 × 0·2 ml	£0·76

PIPETTES, *TECHNICO,* as PMF-250 but **Class A.**

PMF-280-040D	Pipette, 1 × 0·01 ml	£2·36
PMF-280-050A	Pipette, 2 × 0·02 ml	£2·36
PMF-280-070R	Pipette, 5 × 0·05 ml	£2·42
PMF-280-080X	Pipette, 10 × 0·1 ml	£2·47
PMF-280-110Y	Pipette, 25 × 0·2 ml	£3·11

PIPETTES, *TECHNICO,* **BS 700 Class B Type 2.** Calibrated for delivery (Ex) from any scale graduation to jet. Colour coded.

PMF-330-040H	Pipette, 1 × 0·01 ml	£0·54
PMF-330-042D	Pipettes, 1 × 0·01 ml	Pack of 10 £3·91
PMF-330-050E	Pipette, 2 × 0·02 ml	£0·55
PMF-330-052A	Pipettes, 2 × 0·02 ml	Pack of 10 £4·03
PMF-330-070V	Pipette, 5 × 0·05 ml	£0·58
PMF-330-072R	Pipettes, 5 × 0·05 ml	Pack of 10 £4·14
PMF-330-080S	Pipette, 10 × 0·1 ml	£0·60
PMF-330-082X	Pipettes, 10 × 0·1 ml	Pack of 10 £4·37
PMF-330-110M	Pipette, 25 × 0·2 ml	£0·76

PIPETTES, *TECHNICO,* as PMF-330 but **Class A.**

PMF-360-040J	Pipette, 1 × 0·01 ml	£2·36
PMF-360-050G	Pipette, 2 × 0·02 ml	£2·36
PMF-360-070A	Pipette, 5 × 0·05 ml	£2·42
PMF-360-080U	Pipette, 10 × 0·1 ml	£2·47
PMF-360-110X	Pipette, 25 × 0·2 ml	£3·11

PIPETTES, graduated, Class B, safety pattern, with all glass syringe for filling. Calibrated for delivery (Ex) from any scale graduation to jet.

PMF-410-040N	Pipette, 1 × 0·01 ml	**£4·27**
PMF-410-050K	Pipette, 2 × 0·02 ml	**£4·27**
PMF-410-070E	Pipette, 5 × 0·05 ml	**£4·87**
PMF-410-080B	Pipette, 10 × 0·1 ml	**£5·90**
PMF-410-110S	Pipette, 25 × 0·2 ml	**£6·23**

The following fast flow and blow-out pipettes are especially suitable for serological applications and routines involving high speeds of use, viscous samples, etc.

PIPETTES, *TECHNICO,* **BS 700 Class B Type 3,** fast flow. Calibrated for delivery (Ex) from zero at the top of the scale to jet. Colour coded.

PMF-460-040B	Pipette, 1 × 0·01 ml	**£0·51**
PMF-460-042U	Pipettes, 1 × 0·01 ml	Pack of 10 **£3·68**
PMF-460-050V	Pipette, 2 × 0·02 ml	**£0·51**
PMF-460-052R	Pipettes, 2 × 0·02 ml	Pack of 10 **£3·68**
PMF-460-070P	Pipette, 5 × 0·05 ml	**£0·51**
PMF-460-072L	Pipettes, 5 × 0·05 ml	Pack of 10 **£3·68**
PMF-460-080M	Pipette, 10 × 0·1 ml	**£0·51**
PMF-460-082Y	Pipettes, 10 × 0·1 ml	Pack of 10 **£3·68**
PMF-460-110G	Pipette, 25 × 0·2 ml	**£0·51**

PIPETTES, graduated, disposable. Capacity 1 ml subdivided 0·01 ml. Accuracy ±2%. Calibrated for delivery (Ex) from zero at the top of the scale to jet with blow-out of the last drop. Delivery time approximately 2s. Sterilised during manufacture using steam at 134°C. Supplied cotton wool plugged in pack of 500 with 5 rubber teats. Intended to be used once only.

PMF-580-040C	Pipettes	Pack **£24·25**

PIPETTES, *TECHNICO,* **Class B,** fast flow, blow-out. Calibrated for delivery (Ex) from zero at the top of the scale to jet with blow-out of the last drop. Colour coded.

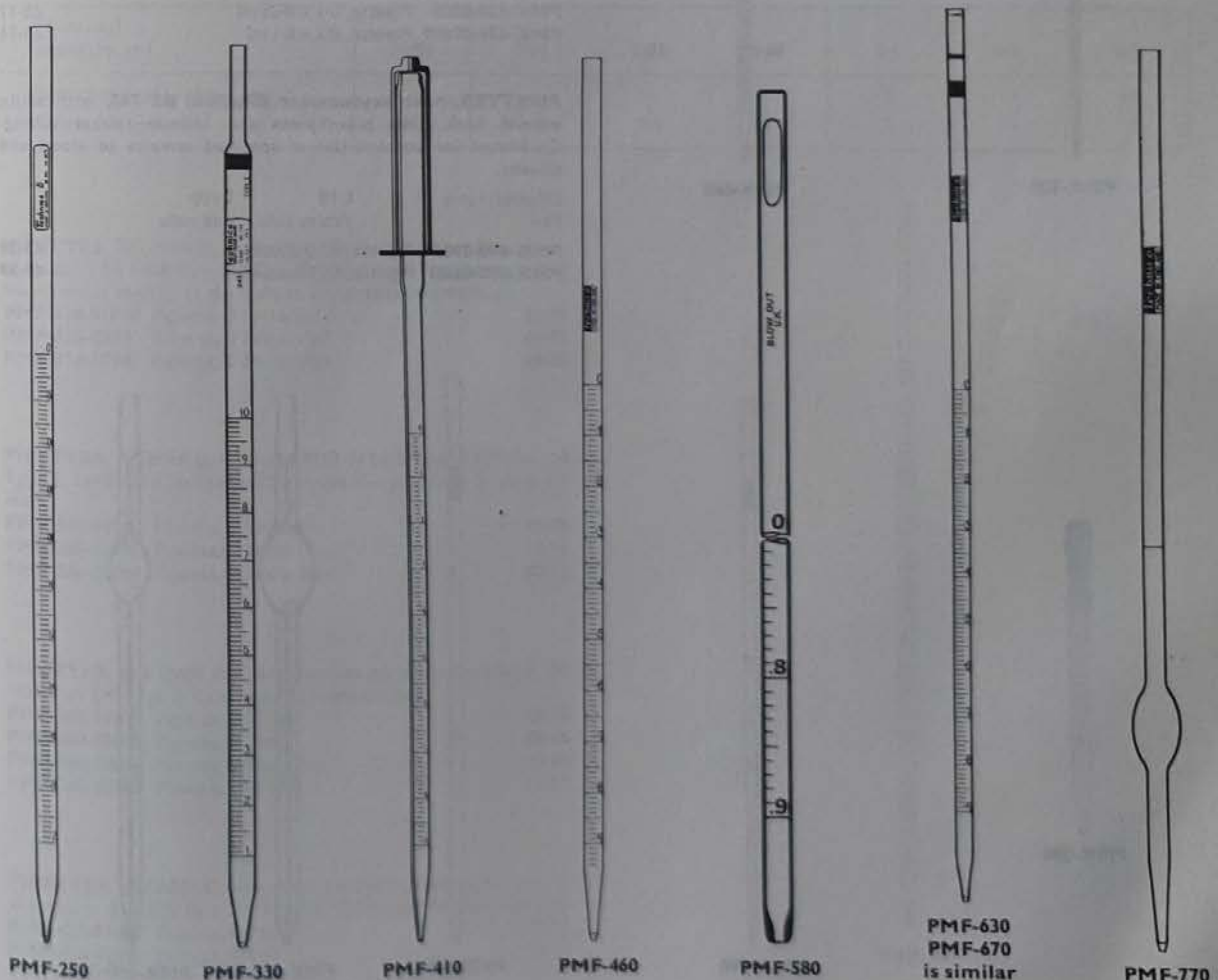
PMF-630-010P	Pipette, 0·1 ml	**£0·59**
PMF-630-020M	Pipette, 0·2 ml	**£0·61**

PIPETTES, *TECHNICO,* **BS 700 Class B Type 4,** fast flow, blow-out, otherwise similar to PMF-630 in a range of larger capacities.

PMF-670-040B	Pipette, 1 × 0·01 ml	**£0·39**
PMF-670-050V	Pipette, 2 × 0·02 ml	**£0·39**
PMF-670-070P	Pipette, 5 × 0·05 ml	**£0·39**
PMF-670-080M	Pipette, 10 × 0·1 ml	**£0·39**
PMF-670-110G	Pipette, 25 × 0·2 ml	**£0·48**

PIPETTES, *TECHNICO,* **Ostwald-Folin, BS 773,** one mark. Calibrated for delivery (Ex) to the jet, with blow-out of the last drop. Colour coded.

PMF-770-020W	Pipette, 0·2 ml	**£0·90**
PMF-770-030T	Pipette, 0·5 ml	**£0·90**
PMF-770-040Q	Pipette, 1 ml	**£0·99**
PMF-770-050N	Pipette, 2 ml	**£1·04**



PMF-250 PMF-330 PMF-410 PMF-460 PMF-580 PMF-630 PMF-670 is similar PMF-770

DISPOSABLE DOSING PIPETTES

Pasteur pipettes which enable blood, serum and other biological fluids to be transferred under sterile conditions. A constriction in the neck acts as a stop for the cotton wool plug and enables the pipette to be carried horizontally when filled. Uncalibrated, with cotton wool plug. The dimension given is the length.

PMK-300-030E	Dosing pipettes, 145mm	Pack of 250 **£3·71**
PMK-300-032A	Dosing pipettes, 145mm	Pack of 1000 **£13·50**
PMK-300-050V	Dosing pipettes, 225mm	Pack of 250 **£3·96**
PMK-300-052R	Dosing pipettes, 225mm	Pack of 1000 **£14·40**
PMK-300-070P	Dosing pipettes, 270mm	Pack of 250 **£4·33**
PMK-300-072L	Dosing pipettes, 270mm	Pack of 1000 **£15·75**



PMK-300



PMK-560

DROPPING (TEAT) PIPETTES

PIPETTES, dropping, with teat. PMK-380-040X has one graduation mark; PMK-380-050L is ungraduated and capacity given is approximate.

PMK-380-040X	Pipettes, 1ml	Pack of 12 **£0·91**
PMK-380-050L	Pipettes, 2ml	Pack of 12 **£0·81**

HAEMATOLOGY PIPETTES

PIPETTES, *TECHNICO*, **blood and opsonic index,** with white enamel back and nipple fitting for teat. Calibrated for content (In) of an accurate volume of blood which must be completely washed out in use. Colour coded (except 0·05ml size).

PMK-560-010V	Pipette, 0·05 × 0·0005ml	**£0·90**
PMK-560-030P	Pipette, 0·1 × 0·001ml	**£0·71**
PMK-560-050J	Pipette, 0·2 × 0·002ml	**£0·71**
PMK-560-070D	Pipette, 0·5 × 0·005ml	**£0·71**
PMK-560-090U	Pipette, 1 × 0·01ml	**£0·71**

PIPETTES, *TECHNICO*, **Ostwald-van Slyke,** for blood gas analysis. Calibrated with three marks for delivery (Ex) of 0·05 or 0·1ml between marks. Type PMK-590-030R has a stopcock below the lowest graduation.

PMK-590-010A	Pipette	**£2·70**
PMK-590-030R	Pipette with stopcock	**£4·14**

PIPETTES, *TECHNICO*, **blood sugar,** with white enamel back and nipple fitting for teat. Calibrated with two marks for content (In). Colour coded.

PMK-630-030F	Pipette, 0·1 × 0·05ml	**£0·71**
PMK-630-050W	Pipette, 0·2 × 0·1ml	**£0·71**

PIPETTES, haemacytometer dilution, BS 748, with white enamel back, glass mouthpiece and 150mm rubber tubing. Calibrated for content (In) of specified samples of blood and diluent.

Dilution ratio		1:10	1:100
For		White cells	Red cells
PMK-690-030J	Pipette, 1:10 dilution		**£1·39**
PMK-690-050D	Pipette, 1:100 dilution		**£1·39**



PMK-380



PMK-590



PMK-630



PMK-690-030



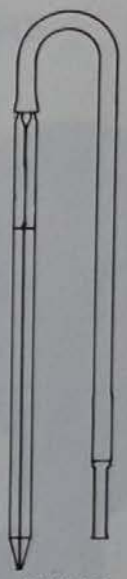
PMK-690-050

PIPETTES, haemoglobinometer capillaries. Precision tubes which fill by capillary action and can be broken off, the detached part containing 0·02ml for immediate dilution (Lewis and Benjamin, *J. Clin. Path.* (1956), **18**, 689).

PMK-750-010M Pipettes — Pack of 1000 **£48·94**

PIPETTES, haemoglobinometer, Sahli, with white enamel back, glass mouthpiece and 150mm rubber tubing. Calibrated for content (In) of specified volume.

PMK-790-010H Pipette, 0·02ml — **£0·69**
PMK-790-030B Pipette, 0·05ml — **£0·60**



PMK-790

MICROCHEMISTRY PIPETTES

DATA SPECIFIED IN BS 1428 MICROCHEMICAL APPARATUS PART D4 CAPILLARY PIPETTES

Nominal capacity, ml	0·005	0·01	0·02	0·05	0·1	0·2	0·5
Subdivided, μl (Types 1 and 2)	–	–	–	–	5	10	20
Tolerance, $\pm\mu$l	0·2	0·2	0·4	1	2	4	6

PIPETTES, *TECHNICO*, graduated capillary pipettes for microchemistry, BS 1428 Part D4 Type 1. Calibrated for delivery (Ex) from zero at the top of the scale to any graduation mark.

PMP-310-010W Pipette, 0·1ml × 5μl — **£0·78**
PMP-310-020T Pipette, 0·2ml × 10μl — **£0·78**
PMP-310-050K Pipette, 0·5ml × 20μl — **£0·76**

PIPETTES, *TECHNICO*, similar to PMP-310 but to BS 1428 Part D4 Type 2, calibrated for content (In) from the jet to any graduation mark.

PMP-340-010B Pipette, 0·1ml × 5μl — **£0·78**
PMP-340-020V Pipette, 0·2ml × 10μl — **£0·78**
PMP-340-050M Pipette, 0·5ml × 20μl — **£0·76**

PIPETTES, one mark capillary pipettes for microchemistry, BS 1428 Part D4 Type 3. Calibrated for content (In).

PMP-380-010T Pipette, 0·005ml — **£0·76**
PMP-380-020Q Pipette, 0·01ml — **£0·66**
PMP-380-030N Pipette, 0·02ml — **£0·66**
PMP-380-050H Pipette, 0·05ml — **£0·66**

PIPETTES, *TECHNICO*, two mark capillary pipettes for microchemistry, BS 1428 Part D4 Type 4. Calibrated for content (In).

PMP-420-010H Pipette, 0·1ml — **£0·71**
PMP-420-020E Pipette, 0·2ml — **£0·71**



PMP-340

Gallenkamp



PMP-550
PMP-580



PMP-640

MICROPIPETTES

PIPETTES, micro, Lang Levy pattern with automatic zero. Calibrated for delivery (Ex).

PMP-550-030S	Pipette, 10 ± 0·5 µl	£1·25
PMP-550-050M	Pipette, 20 ± 1 µl	£1·25
PMP-550-070G	Pipette, 25 ± 1 µl	£1·25
PMP-550-090A	Pipette, 50 ± 1 µl	£1·25
PMP-550-110U	Pipette, 100 ± 2 µl	£1·25
PMP-550-130X	Pipette, 150 ± 3 µl	£1·25
PMP-550-150Y	Pipette, 200 ± 4 µl	£1·25
PMP-550-170C	Pipette, 250 ± 5 µl	£1·25

PIPETTES, micro, Lang Levy pattern with automatic zero. Calibrated for content (In).

PMP-580-030U	Pipette, 10 ± 0·3 µl	£1·25
PMP-580-050X	Pipette, 20 ± 0·4 µl	£1·25
PMP-580-070Y	Pipette, 25 ± 0·5 µl	£1·25
PMP-580-090C	Pipette, 50 ± 0·5 µl	£1·25
PMP-580-110W	Pipette, 100 ± 1 µl	£1·25
PMP-580-130Q	Pipette, 150 ± 1·5 µl	£1·25
PMP-580-150K	Pipette, 200 ± 2 µl	£1·25
PMP-580-170E	Pipette, 250 ± 2·5 µl	£1·25

PIPETTES, ultra-micro, Kirk pattern. Calibrated for content (In).

PMP-640-030R	Pipette, 5 ± 0·03 µl	£1·32
PMP-640-050L	Pipette, 10 ± 0·05 µl	£1·32
PMP-640-070F	Pipette, 25 ± 0·15 µl	£1·50
PMP-640-090W	Pipette, 50 ± 0·15 µl	£1·50
PMP-640-110T	Pipette, 100 ± 0·3 µl	£1·50

PIPETTES, micro, automatic. Lightweight and compact, with a metal barrel and nozzle and a one stroke operating plunger. In use, a disposable polypropylene tip is fitted to the nozzle and the plunger depressed and released with the tip dipping into sample. The sample is expelled from the tip when the plunger is depressed again. Thus, liquids to be dispensed come into contact only with the tip. Accuracy ± 1% at 20°C. **Without** tips. (F)

PMP-690-030F	Pipette, 5 µl	£11·55
PMP-690-050W	Pipette, 10 µl	£11·55
PMP-690-070Q	Pipette, 25 µl	£11·55
PMP-690-090K	Pipette, 50 µl	£11·55
PMP-690-110H	Pipette, 100 µl	£11·55
PMP-690-130B	Pipette, 250 µl	£11·55



PMP-690



PMP-800



PMP-910

ACCESSORIES

PMP-710-502P	Tips, polypropylene, disposable	Pack of 500 £3·38

PIPETTE, micrometer syringe, *AGLA*, comprising 0·5 ml all glass hypodermic syringe with Luer nozzle, attached by a rigid holder to a micrometer screw which operates the piston. The micrometer head is direct reading to an accuracy of 0·00005 ml. With straight and right-angle glass capillary needles and retort stand mounting attachment.

PMP-800-P	Pipette	£52·64

SPARE PARTS

PMP-820-030P	Syringe	£15·40
PMP-820-050J	Needle, straight	£4·24
PMP-820-070D	Needle, right-angle	£4·24

WARBURG PIPETTES

PIPETTES, *TECHNICO*, **Warburg,** with long jet for use with Warburg flasks. Calibrated for delivery (Ex) from zero at the top of the scale to any graduation. Colour coded.

PMP-910-010U	Pipette, 0·1 ml	£0·85
PMP-910-020R	Pipette, 0·2 ml	£0·85
PMP-910-050Y	Pipette, 0·5 ml	£0·81
PMP-910-070C	Pipette, 1 ml	£0·69

Griffin PIPETTE FILLERS

- Precise, fingertip control
- Colour identification
- No metal parts to corrode
- Suitable for bulb or cylindrical pipettes

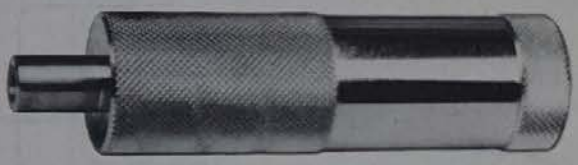


PMR-330

PIPETTE FILLER, *GRIFFIN*, comprising a moulded rubber bulb, approximately 60ml capacity, fitted with three glass ball valves which can be controlled by pressure between finger and thumb. There are no metal parts to corrode and the filler can be used for all liquids except those which attack rubber. Can be used on bulb or cylindrical pipettes from 2 to 50ml capacity. Available in a choice of colours for coding purposes.

PMR-330-030F	Pipette filler, black	£2·81
PMR-330-050W	Pipette filler, blue	£2·81
PMR-330-070Q	Pipette filler, red	£2·81
PMR-330-090K	Pipette filler, yellow	£2·81

MICROPIPETTE FILLER


PMR-400

MICROPIPETTE FILLER, provides precise control for filling and emptying micropipettes. The filler body is stainless steel, with a light alloy piston sealed by an 'O' ring. Knurling on the knob and body enables the device to be used with one hand. Micropipettes should be attached to the 6mm diameter filler nozzle by a short length of heavy wall tubing. Approximate overall dimensions 50 x 16mm diameter, approximate capacity 2ml. Suitable for use with micropipettes up to 1ml capacity.

PMR-400-E	Micropipette filler	£2·25

Bulbs and teats for use with Pipettes See *BVJ-300 et seq.*

PIPETTE ACCESSORIES

Sterilising boxes See *SVF-760-030G et seq.*

Support racks and stands See *STK-310-Y et seq.*

Washers and soaking jars See *WCK-550-030-C et seq.*



DISPENSING PIPETTES



PMR-610

PIPETTES, *TECHNICO*, **Dafert automatic pattern, BS 1132.** Bulb enables overflow on filling to be returned to reservoir. Calibrated for delivery (Ex).

PMR-610-030S	Pipette, 5 ± 0·06 ml	£4·95
PMR-610-050M	Pipette, 10 ± 0·08 ml	£4·60
PMR-610-070G	Pipette, 25 ± 0·12 ml	£4·95
PMR-610-090A	Pipette, 50 ± 0·15 ml	£5·75
PMR-610-110U	Pipette, 100 ± 0·25 ml	£7·59

PIPETTES, *TECHNICO*, **automatic dispensing.** Adjustable capacity pipettes with plastics reservoirs for the rapid dispensing of preset volumes of liquids. Comprises a graduated glass barrel with piston fitted with a silicone rubber sealing ring. A siphon tube on the pipette provides automatic zero adjustment. The pipette is mounted on a polythene bottle and by squeezing the bottle, the liquid can be made to rise in the pipette to slightly above the zero mark. The excess liquid is sucked back by the siphon tube when the bottle is released. The preset volume may then be dispensed.

Capacity, ml	10	50
Subdivisions, ml	0·2	1
Bottle capacity, ml	600	1200

PMR-670-080H	Pipette, 10 ml	£6·41
PMR-670-130S	Pipette, 50 ml	£7·71

SPARE PARTS

PMR-690-080Q	Main glass part, 10 ml	£3·28
PMR-690-130E	Main glass part, 50 ml	£4·72



PMR-670

PIPETTES, automatic tilting, for rapid dispensing of replicate volumes with approximate accuracy. Fitted with a 24/29 polythene stopper on 500 ml reservoir bottle.

PMR-780-040E	Pipette, 1 ml	£2·64
PMR-780-050B	Pipette, 2 ml	£2·53
PMR-780-070S	Pipette, 5 ml	£2·53
PMR-780-080P	Pipette, 10 ml	£2·70
PMR-780-090M	Pipette, 15 ml	£3·15
PMR-780-100M	Pipette, 20 ml	£3·49
PMR-780-110J	Pipette, 25 ml	£3·71
PMR-780-150U	Pipette, 50 ml	£4·73

SPARE PARTS

PMR-800-040G	Main glass part, 1 ml	£2·14
PMR-800-050D	Main glass part, 2 ml	£2·03
PMR-800-070U	Main glass part, 5 ml	£2·03
PMR-800-080R	Main glass part, 10 ml	£2·19
PMR-800-090X	Main glass part, 15 ml	£2·70
PMR-800-100X	Main glass part, 20 ml	£2·98
PMR-800-110L	Main glass part, 25 ml	£3·26
PMR-800-150W	Main glass part, 50 ml	£4·28



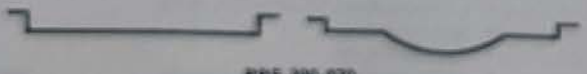
PMR-780

Pipettes, for dairy product testing
See *DBH-610-B to DBH-630-K and DBH-370*

PLANCHETS

PLANCHETS, aluminium, for use as a source tray for lead castles. External diameter 26 mm, internal diameter 23 mm, depth 1·75 mm.

PPF-300-050P	Planchets, flat	Pack of 100 £1·31
PPF-300-070J	Planchets, dimpled	Pack of 100 £3·49



PPF-300-070

PLANIMETERS

For area measurements to an accuracy of approximately ±0·5% under optimum measuring conditions



PPJ-260

PLANIMETER, *ALLBRIT,* **fixed index pattern** with metric scale. With zero reset button, measuring wheel carriage with integral magnifier, pivoting pole arm and fixed length tracer arm. Measures full scale areas up to 710mm diameter with pole inside or up to 320mm diameter with pole outside the area being traced. For areas other than full scale, conversion tables must be used. Supplied in a case with area conversion tables, checking rule and instructions.

PPJ-260-C Planimeter **£88·28**

PLANIMETER, *ALLBRIT,* **sliding bar pattern** with Imperial scale. With zero reset button, pivoting pole arm and measuring wheel carriage which can be moved along a calibrated tracer arm to give direct reading of area independent of the scale. The measuring carriage has an integral magnifier. Measures full scale areas up to 28in. diameter with pole inside or up to 12·5in. diameter with pole outside the area being traced. Supplied in a case with calibration tables, checking rule and instructions.

PPJ-310-G Planimeter **£82·50**

PLASTICS SUNDRIES

Parafilm	*See SEL-430 and SEL-460-F*
Plastics bags	*See BAJ-260-N to BAJ-340*
Plastics labels	*See LAB-690-H to LAB-950-Q*
Plastics sealer	*See TOK-270-R*

PLATES

PLATES, white ceramic, square, edges smooth and bevelled. Thickness approximately 6mm.

PRC-300-030G Plates, 100 × 100mm Pack of 5 **£0·56**
PRC-300-050A Plates, 150 × 150mm Pack of 5 **£0·82**



PRC-300

PLATE, rigid white polystyrene, with 12 cavities for spot tests. Dimensions 115 × 95mm.

PRC-450-S Plate **£0·47**

PLATE, porcelain, glazed, with 12 cavities for spot tests. Dimensions 115 × 85mm.

PRC-500-W Plate **£1·27**



PRC-450
PRC-500

PLATES, porcelain, porous, unglazed. Circular with shallow rim. For drying crystals, etc. Dimension given is top diameter.

PRC-550-030B Plate, 100mm **£0·36**
PRC-550-050S Plate, 150mm **£0·66**

continued overleaf

SintAGlass PLATES



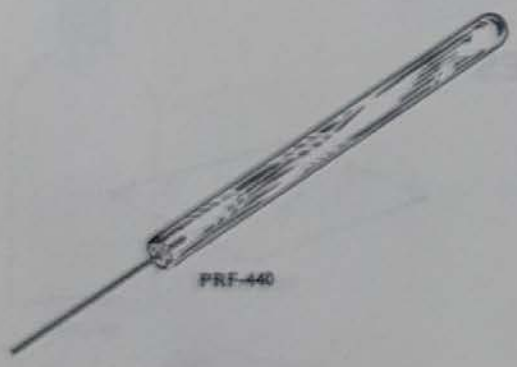
PRC-800

PLATES, *SINTAGLASS,* **flat,** unmounted, borosilicate glass. Suitable for filtering applications and as a convenient substrate in botanical work for growing seeds, germinating spores, etc. The No. shown is the porosity of the plate and the dimension given is the nominal diameter.

PRC-800-010S	Plate, No. 0, 10mm	£0·83
PRC-800-030M	Plate, No. 0, 15mm	£0·87
PRC-800-050G	Plate, No. 0, 20mm	£0·87
PRC-800-070A	Plate, No. 0, 30mm	£0·90
PRC-800-090R	Plate, No. 0, 40mm	£0·94
PRC-800-110X	Plate, No. 1, 10mm	£0·83
PRC-800-130Y	Plate, No. 1, 15mm	£0·87
PRC-800-150C	Plate, No. 1, 20mm	£0·87
PRC-800-170T	Plate, No. 1, 30mm	£0·90
PRC-800-190N	Plate, No. 1, 40mm	£0·94
PRC-800-210K	Plate, No. 2, 10mm	£0·83
PRC-800-230E	Plate, No. 2, 15mm	£0·87
PRC-800-250V	Plate, No. 2, 20mm	£0·87
PRC-800-270P	Plate, No. 2, 30mm	£0·90
PRC-800-290J	Plate, No. 2, 40mm	£0·94
PRC-800-310G	Plate, No. 3, 10mm	£0·83
PRC-800-330A	Plate, No. 3, 15mm	£0·87
PRC-800-350R	Plate, No. 3, 20mm	£0·87
PRC-800-370L	Plate, No. 3, 30mm	£0·90
PRC-800-390F	Plate, No. 3, 40mm	£0·94
PRC-800-410C	Plate, No. 4, 10mm	£0·83
PRC-800-430T	Plate, No. 4, 15mm	£0·87
PRC-800-450N	Plate, No. 4, 20mm	£0·87
PRC-800-470H	Plate, No. 4, 30mm	£0·90
PRC-800-490B	Plate, No. 4, 40mm	£0·94

For Technical data on SINTAGLASS Sintered Glassware
See page headed Sintered Glassware

PLATINUM



PRF-440

PLATINUM FOIL, width 26mm, thickness 0·05mm. Supplied in multiples of 10mm.

PRF-300-Y	Platinum foil	Unit of 10mm £2·64

PLATINUM WIRE. Dimension shown is diameter. Supplied in multiples of 100mm. (F)

PRF-400-030X	Platinum wire, 0·127mm	Unit of 100mm £0·39
PRF-400-050Y	Platinum wire, 0·376mm	Unit of 100mm £2·42
PRF-400-070C	Platinum wire, 0·508mm	Unit of 100mm £3·49
PRF-400-090T	Platinum wire, 0·635mm	Unit of 100mm £6·58
PRF-400-110Q	Platinum wire, 0·762mm	Unit of 100mm £7·99
PRF-400-130K	Platinum wire, 0·889mm	Unit of 100mm £11·93

PLATINUM WIRE, flame test, length 38mm, diameter 0·376mm, fused into glass handle 75mm long.

PRF-440-S	Platinum wire	£1·72

PLATINUM-IRIDIUM WIRE, 10% platinum alloy. 0·5mm diameter. Supplied in multiples of 100mm

PRF-480-N	Platinum-iridium wire	Unit of 100mm £4·22

Wire holder — *See DKD-430-N*

Platinum basins — *See BHT-670*

Platinum crucibles — *See CWB-400*

Griffin HALF SHADOW POLARIMETER

- **Scale 180mm diameter, vernier reading to 0·1°**
- **Suitable for monochromatic and white light**
- **POLAROID disc polariser and analyser**
- **Accepts 100 or 200mm solution tubes**


PSH-300

Half shadow angle approximately 5°. The polariser and analyser have POLAROID discs and the polariser is fitted with a condensing lens for parallel light. The scale, 180mm diameter, is divided in degrees, and a vernier scale reads to 0·1°.

Two V-supports, which can be positioned either 100 or 200mm apart, locate solution tubes in the optical axis and the solution tube is enclosed by an aluminium light shield. Mounted on a heavy cast base with an enamelled finish. All bright parts are plated. Overall height 390mm, overall length 370mm.

POLARIMETER, *GRIFFIN,* **half shadow,** as specified, with one 200mm solution tube.

PSH-300-A	Polarimeter	**£115·88**

SPARE PARTS and ACCESSORIES

PSH-320-030A	Solution tube, 100mm	**£10·24**
PSH-320-050R	Solution tube, 200mm	**£10·24**
PSH-320-090F	Rubber washers for tubes	Pack of 6 **£0·28**
	Sodium lamp outfit	*See LCH-600-Q and LCK-500-1901 plus LCK-550-502E to LCK-550-532S*

B and S POLARIMETERS

MODEL D

For testing sugar solutions and other optically active liquids

PRINCIPLE

The polarimeter comprises a pair of polarisers arranged in line, one of which can be rotated with respect to the other, the amount of rotation being measured by a divided circle. When the polarising planes are mutually perpendicular, no light is transmitted but, on introduction of a tube containing optically active liquid, transmitted light is seen to an extent measured by the rotation of one polariser to a position where light is no longer transmitted.

The instrument is fitted with a 100mm diameter glass circle which has a 360° angular scale subdivided at intervals of 1° and an International Sugar Scale −30° to +130° ISS subdivided to 1° ISS. Further subdivision is by means of a divided drum which enables the angular scale to be read to 0·05° and the sugar scale to 0·1° ISS. The instrument takes tubes up to 220mm long and is intended for use with sodium light, a suitable filter being included in the optical system.


PSH-400 with lamp PSH-440-502

POLARIMETER, *BELLINGHAM AND STANLEY* **Model D2,** as specified, with angular scale, International Sugar Scale, variable half shadow polariser and one 200mm tube.

PSH-400-P	Polarimeter	**£348·70**

POLARIMETER, *BELLINGHAM AND STANLEY* **Model D4,** as specified, with angular scale, International Sugar Scale, front focusing, fixed half shadow and one 200mm tube. Can be used with turbid solutions.

PSH-420-B	Polarimeter	**£348·70**

ACCESSORIES

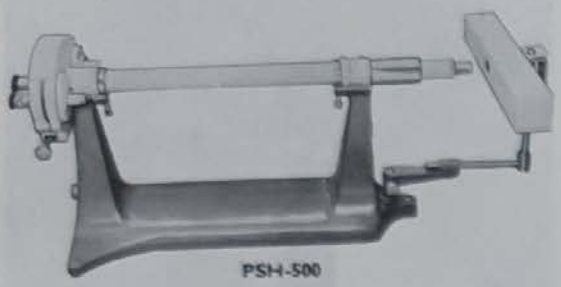
Sodium lamp, 35 W for mounting on polarimeter. For 220–240 V 50 Hz single phase supplies.

PSH-440-502J	Sodium lamp	**£9·40**
	Sodium lamp, bench mounting	See LCH-600-Q
	Polarimeter tubes	See PSH-370 to PSH-630

Gallenkamp

MODEL A

For routine precision polarimetric measurements



PSH-500

The polariser is a variable half shadow of the Lippich design and the angle between the two planes can be varied and locked between zero and 20°.

The analyser has a divided glass circle with double vernier reading to 0·01°. Three telescopes are provided, the central telescope is used to examine the field of the polariser and the two outer telescopes are used to observe the divided circle.

POLARIMETER, *BELLINGHAM AND STANLEY* **Model A No. P1,** as specified, for tubes up to 400 mm long, reading by double vernier to 0·01°. Fitted with variable half shadow polariser adjustment. **Without** tube.

PSH-500-H	Polarimeter	**£564·30**

ACCESSORIES

Sodium lamp	*See PSH-440-502*
Sodium lamp, bench mounting	*See LCH-600-Q*
Polarimeter tubes	*See PSH-570 to PSH-630*



PSH-570

POLARIMETER TUBES

Nominal bore 8 mm

POLARIMETER TUBES, glass, with screw on end caps, 15·5 mm diameter glass cover discs and rubber washers.

PSH-570-030S	Polarimeter tube, 100 mm long	**£8·80**
PSH-570-050M	Polarimeter tube, 200 mm long	**£8·80**
PSH-570-070G	Polarimeter tube, 400 mm long	**£8·80**

POLARIMETER TUBES, glass, as PSH-570 but with bulge in tube to accommodate air bubble and thereby maintain a clear field of view.

PSH-590-030E	Polarimeter tube, 100 mm long	**£10·18**
PSH-590-050V	Polarimeter tube, 200 mm long	**£10·18**

POLARIMETER TUBES, glass, as PSH-570 but with straight central filling tube.

PSH-610-030G	Polarimeter tube, 100 mm long	**£11·28**
PSH-610-050A	Polarimeter tube, 200 mm long	**£11·28**

POLARIMETER TUBES, glass, as PSH-570 but with cup shape central filling tube.

PSH-630-030P	Polarimeter tube, 100 mm long	**£14·03**
PSH-630-050J	Polarimeter tube, 200 mm long	**£14·03**

SPARE PARTS

PSH-650-010H	Cover discs	Pack of 10 **£9·41**
PSH-650-030B	Rubber washers	Pack of 10 **£1·62**

POLARISING FILTERS

POLARISING FILTERS, square, unmounted, for applications where highest optical quality is not essential. Can be cut with scissors.

PSH-790-030L	Polarising filters, 50 × 50 mm	Pair **£1·67**
PSH-790-050F	Polarising filters, 100 × 100 mm	Pair **£6·64**
PSH-790-070W	Polarising filters, 300 × 300 mm	Pair **£59·79**

POLARISING FILTER, circular, mounted, for applications where a high optical quality is required. Mounted between glass discs 45 mm diameter and giving a uniform degree of polarisation.

PSH-820-P	Polarising filter, 45 mm diameter	**£5·40**

Gallenkamp

SODIUM LAMP



- 35 W discharge tube
- Height of aperture adjustable
- Transformer in ventilated base

See LCH-600-Q

POLISHING

CARBORUNDUM POWDER, 400 mesh, for coarse polishing of metallurgical specimens. In pack containing approximately 500g.
PSR-310-Y Carborundum powder Pack **£2·14**

ALUMINA POWDER, grade 5/20, for fine polishing of metallurgical specimens. Contains a mixture of coarse and fine grains with 5% particles larger than 5μm, 20% finer than 1μm and the remaining particles between 1 and 5μm.
PSR-350-D Alumina powder, grade 5/20
Bottle of 100g **£5·96**

ALUMINA POWDER, grade 3/50, as PSR-350-D but with 5% of particles larger than 3μm, 50% finer than 1μm and the remaining particles between 1 and 3μm.
PSR-370-M Alumina powder, grade 3/50
Bottle of 100g **£9·68**

ALUMINA POWDER, gamma grade, for final polishing of specimens.
PSR-390-V Alumina powder, gamma grade
Bottle of 100g **£12·38**

PARCHMENT PAPER, high quality, in sheets 740×500mm specially thick, for covering polishing discs for metallographic work.
PSR-460-L Parchment paper Pack of 25 sheets **£1·50**

POLISHING BOARD, comprising wood baseboard with plate glass 230×230mm over which grinding or polishing paper can be stretched and clamped by adjacent wood clamping strips. Provides a polishing surface from which a uniformly flat specimen may be produced. **Without** polishing paper.
PSR-510-P Polishing board **£5·29**



PSR-510

Polishing cloths See *CMC-360-A et seq.*

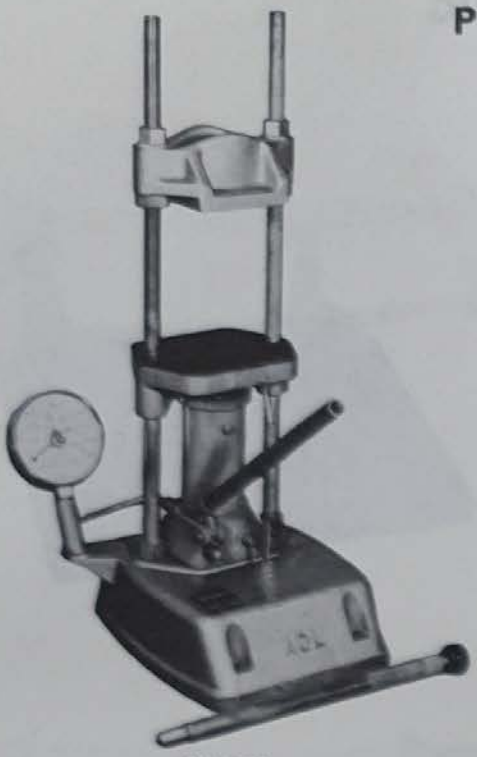
POLLUTION MEASUREMENTS

Apparatus which may be of interest to those concerned with pollution measurements is listed below. Full details and prices will be found under the entries in List No. sequence.

Balances, including micro, analytical and top loading models See *BCT-300 et seq.*
Baths, thermostatic and shaking reaction See *BKA-200 et seq.*
Centrifuges See *CFC-300 et seq.*
Colony counter See *CNW-300 et seq.*
Colorimeters See *COH-300 et seq.*
Conductivity meters See *PJK-400 et seq.*
Dissolved oxygen meters See *DOS-210 et seq.*
Fermenter system for studies of the microbiological treatment of sewage and effluent See *FBL-200 et seq.*
Filter holders and membranes See *FDC-300 et seq.*
Gas analysers for CO, CO_2, O_2, CH_4, SO_2, SO_3 See *GAS-210 et seq.*
Gas washbottles See *GJR-330 et seq.*
Incubators, general purpose, BOD and orbital See *INC-250 et seq.*
Lamps, for examination See *LCF-610 et seq.*
Microscopes, routine research, inverted and stereoscopic See *MJF-300 et seq.*
Ovens, for drying samples See *OVB-300 et seq.*
pH meters See *PHK-290 et seq.*
Sedimentation cone See *WHT-220*
Shakers, for flasks and bottles See *SGL-700 et seq.*
Water test kits See *WHT-500 et seq.*

Gallenkamp

PRESSES



PWS-300

HYDRAULIC PRESSES

Applications include:

Crushing, breaking, extrusion, compression, flow and shearing tests. Extraction of liquids from plants, seeds and animal tissues.

The robust steel press is self-contained with hand pump and oil storage for the built-in ram and head adjustable for height.

A two-part handle 750mm long is fitted, the short handle being used for rapidly closing the press. By adding the extension, the force can be slowly increased by making short pumping strokes.

The inclined pressure gauge has direct reading scales for total load, a maximum pressure indicator and a zero reset device.

The rising platen of the two column model PWS-300-H has a drainage groove and a delivery pipe for expressed liquids. With four column model PWS-350-S the lower platen can be put in contact with the press head enabling work on thin laminated materials to be carried out.

Technical data

Total load	10000kg (10 tons)
Size of platens	150 × 180mm
Maximum separation of platens	400mm
Hydraulic lift	150mm
Gauge scales	0 to 10000kg; 0 to 22000lb
Overall dimensions	500 × 450 × 950mm high
Mass	85kg

PRESS, hydraulic, two column model, as specified.
PWS-300-H Press, two column **£570·35**

PRESS, hydraulic, four column model, as specified, for more accurate alignment of the platens.
PWS-350-S Press, four column **£681·12**



PWS-350

ACCESSORY EQUIPMENT FOR PLASTICS, RUBBER AND HOT PRESSING

For plastics moulding, laminated board production, test cures of rubber mixes, and similar applications at elevated temperatures, the presses can be fitted with hotplates PWS-370-E.

HOTPLATES, electrically heated, 150 × 150mm, temperature controlled up to 200°C by an external controller which can be mounted on the press. With thermometer pocket in each plate. For 220–240V a.c. single phase supplies.
PWS-370-E Hotplates Set of 2 **£327·80**

SPARE PARTS for PWS-370-E
PWS-380-810R Heating elements Set **£15·84**

ACCESSORY
Thermometer, angle type, with 75mm scale 0 to 200°C, in brass case.
PWS-380-502T Thermometer **£15·84**

FOR SEPARATION OF LIQUIDS FROM SOLIDS

PERFORATED CAGE, for use with fibrous and hard materials, capacity 1150ml. With drainage channels directing the liquid to a groove in the rising table, plunger, ejector, three perforated plates and three felt pads.
PWS-400-W Perforated cage Set **£261·36**

PLATE AND CLOTH, for use with pulpy materials, comprising six drainage plates, twelve filter cloths and one 125mm former used to make square cakes of material.
PWS-420-T Plate and cloth Set **£50·00**

METALLURGICAL MOUNTING PRESS

A self-contained hydraulic press for mounting metallurgical specimens in plastics for examination.

Technical data

Total load	5000kg (5 tons)
Size of platens	150 × 180mm
Hydraulic lift	150mm
Gauge scales	0 to 5000kg; 0 to 11000lb
Overall dimensions	450 × 450 × 850mm high
Mass	70kg

METALLURGICAL MOUNTING PRESS, as specified, comprising two columns with rising bottom platen, fixed head and inclined dual scaled gauge. With insulating plates, two-part handle and thermometer pocket. Suitable for producing 1in. (25mm) and 1¼in. (32mm) mounts.

PWS-550-C Metallurgical mounting press **£396·00**



PWS-550

MOUNTING ACCESSORIES

Suitable for pressures up to 30MN/m²(2tf/in²)

MOULD OUTFITS, comprising a steel cylinder, base and plunger drilled for thermometer.

PWS-570-500X Mould outfit, 1in. **£54·45**
PWS-570-502K Mould outfit, 1¼in. **£54·45**

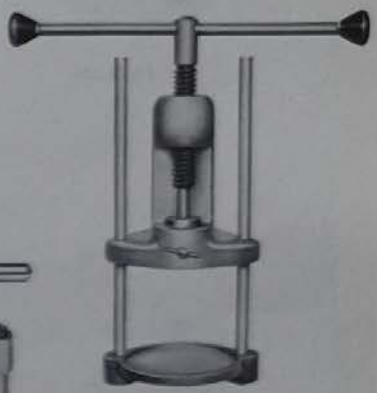
MOULD HEATERS, split type, with aluminium head, cartridge elements, plated tongs and ebonite handles. For 200–250V a.c. single phase supplies.

PWS-570-520Y Mould heater, 1in. **£158·40**
PWS-570-522E Mould heater, 1¼in. **£168·30**

MOULD COOLERS, split type, with aluminium head, plated tongs and ebonite handles.

PWS-570-540C Mould cooler, 1in. **£92·40**
PWS-570-542V Mould cooler, 1¼in. **£100·65**

Power regulator, for heat control of PWS-570-520 and PWS-570-522 See *EFP-250-H*
Thermometer, 0 to 200°C See *THL-210*



PWS-730



PWS-800

MOUNTING MEDIA

MOUNTING MEDIUM, thermosetting black Bakelite. In pack containing 3kg which is sufficient for about 200 mounts.

PWS-590-U Mounting medium Pack **£4·15**

MOUNTING MEDIUM, thermoplastic acrylic, transparent crystals. In pack containing 3kg which is sufficient for about 200 mounts.

PWS-610-W Mounting medium Pack **£6·60**

SODIUM WIRE PRESS

PRESS, sodium wire, *GALLENKAMP*, with hardened steel ram 17mm diameter. Overall dimensions 500mm effective diameter × 500mm high. Complete with one each steel moulds of 0·5 and 1mm orifice diameter respectively.

PWS-730-A Press **£68·23**

SPARE PARTS

PWS-750-010G Mould, 0·5mm **£8·44**
PWS-750-020A Mould, 1mm **£8·44**

TABLET PRESS

TABLET PRESS, *GALLENKAMP*, for 2 and 5mm diameter tablets, with hardened steel rams and dies. Overall dimensions 100mm diameter × 200mm high.

PWS-300-N Tablet press **£13·84**

Gallenkamp

PROJECTORS



PXD-200

EPISCOPE, *GRIFFIN* for projecting photographs or similar opaque subject-matter, up to 125mm square, giving a maximum image size of 1·48m square in a darkened room. Larger objects can be accommodated by removing the hinged cover, or the unit can be inverted and placed over the object. A strong metal case, 340 x 155 x 205mm, houses two 24V 150W tungsten halogen lamps, with heat filters, 47 x 47mm, and cooling fan. For 220–240V 50Hz single phase supplies.

PXD-200-Q Episcope **£79·31**

SPARE PART

PXD-220-010W Heat filter **£3·78**

SLIDE PROJECTOR, *GRIFFIN*, an automatic 35mm projector with remote pushbutton control of forward and reverse slide change and focusing.

A ventilated lamphouse with an efficient cooling fan houses a 24V 150W tungsten halogen projection lamp and is mounted on a rigid plastics base with adjustable front feet. With magazine able to accommodate 36 slides 2 x 2in. Optical system has matched aspheric and biconvex condensers, heat filter, f/2·8 85mm lens coated on glass/air surfaces and automatic blackout between slides. A circular 122-slide magazine is available as an accessory. With projection lamp, 36-slide magazine and instructions. For 230–250V a.c. supplies.

PXD-600-H Slide projector **£75·38**

ACCESSORY

PXD-620-504L Circular magazine **£3·04**



PXD-600

SLIDE AND FILMSTRIP PROJECTOR, *RANK* **ALDIS TUTOR 2,** for 35mm slides and strips. Fitted with 24V 250W quartz halogen lamp cooled by a quiet motor driven fan. With f/2·8 100mm lens, 2 x 2in. slide carrier and mains outlet socket for reading lamp or tape recorder. Case is fitted with levelling feet, handle and length of mains cable. Approximate overall dimensions 460 x 133 x 172mm high, mass 9kg. With mains switch, 3A 20mm fuse, instructions and voltage selector for 115–250V a.c. supplies.

PXD-700-W Slide and filmstrip projector **£88·98**

ACCESSORIES

PXD-720-552P Magazine, semi automatic for 36 slides **£19·25**

Filmstrip attachment, for 35mm filmstrips either half frame 24 x 18mm, or full frame, 36 x 24mm, exposures. Can be rotated on the projector for horizontal or vertical presentation. With feed and take-up spools, and mask for 24 x 18mm exposures.

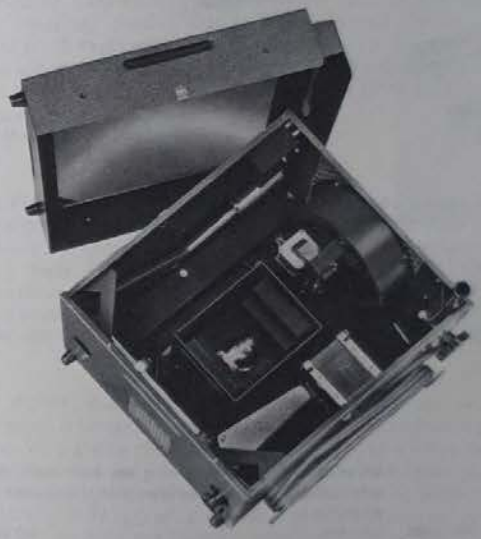
PXD-720-506W Filmstrip attachment **£9·79**



PXD-700 with filmstrip attachment

Griffin OVERHEAD PROJECTOR

- Wide-angle lens
- May be used on its side for direct projection
- Projection head and support arm store within the case
- Complete with carrying handle and cable storage bracket





Case of sheet steel construction, dimensions 360 × 320 × 240mm high, with a two-tone grey hammer paint finish, mounted on four rubber feet. Four rubber feet are also fitted on the front, permitting the instrument to be used for horizontal projection.

The instrument stage, held in position by two spring clips, incorporates a double Fresnel lens and two retractable locating pins. A microswitch is fitted which isolates the mains supply when the stage is lifted. Light is provided by 24V 250 W tungsten halogen lamp mounted above a concave mirror. Lamp supplied from a mains transformer housed in the main body of the instrument. A switch for operation of the fan and lamp is fitted together with a cable storage bracket. Provision is made in the side panels for mounting the acetate scroll attachment PXH-340-502Y, in either N–S or E–W directions.

The projection head consists of a convex lens and mirror, rotatable about a horizontal axis through 180°, mounted on a vertical, plated-steel, tubular support, overall height 660mm, inserted in one corner of the case. Focusing is effected by adjusting the height of the support using a clamping device fitted to the case.

For horizontal use, the instrument is placed on its side and the projection mirror swung clear; projection is then direct from the stage through the lens to the screen. The projection head and support arm may be removed and stored within the cabinet.

Fitted with 5A cartridge fuse accessible externally. Mass 10·6kg.

OVERHEAD PROJECTOR, *GRIFFIN*, as specified, with mains cable and instructions. For 50–60Hz supplies.

PXH-300-X	Overhead projector, 220–240V	**£89·10**
PXH-320-A	Overhead projector, 110–120V	**£112·50**

ACCESSORIES

	Acetate scroll attachments, for N–S or E–W directions.	
PXH-340-502Y	Acetate scroll attachments	Pair **£7·20**
PXH-340-512F	Acetate roll for scroll attachments.	**£2·19**
PXH-340-524V	Acetate sheets, 225 × 225mm	Pack of 50 **£4·56**
PXH-340-536X	Card frames for acetate sheets	Pack of 50 **£5·29**
	Wax pens, set of six comprising one each black, blue, green, orange, red and yellow.	
PXH-350-502B	Wax pens	Set **£6·02**
	Refills for wax pens.	
PXH-350-514R	Refills, black	Pack of 12 **£1·18**
PXH-350-519H	Refills, blue	Pack of 12 **£1·18**
PXH-350-524X	Refills, green	Pack of 12 **£1·18**
PXH-350-531R	Refills, orange	Pack of 12 **£1·18**
PXH-350-536M	Refills, red	Pack of 12 **£1·18**
PXH-350-542M	Refills, yellow	Pack of 12 **£1·18**

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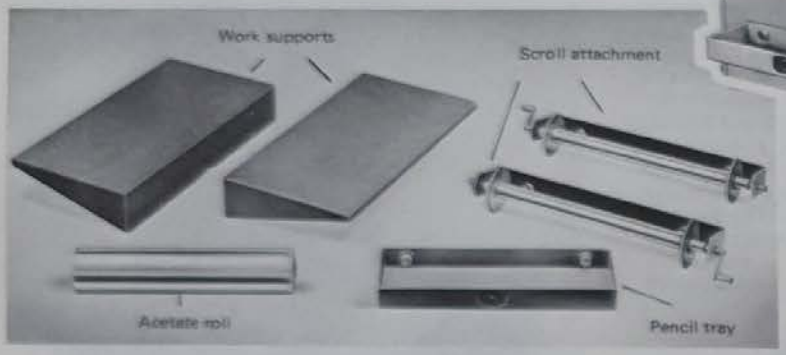



PXH-370

Ink pens, set of six comprising one each black, blue, green, orange, red and yellow. Inks transparent and washable.

PXH-350-560K Ink pens — Set £1·70

Long focus lens unit, designed for use at projector-screen distances greater than 1·65m. Enables images to be projected over longer working distances. Focal length 0·36m. Elevation up to 25° without picture distortion. Picture image is two-thirds of that given by the standard wide-angle lens at the same working distance. Complete unit comprises two lenses and mirror in head which can easily be fitted in place of the projection head supplied.

PXH-360-508F Long focus lens unit — £19·52

Work supports, sheet steel, 325mm long × 175mm wide, to extend the area of the stage in N–S or E–W directions. With knurled screw for attachment to case. May be fitted in reverse to protect the stage during storage.

PXH-360-522L Work supports — Pair £10·29

Pencil tray, sheet steel, 310mm long × 80mm wide × 30mm deep. With captive knurled screws for attachment to any side of the case.

PXH-360-538T Pencil tray — £4·96

Slide attachment, for 35mm slides in 2 × 2in. mounts. With two-piece slide holder, focusing (2·8 85mm coated projection lens in helical mount, angled mirror to align height of projected image and heat filter. Fits in place of the projection head supplied. With instructions.

PXH-370-510L Slide attachment — £33·04

PUMPS

AIR PUMPS



PXW-370

AIR PUMP, diaphragm type, for general aeration purposes. Quiet running, operated by a solenoid and fitted with a Neoprene diaphragm. Output approximately 1·5 litres/min free air, maximum pressure 14·7kN/m² (0·15kgf/cm²). With air inlet filter and integral air delivery tube 5mm o.d., in plastics case 90×50×65mm high, mounted on foam rubber pads. With twin flex cable. Consumption 3W, for 200–240V a.c. single phase supplies.

PXW-370-W Air pump **£2·31**

SPARE PART

PXW-380-010M Diaphragms Pack of 2 **£0·18**



PXW-430

AIR PUMP, piston type, for general aeration purposes. Very quiet, smooth running pump with solid bearings and a self-lubricating, double acting piston driven by a sturdy 20W rotating disc induction motor. Output approximately 450ml/min at 39kN/m² (0·4kgf/cm²). With pair of riffled air delivery outlets 5mm o.d. fitted to cast metal pump body 120×92×124mm high, mass 1·2kg. With mains cable. Consumption 15W, for 230–250V 50Hz single phase supplies.

PXW-430-T Air pump **£16·65**

AIR PUMP, piston type, for general aeration purposes. Similar to PXW-430-T but with twin double acting pistons each having pressure and vacuum riffled outlets 5mm o.d. fitted to cast metal pump body 148×113×124mm high, mass 2·15kg. Output approximately 1 litre/min. Consumption 30W, for 230–250V 50Hz single phase supplies.

PXW-460-V Air pump **£20·70**



PXW-460

AIR PUMP, diaphragm type, compact, reliable and quiet in operation. A Neoprene diaphragm is operated by connecting rods driven via a grease packed eccentric ball race by a series wound motor mounted on a plastics base fitted with a speed control rheostat. Output 5 litres/min free air. Can be used for pressures up to 75kN/m² (0·76kgf/cm²) at zero flow or will evacuate to 350 torr. With air inlet filter and 5mm o.d. inlet and outlet nozzles. Overall dimensions 168×83×127mm high. With mains cable, for 220–240V 50Hz single phase supplies.

PXW-490-A Air pump **£33·00**

AIR PUMP, diaphragm type, similar to PXW-490-A but driven by a constant speed, shaded pole motor suitable for continuous, quiet operation. Output 3·25 litres/min free air. Can be used for pressures up to 64kN/m² (0·65kgf/cm²) at zero flow or will evacuate to 300 torr. For 220–240V 50Hz single phase supplies.

PXW-520-S Air pump **£28·60**



PXW-520



PXW-490

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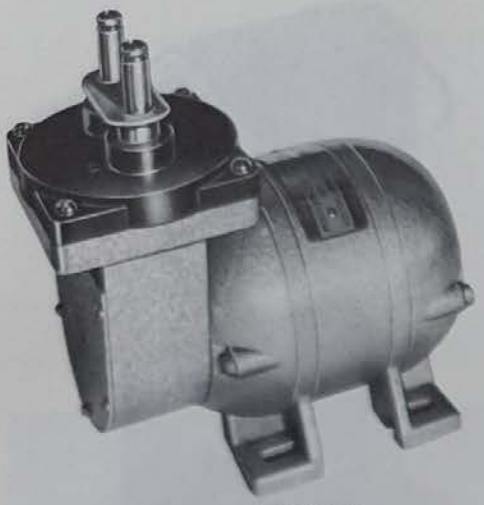


PXW-560

AIR PUMP, diaphragm type, particularly suitable for closed circuit circulation of air or gases. The diaphragm and disc valves are of Neoprene and the pump head is of phenolic resin with 8mm o.d. nickel plated inlet and outlet tubes. Output 6 litres/min free air. Can be used for pressures up to 85kN/m² (0·86kgf/cm²) at zero flow or will evacuate to 360 torr. Mounted directly on constant speed, shaded pole motor. Overall dimensions 139 × 92 × 142mm high, mass 2kg. For 220–240V 50Hz single phase supplies.

PXW-560-N Air pump **£30·91**

AIR PUMP, dry rotary. A non-lubricated air-cooled rotary vane pump which delivers oil free air and is suitable for prolonged operation. Coupled to the pump is a ¼h.p. motor running at approximately 2800rev/min. Fitted with air inlet and outlet filters, pressure gauge, pressure relief valve and nozzles suitable for 6·5mm bore flexible tubing.

Technical data

Maximum pressure	98kN/m² (1kgf/cm²)
Will evacuate to	115 torr
Displacement	50 litres/min
Overall dimensions	240 × 215 × 195mm high
Mass	9kg



PXW-670

For 220–240V 50Hz single phase supplies.

PXW-670-V Air pump **£102·38**

ACCESSORY

PXW-680-502N Vacuum gauge, with separate relief valve. **£12·38**

AIR PUMP, dry rotary, as PXW-670-V but displacement 150 litres/min and with ⅓h.p. motor protected by resettable, automatic overload device. Overall dimensions 400 × 240 × 200mm high, mass 20kg. For 220–240V 50Hz single phase supplies.

PXW-710-J Air pump **£174·60**



PXW-710

ACCESSORY

PXW-720-504U Vacuum gauge, with separate relief valve. **£14·57**

AIR PUMP, diaphragm. A quiet low vibration, **oil free** pump suitable for long periods of operation and **especially suitable for use with flame photometers.** The air output, which can be adjusted up to 137kN/m² (1·4kgf/cm²) by means of the pressure relief valve, is relatively pulse free as a result of the short pump stroke.

The large diameter air inlet filter can be removed to enable the pump to be used for vacuum purposes. The pressure outlet nozzle accepts 6·5mm bore heavy wall flexible tubing. Motor rating ½h.p.

Technical data

Maximum pressure	137kN/m² (1·4kgf/cm²)
Vacuum	300 torr
Displacement, maximum	22 litres/min
Displacement, at max. pressure	11 litres/min
Overall dimensions	250 × 120 × 200mm high
Mass	6kg



PXW-790

For 220–240V 50Hz single phase supplies.

PXW-790-W Air pump **£97·22**

AIR PUMP, diaphragm, for **oil free** delivery up to 410kN/m² (4·2kgf/cm²). Motor, rating ¼h.p., and pump are fitted with ball bearings requiring only intermittent attention.

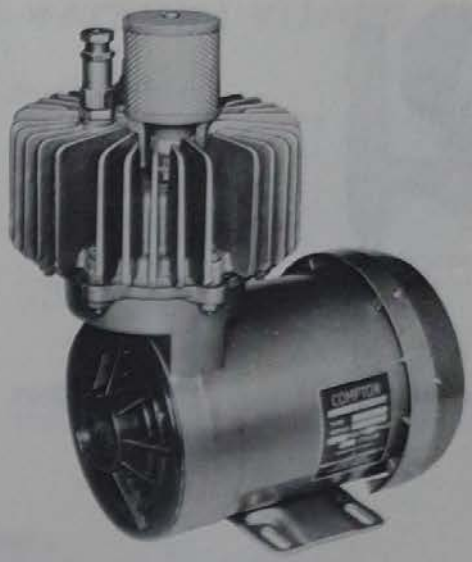
A pressure regulating/safety valve is fitted, with a relief valve for easy starting when pressure remains in the line. The pressure outlet has a male ¼in BSP thread, which can be replaced by the ½in. (12·5mm) hose connector supplied. The air inlet filter can be removed and replaced by the hose connector to enable the pump to be used for vacuum purposes.

Technical data

Maximum pressure	410kN/m² (4·2kgf/cm²)
Displacement at 285kN/m²	30 litres/min
Vacuum	150 torr
Overall dimensions	320 × 200 × 400mm high
Mass	19kg

For 220–240V 50Hz single phase supplies.

PXW-840-D Air pump **£100·13**



PXW-840

FILTER PUMPS

FILTER PUMP, borosilicate glass. With a water supply at 172kN/m² (1·75kgf/cm²), will evacuate to approximately 50 torr. With integral non-return valve, water inlet nozzle for 10mm bore flexible pressure tubing, water outlet for 8mm bore tubing and vacuum nozzle for 8mm bore tubing. Overall length 220mm.

PXY-220-W Filter pump **£3·34**

FILTER PUMP, transparent polymethyl pentene. With a water supply at 140kN/m² (1·4kgf/cm²), a 5 litre system can be evacuated to approximately 150 torr in 2min. Ultimate residual pressure 15 torr. Water consumption approximately 10 litres/min. May be readily dismantled for cleaning and does not require a tail pipe on the water outlet. With integral non-return valve, water inlet nozzle for 10mm bore flexible pressure tubing and vacuum nozzle for 8mm bore tubing. Overall length 190mm. With three spare vacuum nozzles. (F)

PXY-260-R Filter pump **£3·63**

FILTER PUMP, polypropylene. With a water supply at 172kN/m² (1·75kgf/cm²), the pump uses 4 litres/min of water to evacuate a 1 litre system to about 150 torr in 2min. Ultimate residual pressure 15 torr. With integral non-return valve, water inlet with ¼in. wingnut and also suitable for 16mm bore flexible pressure tubing, and vacuum nozzle for 10mm bore tubing. Overall length 270mm. (F)

PXY-290-T Filter pump **£4·73**

FILTER PUMP, *GALLENKAMP,* **nickel plated brass.** With a water supply at 172kN/m² (1·75kgf/cm²), the pump uses only 3·5 litres of water in approximately 40s to evacuate a 1 litre system to about 150 torr. Ultimate residual pressure 15 torr. In operation, water passes through a polypropylene nozzle into a small cavity where an annular space between the water jet and the cavity wall forms a low pressure region. This annular space, compared with the small area of the side arm in traditional pumps, provides greatly enhanced efficiency. The water then proceeds through a venturi and finally to the vortex cavity and offset outlet which ensures that the venturi remains full and so eliminates the need for an immersed tail pipe on the water outlet. With efficient integral non-return valve, water inlet nozzle for 10mm bore flexible pressure tubing and vacuum nozzle for 8mm bore tubing. A wingnut adapter is available as an accessory to enable direct connection to a water tap. Overall length 200mm.

PXY-400-U Filter pump **£4·39**

SPARE PARTS

Spares kit, comprising 3 Neoprene inserts for non-return valve and 12 Neoprene washers for the wingnut adapter.

PXY-410-0140K Spares kit **£0·96**

ACCESSORY

Wingnut adapter, for direct connection to water tap having ¼in. BSP male threaded outlet. Comprises insert with wingnut and washer.

PXY-410-5066E Wingnut adapter **£1·01**



PXY-220



PXY-260

Performance figures given are typical only.



PXY-290



PXY-400 with wingnut

continued overleaf



PXY-480 with gauge



PXY-510



PXY-690



PXY-600



PXY-730

FILTER PUMP, *EDWARDS* **Model 7,** stainless steel. With a water supply at 140kN/m² (1·4kgf/cm²), will evacuate a 5 litre system to 150 torr in 2 minutes. Ultimate residual pressure 15 torr. Water consumption approximately 10 litres/min. With integral non-return valve, water inlet screwed ¼in. BSP male and also suitable for 13mm bore flexible pressure tubing, water outlet for 10mm bore tubing and vacuum nozzle for 8mm bore tubing. For efficient operation, a tail pipe should be used on the water outlet with the open end immersed in water. A length of plastics tubing is supplied.

PXY-480-K Filter pump **£7·04**

FILTER PUMP, *EDWARDS* **Model 8,** stainless steel, as PXY-480-K but with water inlet screwed ¼in. BSP female.

PXY-510-F Filter pump **£7·04**

SPARE PART

PXY-520-010S Valve insert **£0·71**

ACCESSORY

Vacuum gauge, 40mm diameter, scaled 0 to 760 torr and 0 to 30in. mercury. For direct attachment to pump, with nozzle for vacuum connection.

PXY-520-508Y Vacuum gauge **£6·82**

FILTER PUMP, electrically operated. A reciprocating diaphragm pump driven by a shaded pole motor suitable for long period operation. Enclosed in a louvred metal case with inlet and exhaust nozzles for 8mm bore flexible tubing and mains connecting cable. Vacuum 400 torr. Pressure 73kN/m² (0·75kgf/cm²). Provides adequate suction for most laboratory filtration purposes. For 220–240V 50Hz single phase supplies.

PXY-600-E Filter pump **£59·40**

NON-RETURN VALVE, polythene, for use with filter pumps. Also suitable in low pressure water lines. With Neoprene diaphragm and nozzles for 6 to 9mm bore flexible tubing. (F)

PXY-690-K Non-return valve, polythene **£0·61**

AIR INLET VALVE, plastics for vacuum systems. With nozzles for 8mm bore flexible vacuum tubing. (F)

PXY-730-V Air inlet valve **£1·63**



Filter pump with ¼in. female wing nut connection

See FTK-340-T

EDWARDS ROTARY VACUUM PUMPS

OIL NON-RETURN VALVE
All pumps are fitted with a patented anti-suckback valve which is designed to prevent oil flooding the pipeline system should the electrical power to the motor fail.

GAS BALLAST
All pumps are fitted with a gas ballast facility which enables most condensable vapours to be pumped directly without significant oil contamination.

INLET FILTER
The gas ballast control valve includes a filter which prevents dirt entering the pump and reduces the ballast air hiss.

BAFFLE SYSTEM
An effective baffle prevents oil spray discharge. For elimination of oil mist, filters are available.

TWO-STAGE PUMPS
Two-stage pumps should be used where vacua below 0·01 torr are required while using full gas ballast or where the rotary pump is required to back a vapour diffusion pump.

PRESSURE DUTY
PYB-550-M and PYB-670-N can be used as compressors.

PUMP DATA

List No.	Model No.	No. of stages	Will evacuate to, torr		Approximate water vapour pumping rate, g/hour	Displacement, litres/min	Oil capacity, litres	Vacuum connection o.d. mm
			Without gas ballast	With gas ballast				
PYB-550-M	Speedivac 2	1	0·1	5	45	45	0·5	15
PYB-620-C	ED M2	2	0·0007	0·05	40	30	1	15
PYB-670-N	ES 50	1	0·01	0·5	70	50	0·45	15
PYB-740-D	ED 50	2	0·0005	0·01	100	50	0·75	15
PYB-840-S	ES 200	1	0·005	0·3	190	190	1·7	28
PYB-890-G	ED 200	2	0·0001	0·001	170	190	1·85	28


PYB-550


PYB-620

Gallenkamp



PYB-670

VACUUM PUMP, *EDWARDS* **Speedivac 2,** as specified, with direct drive motor, initial charge of oil and instructions. Can be used also as a compressor giving up to 69kN/m² (0·7kgf/cm²)when fitted with pressure relief valve PYB-570-502H. For 220–240V 50Hz single phase supplies.

PYB-550M	Vacuum pump	**£109·45**

ACCESSORY

PYB-570-502H	Pressure relief valve	**£2·97**

VACUUM PUMP, *EDWARDS* **ED M2,** as specified, having direct drive motor. With initial charge of oil and instructions. For 220–240V 50Hz single phase supplies.

PYB-620-C	Vacuum pump	**£193·60**

VACUUM PUMP, *EDWARDS* **ES 50,** as specified, with initial charge of oil and instructions. Can be used also as a compressor giving up to 69kN/m² (0.7kgf/cm²). For 220–240V 50Hz single phase supplies.

PYB-670-N	Vacuum pump	**£180·40**

SPARE PART

PYB-680-030U	V-belt	**£0·77**

ACCESSORIES

PYB-680-502F	Anti-vibration mountings	Set **£9·63**
	Adapter, metal, to enable connection of 6·5 or 8mm flexible vacuum tubing.	
PYB-680-512C	Adapter	**£1·29**
	Cone, borosilicate glass, 19/26, to enable connection of an all-glass system.	
PYB-680-522W	Cone	**£1·51**



PYB-740

VACUUM PUMP, *EDWARDS* **ED 50,** as specified, with initial charge of oil and instructions. For 220–240V 50Hz single phase supplies.

PYB-740-D	Vacuum pump	**£231·00**

ACCESSORIES

PYB-750-504X	Anti-vibration mountings	Set **£9·63**
	Adapter, for connection of tubing	*See PYB-680-512C*
	Cone, for connection of all-glass system	*See PYB-680-522W*

VACUUM PUMP, *EDWARDS* **ES 200,** as specified, with initial charge of oil and instructions. For 220–240V 50Hz single phase supplies.

PYB-840-S	Vacuum pump	**£310·20**

ACCESSORIES

PYB-850-502K	Anti-vibration mountings	Set **£9·63**



PYD-218

VACUUM PUMP, *EDWARDS* **ED 200,** as specified, with initial charge of oil and instructions. For 220–240V 50Hz single phase supplies.

PYB-890-G	Vacuum pump	**£429·00**

ACCESSORIES

PYB-890-506U	Anti-vibration mountings	Set **£9·63**

VACUUM VALVE

NEEDLE VALVE, vacuum sealed, *EDWARDS* **OSID,** with adjustable dial pointer, and 0 to 100 scale. Chromium plated brass construction, with two $\frac{3}{8}$in. unions at right angles.

PYD-218-V	Needle valve	**£24·50**

VACUSTAT VACUUM GAUGES

Portable, bench gauges similar in principle to the McLeod gauge. To take a reading, the backplate with attached scale and reservoir is merely rotated through 90°.

VACUUM GAUGE, *VACUSTAT* **Model 1,** range 10 to 10^{-2} torr. With tripod stand, ¼in. union for connection to vacuum system and a protective cover. Height 220mm. Requires but **does not include** approximately 100g of triple distilled mercury.

PYD-300-U Vacuum gauge **£44·00**

VACUUM GAUGE, *VACUSTAT* **Model 2,** as PYD-300-U but range 1 to 10^{-3} torr. Requires but **does not include** approximately 150g of triple distilled mercury.

PYD-320-G Vacuum gauge **£44·00**

Triple distilled mercury *See MGH-550-C*



PYD-300
PYD-320

DIAL VACUUM GAUGES

VACUUM GAUGES, dial type, employing an evacuated metal capsule as the sensitive element which is unaffected by barometric changes. Dial, 100mm diameter, housed in metal case. Accuracy 2·5% of full scale deflection.

PYD-380-030B Vacuum gauge, 0 to 20 torr **£64·24**
PYD-380-050S Vacuum gauge, 0 to 100 torr **£64·24**
PYD-380-090G Vacuum gauge, 0 to 760 torr **£64·24**



PYD-380

THERMAL (PIRANI) VACUUM GAUGE

The principle depends upon the change in temperature and hence in resistance of an electrically heated filament measured by a Wheatstone bridge circuit as the thermal conductivity of the surrounding gas changes with pressure.

VACUUM GAUGE, Pirani, *EDWARDS* **Model 10,** range 3 to 10^{-3} torr, for bench or panel mounting. Dimensions 135 × 110 × 130mm. For 200–250V 50–60Hz single phase supplies. **Without** gauge head.

PYD-430-X Vacuum gauge **£92·98**

ACCESSORIES

Gauge head, glass, EDWARDS G6B, with 14/23 cone and 14/23 borosilicate glass socket for connection to glass vacuum system. With 1·8m lead.

PYD-440-502G Gauge head **£27·62**

Gauge head, metal enclosed, EDWARDS PR10, with connector to fit ¼in. bore x 0·596in. (15mm) o.d. metal tube. With 1·8m lead.

PYD-440-512D Gauge head **£32·06**



PYD-430

HIGH FREQUENCY SPARK TESTER

When the probe is placed close to the wall of a glass vacuum system, a discharge is produced. With a knowledge of the gas in the system and from the appearance of the discharge, the pressure in the system can be deduced.

For leak detection, the probe is passed over the external surfaces of the system and any pinhole or crack is located instantly by a thread-like discharge running through it.

HIGH FREQUENCY SPARK TESTER, *EDWARDS* **Model ST200K,** in plastics case with hand grip, trigger switch, voltage selector and voltage control. Output voltage is variable between 10 and 50kV at a frequency of approximately 200kHz. With probe 150mm long. For 200–240V 50–60Hz single phase supplies.

PYD-490-S High frequency spark tester **£92·81**



PYD-490

Gallenkamp VACUUM PUMP TROLLEY

Metal construction, fitted with vapour traps, vacuum gauge, manifold and control valves



PYD-600 with vacuum pump

Trolley

Stove enamelled tubular frame, 600 × 450 × 800mm high, on castors with shelf 560 × 430mm and fitted with two vapour traps, VACUSTAT gauge range 10 to 10^{-3} torr and manifold.

Vapour trap

Borosilicate glass Dewar vessel with drain tube connected by 19/26 joint to a 100ml receiving flask. The simple design provides adequate thermal insulation of the freezing mixture and a large condensing surface for contaminating vapours. In use, the trap is filled with acetone or alcohol and a few lumps of solid carbon dioxide added. The receiving flask is detachable to remove condensate.

Manifold

All-metal with heavy wall tubing connections to the vapour traps. Two diaphragm control valves are provided.

Oil trap

Accessory PYD-620-514U is recommended for use with pumps which do not have an anti-suckback valve. The trap, when fitted to the pump inlet, will prevent oil flooding the system should the pump be switched off before the vacuum is broken.

VACUUM PUMP TROLLEY, *GALLENKAMP*, as specified, with VACUSTAT gauge, two vapour traps with receiving flasks and two diaphragm control valves but **without** vacuum pump and oil trap.

PYD-600-T	Vacuum trolley	**£275·63**

SPARE PARTS

PYD-620-030T	Vapour trap	**£20·48**
PYD-620-050N	Receiving flask	**£1·91**

ACCESSORIES

	Oil trap, 1 litre, borosilicate glass, with 16mm plain tubing connector for pump inlet.	
PYD-620-514U	Oil trap	**£5·91**

Vacuum pumps

See PYB-500-B, PYB-670-N and PYB-740-D

VACUUM PUMP TROLLEY

Hardwood construction, fitted with vacuum gauge, manifold and control valves



PYD-700

Trolley

Natural hardwood frame mounted on four rubber tyred castors, two of which have foot operated brakes which can be applied when the trolley is stationary.

Shelves

The lower shelf is 590 × 440mm and is intended to accommodate the vacuum pump. The selected pump should be fitted with anti-vibration mountings when installed. The upper shelf is 730 × 530mm and has an inclined fascia panel at one end on which are mounted two diaphragm valves and a 50mm diameter dial vacuum gauge scaled 0 to 760mm Hg. These components are fitted to a manifold to provide two vacuum outlets. The manifold nozzles accept 9 to 10mm bore flexible vacuum tubing. A grommet and hooks are provided for stowage of the vacuum pump mains cable. Space is provided on the shelves for the user to mount other equipment. **Without** vacuum pump, anti-vibration mountings or vapour traps.

PYD-700-L	Vacuum pump trolley	**£112·50**

COMBINATION ROTARY AND VAPOUR DIFFUSION VACUUM PUMP

Comprises a gas ballasted rotary pump connected to a stainless steel water cooled oil diffusion pump. Gives a combined pumping speed of 6 litres/s and will evacuate to 10^{-5} torr. A minimum cooling water flow of 300ml/min at 15°C is necessary. Manually operated backing, roughing and air admittance valves, a thermal overload switch and ON-OFF switches for the pumps are fitted. A baffle valve, which enables the operator to isolate the pump and admit air to the system without switching off the pumps, is mounted on the diffusion pump. Provision is made for fitting a Pirani gauge head PYD-440-512D.

COMBINATION PUMP, *EDWARDS,* 10^{-5} *torr,* as specified, comprising rotary and diffusion pumps and baffle valve mounted on a baseplate, and an initial supply of oil for both pumps. For 230–240V 50Hz single phase supplies.

PYD-810-T Combination pump **£644-63**

ACCESSORY

Gauge head *See PYD-440-512D*



PYD-810

ROTARY PUMP OILS

Refined oils for high vacuum use with low vapour pressures even at high temperatures. No. 16 is a plain oil capable of achieving the best ultimate vacua and is preferred for use with clean systems. No. 18 is blended with additives for protection against corrosion.

ROTARY PUMP OIL, SAE 30, *EDWARDS* **No. 16,** medium grade, containing multifunctional additives for use in small vacuum pumps having a displacement of up to 1000 litres/min.

PYD-890-J Rotary pump oil 5 litre can **£3-58**

ROTARY PUMP OIL, *EDWARDS* **No. 18,** medium grade, similar to PYD-890-J but with additives which afford some protection against corrosion.

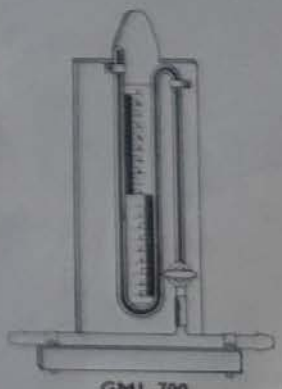
PYD-940-N Rotary pump oil 5 litre can **£3-58**

VACUUM GAUGES



GMJ-330

Bourdon tube dial pattern	*See GMJ-330-S*
Anschutz U-tube pattern	*See GML-700-K*



GML-700

OTHER VACUUM APPARATUS

Desiccators	*See DES-260 et seq.*
Dewar vessels	*See DFH-300 et seq.*
Embedding baths	*See HUC-850 et seq.*
Evaporator	*See EVF-300 et seq.*
Lubricants	*See LUB-420 et seq.*
Oven	*See OVL-600 et seq.*
Stopcocks	*See STA-600 et seq.*
Tubing	*See TWR-460 et seq.*

WATER PUMPS



PYH-250

PUMP, water, centrifugal type, driven by a series wound motor. Suitable for pumping water at temperatures between 20 and 90°C. With nylon filled phenolic resin pump body, impeller and tubulures, Neoprene seal, rubber gasket and stainless steel driving shaft. Must be primed before use.

Technical data

Flow at zero head	22 litres/min
Flow at 2m head	18 litres/min
Maximum head	6m
Tubulures	12·5mm o.d.
Motor rating	Up to 4h continuous running
Overall dimensions	210 × 90 × 110mm high

With terminal box and mains cable. For 220–240V 50–60Hz single phase supplies.

PYH-250-W Pump, water **£36·50**



PYH-280

PUMP, water, centrifugal type, similar in construction and performance to PYH-250-W but fitted with adjustable rheostat to control flow rate, and mounted in a splashproof aluminium carrying case. Overall dimensions 320 × 140 × 180mm high.

With terminal box and mains cable. For 220–240V 50–60Hz single phase supplies.

PYH-280-B Pump, water **£57·20**



PYH-330

PUMP, water, centrifugal type, driven by a constant speed permanent capacitor motor. Suitable for pumping water at temperatures between 20 and 90°C. With nylon filled phenolic resin pump body, impeller and tubulures, Neoprene seal, rubber gasket and stainless steel driving shaft. Must be primed before use.

Technical data

Flow at zero head	11 litres/min
Flow at 1m head	8 litres/min
Maximum head	2m
Tubulures	12·5mm o.d.
Motor rating	Continuous
Overall dimensions	230 × 110 × 112mm high

With fitted capacitor, terminal box and mains cable. For 220–240V 50Hz single phase supplies.

PYH-330-F Pump, water **£40·27**



PYH-350

PUMP, water, centrifugal type, similar to PYH-330-F but with polypropylene body, impeller and tubulures, Neoprene seal and stainless steel shaft. Must be primed before use.

Technical data

Flow at zero head	30 litres/min
Flow at 3m head	25 litres/min
Maximum head	5·5m
Tubulures	inlet 25mm o.d., outlet 19mm o.d.
Motor rating	Continuous
Overall dimensions	210 × 110 × 130mm high

With fitted capacitor, terminal box and mains cable. For 220–240V 50Hz single phase supplies.

PYH-350-X Pump, water **£41·86**

PUMP, water, centrifugal type, designed for totally submerged operation. The motor is enclosed in a watertight plastics case and has a length of rubber covered mains cable sealed through the case. With plastics pump body and impeller, inlet filter, flow control valve and removable spray jet on the outlet.

Technical data

Flow at zero head	1500 litres/h
Maximum head	2·4m
Power consumption	30 W
Overall dimensions	Approx. 195 × 90 × 200mm high

For 200–250V a.c. single phase supplies.

PYH-410-L Pump, water **£26·31**



PYH-410

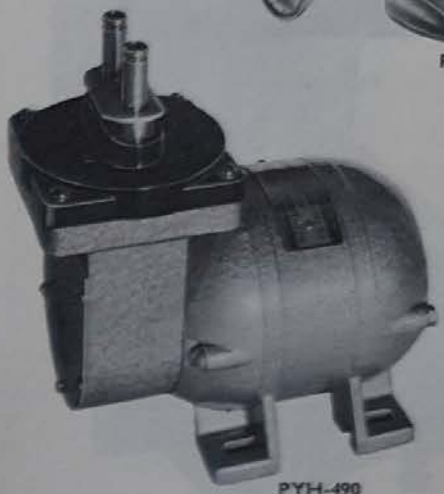
PUMP, water and chemical, diaphragm type, driven by a $\frac{1}{15}$ h.p. totally enclosed shaded pole motor. With stainless steel internal parts and connecting tubes, and Neoprene diaphragm and gasket. To enable rigid PVC connecting tubing to be used, flexible PVC bellows are fitted to the inlet and outlet tubulures.

Technical data

Water flow at zero head	48 litres/h
Maximum head of water	8·5m
Maximum lift (dry)	1·8m
Tubulures	8mm o.d.
Motor rating	Continuous
Overall dimensions	140 × 92 × 142mm high

For 220–240V 50Hz single phase supplies.

PYH-490-B Pump, water and chemical **£124·31**



PYH-490

PUMP, water and chemical, centrifugal immersion type, driven by an induction motor. Immersed parts are stainless steel and PTFE. Suitable for pumping a wide range of liquids and solvents, at temperatures between 20 and 120°C. Can be dismantled for cleaning.

Technical data

Water flow at zero head	20 litres/min
Water flow at 2m head	10 litres/min
Maximum head of water	3m
Immersion depth	280mm
Pump head diameter	110mm
Outlet diameter	20mm
Motor rating	Up to 4h continuous running

With 12·5mm diameter support tube, through which the mains cable passes, to enable bosshead mounting. For 220–250V 50Hz single phase supplies.

PYH-540-F Pump, water **£124·31**



PYH-540

PUMP, water and chemical, peristaltic metering type, *WATSON-MARLOW* **MHRE/200.** For pumping, dosing and metering corrosive, sterile and other fluids.

Flexible, elastic tubing of 0·5 to 8mm bore × 1·6mm wall thickness is clipped to a curved track which is mounted concentrically with a rotor having three rollers. Rotation of the rollers flattens the tubing against the track and these flats move the contents along the tubing by positive displacement. As the tubing recovers, the suction created draws more fluid into the tubing. A speed control provides continuously variable adjustment from approximately 4 to 200rev/min and the direction of rotation is reversible. A polarised socket is fitted to allow remote control of speed. The minimum flow rates are about 4% of the approximate maximum figures.

Bore of tubing, mm	0·5	0·8	1·6	3·2	4·8	6·4	8
Flow rate, max., ml/min	10	20	40	190	300	500	800

Without tubing. For 200–250V 50Hz single phase supplies.

PYH-670-W Pump, water and chemical **£164·89**



PYH-670

ACCESSORIES

Tubing, silicone rubber, 1·6mm wall thickness.

PYH-690-030W	Tubing, 0·5 mm bore	Metre **£0·50**
PYH-690-050Q	Tubing, 0·8 mm bore	Metre **£0·55**
PYH-690-070K	Tubing, 1·6 mm bore	Metre **£0·72**
PYH-690-110B	Tubing, 3·2 mm bore	Metre **£0·88**
PYH-690-130S	Tubing, 4·8 mm bore	Metre **£0·99**
PYH-690-150M	Tubing, 6·4 mm bore	Metre **£1·21**
PYH-690-170G	Tubing, 8 mm bore	Metre **£1·38**

Gallenkamp

PYROMETER INDICATORS



PYL-300
PYL-410 is similar

MAXIMUM TEMPERATURE 1200°C

PYROMETER INDICATOR, flush mounting, 70mm scale, range 0 to 1200°C. **Without** thermocouple.

PYL-300-J Pyrometer indicator **£25·31**

PYROMETER INDICATOR, bracket mounting, 100mm scale, range 0 to 1200°C. With automatic cold junction compensation. **Without** thermocouple.

PYL-330-L Pyrometer indicator **£52·20**

PYROMETER INDICATOR, portable, 200mm scale, range 0 to 1200°C. With manual cold junction compensation. **Without** thermocouple.

PYL-360-N Pyrometer indicator **£84·60**

ACCESSORIES for PYL-300 to PYL-360

Thermocouple, chromel-alumel, furnace mounting pattern, for 230mm immersion. With mounting flange, 10mm o.d., porcelain sheath and 1·85m of flexible compensating cable with spade ends.

PYL-380-010T Thermocouple **£9·56**

Thermocouple, chromel-alumel, blade pattern, with 460mm handle and with 1·85m of flexible compensating cable with spade ends.

PYL-380-030N Thermocouple **£11·70**

Thermocouple, chromel-alumel, needle pattern, with pistol grip and with 1·85m of flexible compensating cable with spade ends.

PYL-380-050H Thermocouple **£15·53**

Rotary switch, 3-way, wall mounting, double pole with self cleaning contacts, mounted in dustproof case.

PYL-380-090S Rotary switch **£27·00**

Compensating cable, flexible, for chromel-alumel thermocouples. Colour coded to BS 1843.

PYL-380-130J Compensating cable Metre **£1·35**



PYL-330
PYL-440



PYL-380-030



PYL-360
PYL-470



PYL-380-050

MAXIMUM TEMPERATURE 1600°C

PYROMETER INDICATOR, flush mounting, 70mm scale, range 0 to 1600°C. **Without** thermocouple.

PYL-410-R Pyrometer indicator **£25·31**

PYROMETER INDICATOR, bracket mounting, 100mm scale, range 0 to 1600°C. **Without** thermocouple.

PYL-440-T Pyrometer indicator **£48·38**

PYROMETER INDICATOR, portable, 200mm scale, range 0 to 1600°C. **Without** thermocouple.

PYL-470-V Pyrometer indicator **£84·60**

ACCESSORIES

Thermocouple, platinum-13% rhodium platinum, furnace mounting pattern, for 230mm immersion. With mounting flange, aluminous porcelain sheath 10mm o.d. and 1·85m of flexible compensating cable with spade ends.

PYL-490-010E Thermocouple **£36·56**

Thermocouple, platinum-13% rhodium platinum, portable pattern, 300mm long, with aluminous porcelain sheath 10mm o.d., ebonite handle and 1·85m of flexible compensating cable with spade ends.

PYL-490-030V Thermocouple **£37·58**

Compensating cable, flexible, for platinum-13% rhodium platinum thermocouples. Colour coded to BS 1843.

PYL-490-070J Compensating cable Metre **£1·18**

Rotary switch, 3-way See *PYL-380-090S*



PYL-650

THERMOCOUPLE TEST SET

Suitable for:

(a) Checking and calibrating thermocouples by comparison with a standard.

(b) Measurement of thermocouple lead resistance, etc. The reversing switch enables correction to be made for any inherent emf in the circuit and eliminates the need to reverse the leads.

(c) Calibration of indicators, recorders and controllers under correct conditions of external circuit resistance

Technical data

Potentiometer ranges	0 to 20mV and 1 to 100mV
Potentiometer accuracy, approx.	±0·1%
Bridge accuracy, approx.	±0·1%
Potential source ranges	20, 50 and 100mV

THERMOCOUPLE TEST SET, as specified, comprising d.c. potentiometer, Wheatstone bridge, potential source with variable resistance load, taut suspension pointer galvanometer, two 1·5V batteries and instructions manual, in carrying case.

PYL-650-T Thermocouple test set **£411·75**

Gallenkamp **CALIBRATING OIL BATHS**

- **Suitable for comparisons of thermocouples**
- **Maximum temperature 200°C**
- **Alternative manual or thermostatic controlled models**
- **Capacity 9 litres**



See *BLC-550-010L et seq.*

QUICKFIT INTERCHANGEABLE LABORATORY GLASSWARE

QUICKFIT glassware is made from heat- and chemically-resistant borosilicate glass. The joints are internationally interchangeable, being made in accordance with ISO and various national standardising authorities, including British Standards BS 572 and 2761. The conical joint designations refer to nominal diameter at the wide end and the length of engagement, e.g. a 24/29 joint is 24 x 29mm, diameter x length of engagement.

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CHROMATOGRAPHY, THIN LAYER; CHEMISTRY SETS; GAS GENERATORS; WATER STILLS; STOPCOCKS

ADAPTERS

REDUCTION ADAPTERS

List No.	QUICKFIT No.	Socket	Cone	Each
QAC-020-Q	DA 01	10/19	14/23	£1·06
QAC-030-J	DA 12	14/23	19/26	£0·97
QAC-040-C	DA 13	14/23	24/29	£1·06
QAC-050-S	DA 14	14/23	29/32	£1·07
QAC-060-L	DA 23	19/26	24/29	£1·01
QAC-070-E	DA 24	19/26	29/32	£1·12
QAC-080-U	DA 25	19/26	34/35	£1·21
QAC-090-N	DA 26	19/26	40/38	£1·63
QAC-100-W	DA 27	19/26	45/40	£1·86
QAC-110-P	DA 29	19/26	55/44	£2·02
QAC-120-Y	DA 34	24/29	29/32	£1·10
QAC-130-B	DA 35	24/29	34/35	£1·16
QAC-140-R	DA 36	24/29	40/38	£1·63
QAC-150-K	DA 37	24/29	45/40	£1·71
QAC-160-D	DA 38	24/29	50/42	£2·01
QAC-170-T	DA 39	24/29	55/44	£2·08
QAC-180-M	DA 45	29/32	34/35	£1·37
QAC-200-X	DA 56	34/35	40/38	£1·78
QAC-220-A	DA 58	34/35	50/42	£2·23
QAC-230-Q	DA 59	34/35	55/44	£2·53



DA

EXPANSION ADAPTERS

List No.	QUICKFIT No.	Socket	Cone	Each
QAC-600-F	XA 10	14/23	10/19	£1·51
QAC-610-V	XA 21	19/26	14/23	£1·24
QAC-620-X	XA 31	24/29	14/23	£1·27
QAC-630-H	XA 32	24/29	19/26	£1·27
QAC-640-A	XA 41	29/32	14/23	£1·64
QAC-650-Q	XA 42	29/32	19/26	£1·64
QAC-660-J	XA 43	29/32	24/29	£1·56
QAC-670-C	XA 52	34/35	19/26	£1·85
QAC-680-S	XA 53	34/35	24/29	£1·64
QAC-690-L	XA 54	34/35	29/32	£1·64



XA



SB

CONICAL-SPHERICAL ADAPTERS

These adapters used as a pair at a critical point provide a ready means of introducing flexibility into a conical jointed assembly.

List No.	QUICKFIT No.	Socket	Ball	QUICKFIT clip ref.	Each
QAE-300-J	SB 2/29	19/26	S 29	JC 29	£2·08
QAE-310-C	SB 3/35	24/29	S 35	JC 35	£2·38
		Cone	Cup		
QAE-380-W	CC 2/29	19/26	S 29	JC 29	£2·23
QAE-390-P	CC 3/35	24/29	S 35	JC 35	£2·23

Joints clips. See QAL-800 et seq.

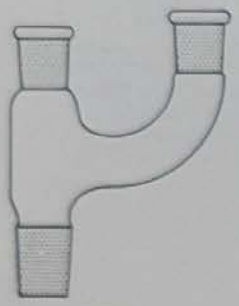


CC

ADAPTERS

MULTIPLE ADAPTERS

With two necks parallel.



MA 1/

List No.	QUICKFIT No.	Socket	Cone	Each
QAF-020-J	MA 1/00	10/19	10/13	£2·68
QAF-030-C	MA 1/11	14/23	14/23	£2·58
QAF-040-S	MA 1/2	19/26	19/26	£2·79
QAF-050-L	MA 1/3	19/26	24/29	£2·79
QAF-060-E	MA 1/33	24/29	24/29	£3·51
QAF-070-U	MA 1/5	19/26	34/35	£2·75

With two necks at 45°.

List No.	QUICKFIT No.	Socket	Cone	Each
QAF-200-H	MA 2/2	19/26	19/26	£2·76
QAF-210-A	MA 2/3	19/26	24/29	£2·76

MULTIPLE ADAPTERS

With three necks, two parallel, one at 45°.



MA 2/

List No.	QUICKFIT No.	Sockets		Cone	Each
		Parallel necks	Angled necks		
QAF-400-X	MA 4/13	19/26	14/23	24/29	£4·17
QAF-410-H	MA 4/23	19/26	19/26	24/29	£4·03

SWAN NECK ADAPTERS

With screw cap to accept thermometer or air leak tube.



MA 4/

List No.	QUICKFIT No.	Socket	Cone	Thread	Each
QAF-600-V	MA 6/11	14/23	14/23	13	£2·61
QAF-610-X	MA 6/22	19/26	19/26	13	£2·61
QAF-620-H	MA 6/23	19/26	24/29	13	£2·53



MA 6/

ADAPTERS

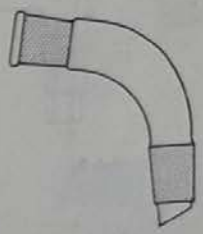
RECEIVER ADAPTERS

Plain bends, short.

List No.	QUICKFIT No.	Socket	Cone	Each
QAH-020-M	RA 1/01	14/23	–	£1·27
QAH-030-F	RA 1/02	19/26	–	£1·31
QAH-040-V	RA 1/03	24/29	–	£1·33
QAH-100-S	RA 9/11	14/23	14/23	£1·78
QAH-110-L	RA 9/22	19/26	19/26	£1·78
QAH-120-E	RA 9/23	19/26	24/29	£1·64
QAH-130-U	RA 9/33	24/29	24/29	£1·93
QAH-140-N	RA 9/55	34/35	34/35	£3·14



RA 1/0-



RA 9/

RECEIVER ADAPTERS

Plain bends, long.

List No.	QUICKFIT No.	Socket	Each
QAH-300-C	RA 1/10	10/19	£1·33
QAH-310-S	RA 1/11	14/23	£1·33
QAH-320-L	RA 1/12	19/26	£1·33
QAH-330-E	RA 1/13	24/29	£1·48



RA 1/1-



RA 1/2-

Straight delivery adapters.

List No.	QUICKFIT No.	Socket	Each
QAH-400-R	RA 1/21	14/23	£1·20
QAH-410-K	RA 1/22	19/26	£1·20
QAH-420-D	RA 1/23	24/29	£1·27

Bends with vent.

List No.	QUICKFIT No.	Socket	Cone	Each
QAH-500-J	RA 2/00	10/19	10/13	£1·82
QAH-510-C	RA 2/11	14/23	14/23	£1·86
QAH-520-S	RA 2/22	19/26	19/26	£2·08
QAH-530-L	RA 2/23	19/26	24/29	£1·79
QAH-540-E	RA 2/33	24/29	24/29	£2·08



RA 2/



RA 13/33

Vacuum type, straight.

List No.	QUICKFIT No.	Socket	Cone	Each
QAH-590-P	RA 13/33	24/29	24/29	£2·83

ADAPTERS



RA 3/

Vacuum type, bent.

List No.	QUICKFIT No.	Socket	Cone	Each
QAH-650-M	RA 3/11	14/23	14/23	£2·74
QAH-660-F	RA 3/22	19/26	19/26	£3·00
QAH-670-V	RA 3/23	19/26	24/29	£3·20
QAH-680-X	RA 3/33	24/29	24/29	£3·19



RA 4/

Bends with socket connection.

List No.	QUICKFIT No.	Socket	Cone	Each
QAH-720-C	RA 4/11	14/23	14/23	£2·53
QAH-730-S	RA 4/22	19/26	19/26	£2·68
QAH-740-L	RA 4/23	19/26	24/29	£2·68

Bends with multiple connections (pig).

List No.	QUICKFIT No.	Socket	Cone	Each
QAH-790-W	RA 5/00	10/19	10/13	£4·17
QAH-800-Y	RA 5/11	14/23	14/23	£6·62
QAH-810-B	RA 5/21	19/26	14/23	£6·69



RA 5/

Adapters, socket to cone, with T-connection.

List No.	QUICKFIT No.	Socket	Cone	Each
QAJ-200-N	MF 17/1	14/23	14/23	£1·52
QAJ-210-G	MF 17/2	14/23	19/26	£1·56
QAJ-220-W	MF 17/3	14/23	24/29	£1·63
QAJ-270-K	MF 18/2	19/26	19/26	£2·02
QAJ-280-D	MF 18/3	19/26	24/29	£1·52
QAJ-290-T	MF 18/5	19/26	34/35	£1·78
QAJ-300-F	MF 18/33	24/29	24/29	£2·04



MF 17/
MF 18/

Vacuum type, with multiple connections.

List No.	QUICKFIT No.	Description	Socket	Cone	Each
QAJ-400-U	RA 11	Vacuum receiver adapter, with 14/23 cones to take 4 x 100ml receiver flasks	19/26	14/23	£6·33
QAJ-410-N	RA 11/2	Adapter for vertical delivery	19/26	19/26	£1·78
QAJ-420-G	RA 12/2	Adapter for sloping delivery	19/26	19/26	£2·53



RA 11



RA 11/2

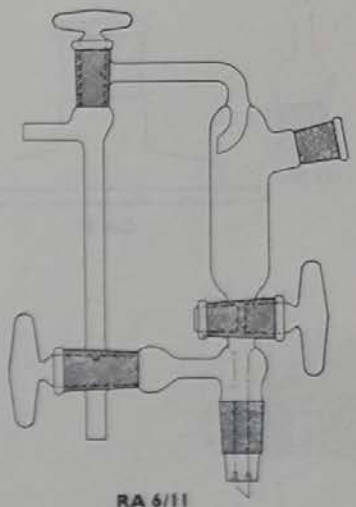


RA 12/2

ADAPTERS

Perkin intermediate receiver.

List No.	QUICKFIT No.	Socket	Cone	Each
QAJ-600-E	RA 6/11	14/23	14/23	£26·16


RA 6/11

Cone and screw cap adapters.

List No.	QUICKFIT No.	Thread	Cone	Dia. through screw cap mm	Each
QAJ-700-T	ST 51/13	13	14/23	6 to 7	£1·52
QAJ-710-M	ST 52/13	13	19/26	6 to 7	£1·52
QAJ-720-F	ST 53/13	13	24/29	6 to 7	£1·64
QAJ-730-V	ST 54/13	13	29/32	6 to 7	£1·78
QAJ-760-A	ST 51/18	18	14/23	7 to 8·5	£1·63
QAJ-770-Q	ST 52/18	18	19/26	7 to 8·5	£1·63
QAJ-780-J	ST 53/18	18	24/29	7 to 8·5	£1·64
QAJ-790-C	ST 54/18	18	29/32	7 to 8·5	£1·78
QAJ-820-U	ST 52/24	24	19/26	10·5 to 11·5	£2·02
QAJ-830-N	ST 53/24	24	24/29	10·5 to 11·5	£1·78
QAJ-840-G	ST 55/24	24	34/35	10·5 to 11·5	£2·38
QAJ-870-Y	ST 55/28	28	34/35	18 to 19	£2·38

SPARE PARTS for Screw Thread Connectors.

List No.	QUICKFIT No.	Thread	Each
	Plastics Cap		
QAK-100-L	QC 13/7	13	£0·22
QAK-110-E	QC 18/11	18	£0·22
QAK-120-U	QC 24/12	24	£0·30
	Rubber Ring		
QAK-160-P	QR 13/6	13	£0·08
QAK-170-Y	QR 18/7	18	£0·14
QAK-180-B	QR 24/11	24	£0·23
	PTFE Washer		
QAK-220-M	QW 13/6	13	£0·08
QAK-230-F	QW 18/7	18	£0·09
QAK-240-V	QW 24/11	24	£0·15


ST

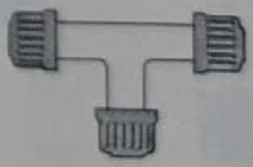
THERMOMETER ADAPTERS

Suitable for fitting thermometers or gas entry tubes into standard joint sockets allowing adjustment of immersion depth. Cones 14/23 and 19/26.

See *THM-820*

Connectors, T-shape.

List No.	QUICKFIT No.	Thread	Approx. length of limbs mm	Each
QAK-400-K	SQ 1/13	13	35	£2·46
QAK-410-D	SQ 1/18	18	40	£3·05

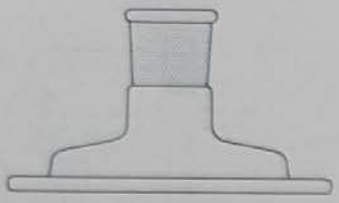

SQ 1/

ADAPTERS

FLAT FLANGE ADAPTERS

The flange sizes given below represent the internal diameter in millimetres within the flanges.

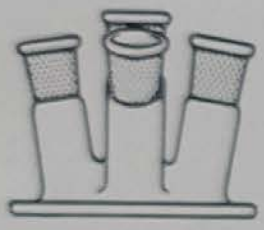
Single socket/flat flange.



DA 5/

List No.	QUICKFIT No.	Flat flange mm	Centre socket	Each
QAK-500-C	DA 5/75	75	34/35	£5·73
QAK-530-E	DA 5/100	100	34/35	£5·73

Multi socket/flat flange.

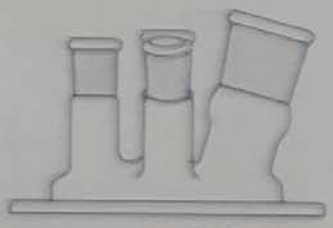


MAF 0/50
MAF 1/75

List No.	QUICKFIT No.	Flat flange mm	Centre socket	Side sockets	Each
QAK-600-R	MAF 0/50	50	10/19	4 × 10/19	£9·09
QAK-610-K	MAF 1/75	75	19/26	3 × 19/26 1 × 14/23	£9·71
QAK-620-D	MAF 2/2	100	19/26	4 × 19/26	£9·71
QAK-630-T	MAF 2/32	100	19/26	2 × 19/26 1 × 24/29	£8·34
QAK-650-F	MAF 2/52	100	19/26	3 × 19/26 1 × 34/35	£10·03
QAK-660-V	MAF 3/52	100	24/29	3 × 19/26 1 × 34/35	£10·48
QAK-680-H	MAF 5/2	100	34/35	3 × 19/26	£10·81

Flat flange clips — See *QJL-800 et seq.*

Reaction vessels for use with flat flange adapters — See *QRE-100 et seq.*



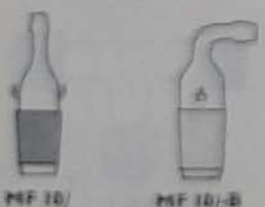
MAF 2/52
MAF 3/52

TUBING ADAPTERS

Cone to rubber tubing, straight connection.

List No.	QUICKFIT No.	Cone	Each
QAL-100-B	MF 10/1	14/23	£1·21
QAL-110-R	MF 10/2	19/26	£1·35
QAL-120-K	MF 10/3	24/29	£1·51

Cone to rubber tubing, right angle connection.



MF 10/ MF 10/-B

List No.	QUICKFIT No.	Cone	Each
QAL-200-Q	MF 10/1B	14/23	£1·24
QAL-210-J	MF 10/2B	19/26	£1·51
QAL-220-C	MF 10/3B	24/29	£1·52
QAL-230-S	MF 10/4B	29/32	£1·64
QAL-240-L	MF 10/5B	34/35	£1·78

ADAPTERS

TUBING ADAPTERS

Cone with stem to rubber tubing, right angle connection.

List No.	QUICKFIT No.	Cone	Each
QAL-310-B	MF 15/1B	14/23	£1·38
QAL-320-R	MF 15/2B	19/26	£1·52
QAL-330-K	MF 15/3B	24/29	£1·71



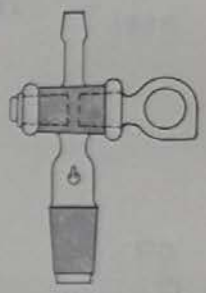
MF 15/-B



MF 13/

Socket to rubber tubing, straight connection.

List No.	QUICKFIT No.	Socket	Each
QAL-400-A	MF 13/2	19/26	£1·51
QAL-410-Q	MF 13/3	24/29	£1·51



MF 11/

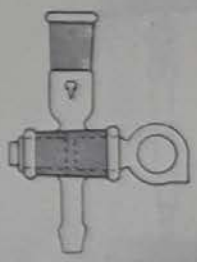
STOPCOCK ADAPTERS

Cone to rubber tubing, with interchangeable stopcock, straight connection.

List No.	QUICKFIT No.	Cone	Each
QAL-480-N	MF 11/1	14/23	£3·71
QAL-490-G	MF 11/2	19/26	£4·06
QAL-500-P	MF 11/3	24/29	£3·96



MF 11/-B



MF 14/

Cone to rubber tubing, with interchangeable stopcock, right angle connection.

List No.	QUICKFIT No.	Cone	Each
QAL-510-Y	MF 11/1B	14/23	£4·09
QAL-520-B	MF 11/2B	19/26	£3·96
QAL-530-R	MF 11/3B	24/29	£4·16
QAL-540-K	MF 11/5B	34/35	£4·46

Socket to rubber tubing, with interchangeable stopcock.

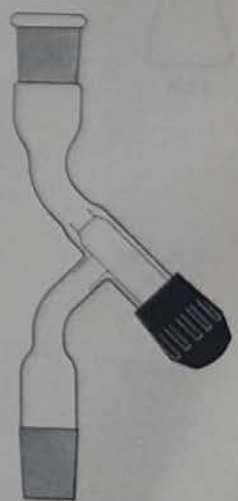
List No.	QUICKFIT No.	Socket	Each
QAL-600-H	MF 14/2	19/26	£4·16
QAL-610-A	MF 14/2B	19/26	£4·39
QAL-620-Q	MF 14/3	24/29	£4·16



CR 3T/23

Vacuum stopcock.

List No.	QUICKFIT No.	Socket	Cone	Each
QAL-700-W	CR 3T/23	19/26	24/29	£9·09
QAL-750-K	EF 6T/33	24/29	24/29	£9·85



EF 6T/33

BLOOD



2 BC

CAVETT BLOOD TEST APPARATUS, for determination of alcohol in blood.

List No.	QUICKFIT No.	Description	Each
QBD-150-M	2BC	**Assembly**	£3·71
QBD-180-X	BC 3CH	**Components** Special 24/29 stopper with hooks and cup	£2·12
QBD-190-H	BC 50/3H	Conical flask, 50ml, 24/29 joint with hooks	£1·56

Stainless steel springs 38mm (2 required) — See *QJH-870-V*

QUICKFIT Chemistry Sets — See *CHK-230-E et seq.*

COLUMN CHROMATOGRAPHY



1 CR



2 CR

List No.	QUICKFIT No.	Description	Socket or cone	Each
QCA-100-U	1 CR	**Assembly with 10mm × 100mm column**	–	£24·55
QCA-130-W	CR 12/10	**Components** Column 10mm × 100mm with tap and sintered glass porosity 0 support plate	14/23 socket 19/26 cone	£10·93
QCA-140-P	CR 2/11	Reservoir, 50ml	14/23	£7·94
QCA-150-Y	CR 12/30	**Accessory** Column 10mm × 300mm with tap and sintered glass porosity 0 support plate	14/23 socket 19/26 cone	£12·19

List No.	QUICKFIT No.	Description	Socket or cone	Each
QCA-300-E	2 CR	**Assembly with 18mm × 200mm column**	–	£25·59
QCA-330-G	CR 32/20	**Components** Column 18mm × 200mm with sintered glass porosity 0 support plate	–	£4·54
QCA-340-W	CR 43/53	Tamping rod for CR 32/20, 30 and 40	–	£1·33
QCA-350-P	CR 32/30	**Accessories** Column 18mm × 300mm with sintered glass porosity 0 support plate	19/26 cone 24/29 socket	£4·92
QCA-360-Y	CR 32/40	Drop bar 18mm × 400mm		£5·59

QUICKFIT Thin Layer Chromatography Set — See *CJK-320-S*

CONDENSERS

AIR CONDENSERS

List No.	QUICKFIT No.	Effective length mm	Socket	Cone	Each
QCH-020-N	C 2/00	100	10/19	10/13	£1·27
QCH-030-G	C 2/11	200	14/23	14/23	£1·20
QCH-040-W	C 2/12	150	19/26	19/26	£1·35
QCH-060-Y	FC 7/23	300	24/29	24/29	£1·64
QCH-070-B	C 2/22	400	19/26	19/26	£1·41
QCH-090-K	FC 7/43	550	24/29	24/29	£2·53
QCH-120-F	FC 7/53	800	24/29	24/29	£3·28


C 2/


FC 7/

LIEBIG CONDENSERS

List No.	QUICKFIT No.	Effective length mm	Socket	Cone	Each
QCH-300-D	C 1/00	60	10/19	10/13	£2·20
QCH-310-T	C 1/11	150	14/23	14/23	£2·75
QCH-320-M	C 1/12	200	19/26	19/26	£2·98
QCH-330-F	C 1/13	200	24/29	24/29	£3·58
QCH-340-V	C 1/22	400	19/26	19/26	£3·21
QCH-350-X	C 1/23	400	24/29	24/29	£3·66
QCH-370-A	C 1/55	500	34/35	34/35	£13·46
QCH-390-J	CX 1/2/25	250	–	19/26	£3·05


C 1/


CX 1/2/25

DAVIES CONDENSERS

List No.	QUICKFIT No.	Effective length mm	Socket	Cone	Each
QCH-600-C	C 5/00	100	10/19	10/13	£6·27
QCH-610-S	C 5/12	150	19/26	19/26	£5·21
QCH-620-L	C 5/13	150	24/29	24/29	£5·87
QCH-630-E	C 5/22	200	19/26	19/26	£5·51
QCH-640-U	C 5/23	200	24/29	24/29	£6·04

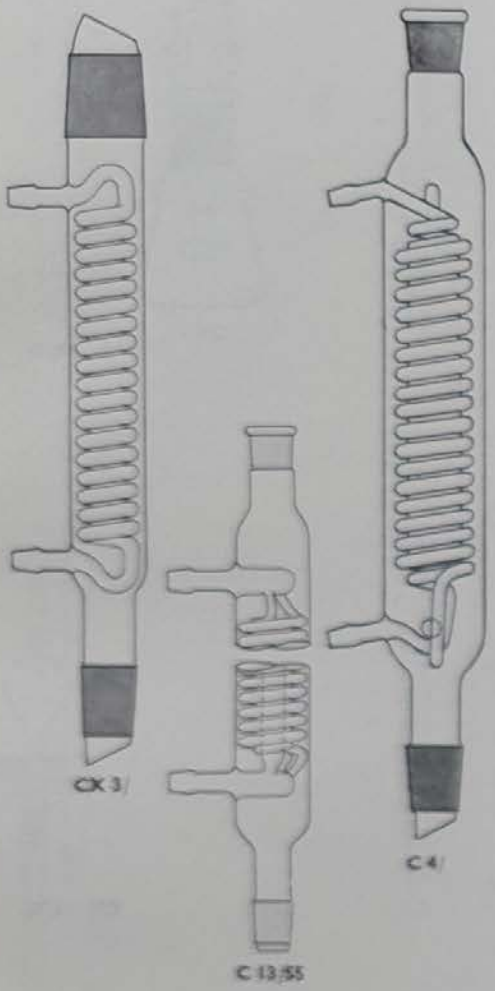

C 5/


C 3/

COIL OR GRAHAM CONDENSERS

List No.	QUICKFIT No.	Effective length mm	Socket	Cone	Each
QCJ-100-W	C 3/12	150	19/26	19/26	£4·60
QCJ-110-P	C 3/13	150	24/29	24/29	£4·83
QCJ-200-X	CX 3/05	150	–	34/35	£4·83
QCJ-210-H	CX 3/06	200	–	40/38	£6·27
QCJ-220-A	CX 3/07	200	–	45/40	£7·19
QCJ-230-Q	CX 3/08	200	–	50/42	£7·19
QCJ-300-G	C 3/22	300	19/26	19/26	£7·76
QCJ-310-W	C 3/23	300	24/29	24/29	£7·59

CONDENSERS



REVERSIBLE COIL CONDENSERS

List No.	QUICKFIT No.	Effective length mm	Cones	Each
QCJ-380-T	CX 3/23	150	19/26 and 24/39	£5·06
QCJ-390-M	CX 3/35	150	24/29 and 34/35	£5·35

DOUBLE COIL CONDENSERS

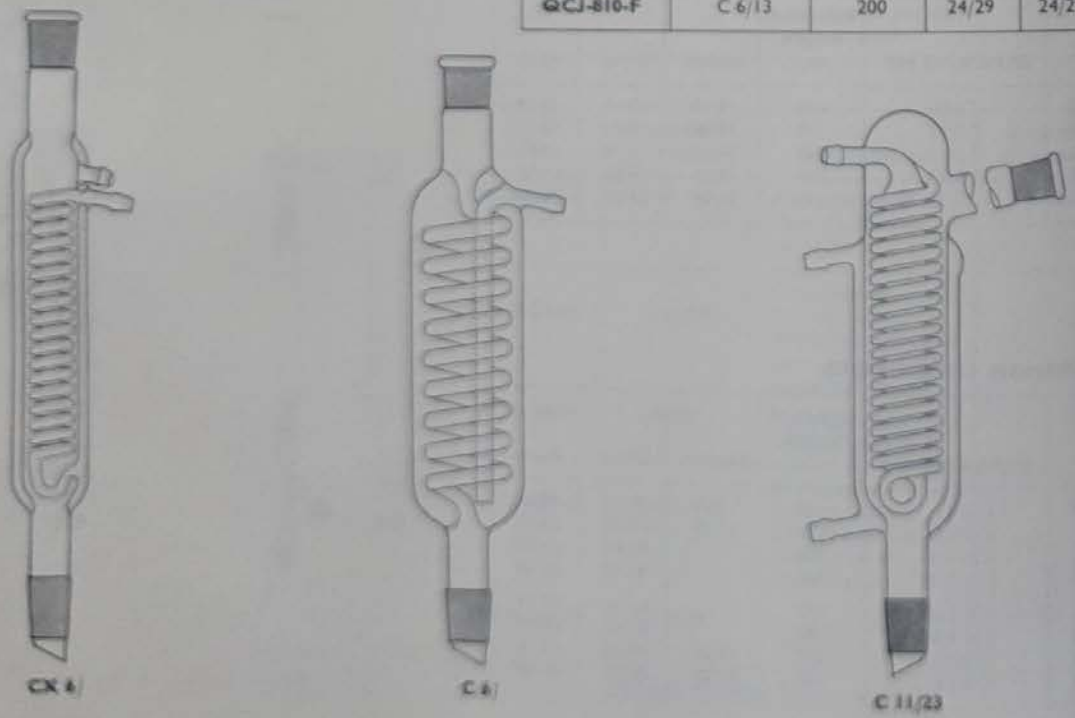
List No.	QUICKFIT No.	Effective length mm	Socket	Cone	Each
QCJ-500-N	C 4/12	200	19/26	19/26	£12·71
QCJ-510-G	C 4/13	200	24/29	24/29	£13·46
QCJ-520-W	C 13/55	230	34/35	34/35	£26·11
QCJ-530-P	C 13/55/2	380	34/35	34/35	£29·04

JACKETED COIL CONDENSERS

List No.	QUICKFIT No.	Effective length mm	Socket	Cone	Each
QCJ-720-G	CX 6/22	150	19/26	19/26	£11·39
QCJ-730-W	CX 6/33	150	24/29	24/29	£10·70
QCJ-750-Y	CX 6/05	150	–	34/35	£10·70

INLAND REVENUE CONDENSERS

List No.	QUICKFIT No.	Effective length mm	Socket	Cone	Each
QCJ-800-M	C 6/12	200	19/26	19/26	£11·39
QCJ-810-F	C 6/13	200	24/29	24/29	£11·90



CONDENSERS

ETHER CONDENSERS

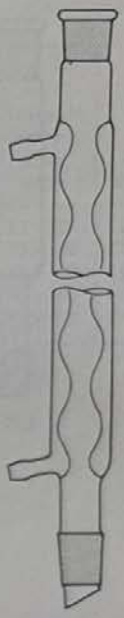
List No.	QUICKFIT No.	Effective length mm	Socket	Cone	Each
QCJ-860-Q	C 11/23	180	19/26	24/29	£22·02

ALLIHN CONDENSERS

List No.	QUICKFIT No.	Effective length mm	Socket	Cone	Each
QCK-330-V	CX 7/02	200	–	19/26	£5·09
QCK-340-X	CX 7/03	200	–	24/29	£5·51
QCK-350-H	CX 7/04	200	–	29/32	£5·58
QCK-360-A	CX 7/05	200	–	34/35	£5·21
QCK-370-Q	CX 7/06	200	–	40/38	£6·04
QCK-380-J	CX 7/08	220	–	50/42	£6·56
QCK-390-C	CX 7/33	300	24/29	24/29	£7·02



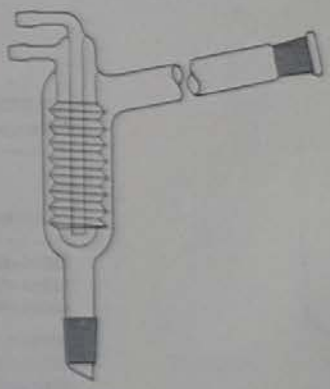
CX 7/0/-



CX 7/33

FRIEDRICHS CONDENSER

List No.	QUICKFIT No.	Effective length mm	Socket	Cone	Each
QCK-550-X	C10/22	100	19/16	19/16	£8·34



C 10/22

COLD FINGER CONDENSER

List No.	QUICKFIT No.	Effective length mm	Socket	Cone	Each
QCK-600-S	FC 14/00	100	12	19/26	£2·65



FC 14/00

DILATOMETER

DILATOMETER

For measuring the expansion of edible oils and fats over the temperature range within which melting takes place.

List No.	QUICKFIT No.	Description	Each
QDL-400-N	WE 12/1	Dilatometer body, socket 14/23	£7·88
QDL-420-W	SB 14DL	Stopper portion, cone 14/23	£1·20

Standard joint condensers
See CONDENSERS



WE 12/1 with SB 14DL

EXTRACTORS



EX 5/



EX 7/13

SOXHLET EXTRACTORS, to BS 2071.

List No.	QUICKFIT No.	Nominal capacity ml	Socket or Flange	Cone	Each
QEH-020-X	EX 5/21	6	19/26	14/23	£4·76
QEH-040-A	EX 5/32	20	24/29	19/26	£5·21
QEH-060-J	EX 5/43	40	29/32	24/29	£5·51
QEH-080-S	EX 5/53	60	34/35	24/29	£5·96
QEH-100-U	EX 5/55	60	34/35	34/35	£7·74
QEH-120-G	EX 5/55/100	100	34/35	34/35	£6·33
QEH-140-P	EX 5/63	100	40/38	24/29	£6·38
QEH-160-B	EX 5/55/200	200	34/35	34/35	£7·65
QEH-180-K	EX 5/83	200	50/42	24/29	£7·88
QEH-200-M	EX 5/75*	600	75mm	34/35	£22·71
QEH-220-V	EX 5/105*	2000	100mm	34/35	£36·28

* Extractors EX 5/75 and EX 5/105 are designed to accommodate large samples up to 75mm and 100mm diameter (e.g. wool). They utilise 75mm and 100mm flat flange joints together with 34/35 socket adapters.

Socket adapters, 75 and 100mm flat flange — See *QAK-500 et seq.*
Clips for flat flanges — See *QJL-800 et seq.*



EX 7/30

JACKETED SOXHLET EXTRACTORS, for use with siphon liner or as plain tube with spiral support.

List No.	QUICKFIT No.	Description	Nominal capacity ml	Socket	Cone	Each
QEH-450-H	EX 7/10	Liner	20	–	–	£2·38
QEH-470-Q	EX 7/13	Body	–	34/35	24/29	£2·38
QEH-490-C	EX 7/15	Body	–	34/35	34/35	£2·60
QEH-510-E	EX 7/20	Liner	50	–	–	£2·60
QEH-530-N	EX 7/23	Body	–	45/40	24/29	£3·50
QEH-550-W	EX 7/30	Liner	100	–	–	£2·83
QEH-570-Y	EX 7/33	Body		55/44	24/29	£4·16



EX 13

SPIRAL SUPPORTS, for use in extractor tubes and fractionating columns.

List No.	QUICKFIT No.	Diameter mm	To fit	Pack of 10
QEH-590-R	EX 13/12	16	FC 1	£3·13
QEH-610-T	EX 13/23	21	FC 7	£3·13
				Pack of 5
QEH-630-F	EX 13/25	29	FC 6 and 8	£2·23
QEH-650-K	EX 13/26	35	EX 7/13 and 7/15 EX 7/23 and 7/33	£2·23

EXTRACTORS

SOXHLET LIQUID/SOLID EXTRACTION ASSEMBLIES

List No.	QUICKFIT Assembly No.	COMPONENTS						Suitable thimble size mm	Each
		EXTRACTOR BODY		FLASK		CONDENSER	ADAPTER		
		Capacity ml	QUICKFIT No.	Capacity ml	QUICKFIT No.	QUICKFIT No.	QUICKFIT No.		
QEK-100-N	40 RASX	40	EX 5/43	100	FR 100/3S	CX 7/04	–	22 × 80	£12·77
QEK-120-W	100 RASX	100	EX 5/63	250	FR 250/3S	CX 7/06	–	33 × 100	£13·63
QEK-140-Y	200 RASX	200	EX 5/83	500	FR 500/3S	CX 7/08	–	41 × 130	£16·39
QEK-160-R	600 RDSX	600	EX 5/75	2000	FR 2L/5S	CX 5/25	DA 5/75	60 × 160	£40·19
QEK-180-D	2L RCSX	2000	EX 5/105	5000	FR 5L/5US	C 13/55	DA 5/100	90 × 200	£75·56



600 RDSX



2L RCSX

Gallenkamp

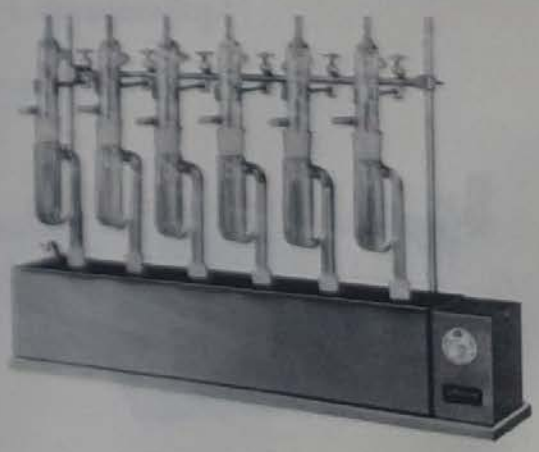
EXTRACTION APPARATUS

Water baths

6-place to take flasks up to 500ml capacity — See EXP-300

Extractors

Capacities 40 to 200ml — See EXP-600



FLASKS

FLASKS, round bottom, short neck.

List No.	QUICKFIT No.	Capacity ml	Socket	Each
QFH-020-D	FR 5/0S	5	10/19	£0·83
QFH-030-T	FR 5/1S	5	14/23	£0·77
QFH-050-F	FR 10/1S	10	14/23	£0·92
QFH-060-V	FR 25/1S	25	14/23	£0·90
QFH-070-X	FR 25/2S	25	19/26	£0·92
QFH-080-H	FR 25/3S	25	24/29	£0·94
QFH-090-A	FR 50/1S	50	14/23	£1·06
QFH-100-J	FR 50/2S	50	19/26	£1·15
QFH-110-C	FR 50/3S	50	24/29	£1·12
QFH-130-L	FR 100/1S	100	14/23	£1·25
QFH-140-E	FR 100/2S	100	19/26	£1·24
QFH-150-U	FR 100/3S	100	24/29	£1·25
QFH-160-N	FR 100/4S	100	29/32	£1·37
QFH-170-G	FR 100/5S	100	34/35	£1·41
QFH-180-W	FR 150/2S	150	19/26	£1·35
QFH-190-P	FR 150/3S	150	24/29	£1·36
QFH-210-R	FR 150/5S	150	34/35	£1·41
QFH-230-D	FR 250/2S	250	19/26	£1·52
QFH-250-M	FR 250/3S	250	24/29	£1·45
QFH-260-F	FR 250/4S	250	29/32	£1·52
QFH-270-V	FR 250/5S	250	34/35	£1·64
QFH-280-X	FR 500/2S	500	19/26	£1·73
QFH-290-H	FR 500/3S	500	24/29	£1·67
QFH-300-Q	FR 500/4S	500	29/32	£1·84
QFH-310-J	FR 500/5S	500	34/35	£1·93
QFH-340-L	FR 1L/3S	1000	24/29	£1·86
QFH-350-E	FR 1L/4S	1000	29/32	£2·16
QFH-360-U	FR 1L/5S	1000	34/35	£2·38
QFH-380-G	FR 2L/3S	2000	24/29	£3·28
QFH-390-W	FR 2L/4S	2000	29/32	£3·14
QFH-400-Y	FR 2L/5S	2000	34/35	£3·14
QFH-410-B	FR 3L/3S	3000	24/29	£4·16
QFH-420-R	FR 3L/5S	3000	34/35	£4·31
QFH-440-D	FR 5L/5US	5000	34/35	£6·84
QFH-460-M	FR 5L/9S	5000	55/44	£7·02



FR-/-S

Gallenkamp FLASK SHAKER

For dissolving, dispensing, extracting and other applications



- Accepts up to six 5000 ml flasks
- Positive grip clamps
- Speeds up to 800 oscillations/min
- Integral 0 to 30 minute timer

See SGL.700

FLASKS

FLASKS, round bottom, medium neck.

List No.	QUICKFIT No.	Capacity ml	Socket	Each
QFJ-020-G	FR 50/1M	50	14/23	£1·12
QFJ-040-P	FR 50/3M	50	24/29	£1·12
QFJ-050-Y	FR 100/1M	100	14/23	£1·27
QFJ-060-B	FR 100/2M	100	19/26	£1·20
QFJ-070-R	FR 100/3M	100	24/29	£1·27
QFJ-080-K	FR 150/3M	150	24/29	£1·35
QFJ-100-M	FR 250/2M	250	19/26	£1·63
QFJ-110-F	FR 250/3M	250	24/29	£1·51
QFJ-140-H	FR 500/3M	500	24/29	£1·78
QFJ-160-Q	FR 500/4U	500	29/32	£1·86
QFJ-170-J	FR 500/5M	500	34/35	£1·86
QFJ-180-C	FR 1L/3UM	1000	24/29	£1·93
QFJ-200-E	FR 1L/5M	1000	34/35	£2·46
QFJ-210-U	FR 2L/3M	2000	24/29	£3·28
QFJ-220-N	FR 2L/5UM	2000	34/35	£3·35



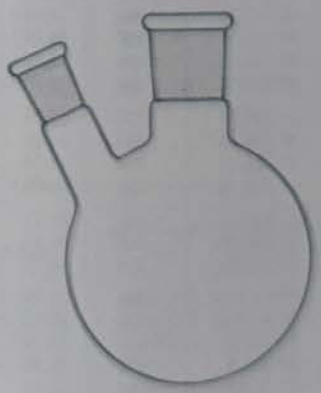
FR-/-M

FLASKS, round bottom, long neck.

List No.	QUICKFIT No.	Capacity ml	Socket	Each
QFJ-500-D	FR 250/3L	250	24/29	£1·48
QFJ-510-T	FR 500/3L	500	24/29	£1·78

FLASKS, round bottom, two necks. With short centre neck and angled side neck.

List No.	QUICKFIT No.	Capacity ml	Centre socket	Side socket	Each
QFM-020-W	FR 100/3S/1A	100	24/29	14/23	£2·53
QFM-040-Y	FR 250/3S/1A	250	24/29	14/23	£2·61
QFM-050-B	FR 250/3S/2A	250	24/29	19/26	£2·83
QFM-060-R	FR 500/3S/1A	500	24/29	14/23	£2·83
QFM-070-K	FR 500/3S/2A	500	24/29	19/26	£3·13
QFM-080-D	FR 1L/3S/1A	1000	24/29	14/23	£3·28
QFM-100-F	FR 2L/5S/2A	2000	34/35	19/26	£5·13



FR-/-/2A



FR-/3L

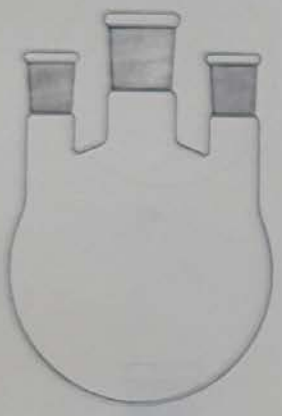
FLASKS



FR-/-/22A

FLASKS, round bottom, three necks. With short centre neck and two angled side necks.

List No.	QUICKFIT No.	Capacity ml	Centre socket	Side sockets	Each
QFM-300-M	FR 250/3S/11A	250	24/29	14/23	£3·51
QFM-310-F	FR 250/3S/22A	250	24/29	19/26	£4·22
QFM-330-X	FR 500/3S/11A	500	24/29	14/23	£3·89
QFM-340-H	FR 500/3S/22A	500	24/29	19/26	£4·50
QFM-360-Q	FR 1L/3S/11A	1000	24/29	14/23	£4·23
QFM-380-C	FR 1L/3S/22A	1000	24/29	19/26	£4·77
QFM-390-S	FR 1L/5S/22A	1000	34/35	19/26	£5·21
QFM-400-E	FR 2L/3US/22A	2000	24/29	19/26	£6·79
QFM-410-U	FR 2L/5S/22A	2000	34/35	19/26	£6·50



FR-/-/22P

FLASKS, round bottom, three parallel necks.

List No.	QUICKFIT No.	Capacity ml	Centre socket	Side sockets	Each
QFM-600-L	FR 250/3S/22P	250	24/29	19/26	£4·46
QFM-620-U	FR 500/3S/22P	500	24/29	19/26	£5·06
QFM-650-W	FR 1L/3S/22P	1000	24/29	19/26	£5·06
QFM-660-P	FR 1L/5S/22P	1000	34/35	19/26	£5·44
QFM-690-R	FR 2L/3US/22P	2000	24/29	19/26	£7·07
QFM-720-M	FR 2L/5S/22P	2000	34/35	19/26	£6·67
QFM-730-F	FR 2L/5S/33P	2000	34/35	24/29	£7·13
QFM-740-V	FR 3L/5S/22P	3000	34/35	19/26	£9·09
QFM-750-X	FR 3L/5S/33P	3000	34/35	24/29	£9·37
QFM-760-H	FR 5L/5US/33P	5000	34/35	24/29	£11·33



FF-/-S

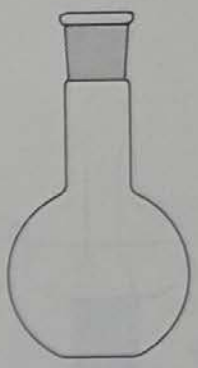
FLASKS, flat bottom, short neck.

List No.	QUICKFIT No.	Capacity ml	Socket	Each
QFT-050-A	FF 50/2S	50	19/26	£1·12
QFT-060-Q	FF 50/3S	50	24/29	£1·05
QFT-070-J	FF 100/2S	100	19/26	£1·20
QFT-080-C	FF 100/3S	100	24/29	£1·20
QFT-100-E	FF 100/5S	100	34/35	£1·41
QFT-110-U	FF 150/2S	150	19/26	£1·35
QFT-120-N	FF 150/3S	150	24/29	£1·35
QFT-130-G	FF 150/4S	150	29/32	£1·35
QFT-140-W	FF 150/5S	150	34/35	£1·41
QFT-150-P	FF 250/2S	250	19/26	£1·56
QFT-160-Y	FF 250/3S	250	24/29	£1·43
QFT-170-B	FF 250/4S	250	29/32	£1·52
QFT-180-R	FF 250/5S	250	34/35	£1·64
QFT-230-V	FF 500/3S	500	24/29	£1·50
QFT-240-X	FF 500/4S	500	29/32	£1·59
QFT-250-H	FF 500/5S	500	34/35	£1·86
QFT-260-A	FF 1L/3US	1000	24/29	£1·93
QFT-270-Q	FF 1L/4US	1000	29/32	£2·16
QFT-280-J	FF 1L/5S	1000	34/35	£2·30
QFT-290-C	FF 2L/3S	2000	24/29	£3·28
QFT-310-E	FF 2L/5S	2000	34/35	£3·28

FLASKS

FLASKS, flat bottom, medium neck.

List No.	QUICKFIT No.	Capacity ml	Socket	Each
QFT-700-C	FF 100/3M	100	24/29	£1·20
QFT-710-S	FF 150/3M	150	24/29	£1·35
QFT-720-L	FF 250/2M	250	19/26	£1·56
QFT-730-E	FF 250/3M	250	24/29	£1·41
QFT-760-G	FF 500/3UM	500	24/29	£1·64
QFT-770-W	FF 500/4UM	500	29/32	£1·79
QFT-780-P	FF 1L/3M	1000	24/29	£1·93



FF-/-M

FLASKS, Kjeldahl, long neck, round bottom.

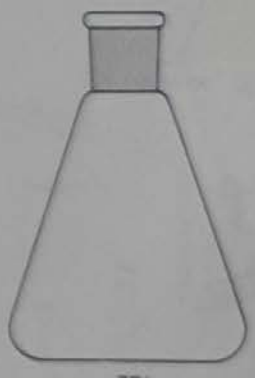
List No.	QUICKFIT No.	Capacity ml	Socket	Each
QFY-020-R	FK 100/3L	100	24/29	£1·64
QFY-030-K	FK 200/3L	200	24/29	£1·78
QFY-040-D	FK 300/3L	300	24/29	£1·86
QFY-050-T	FK 500/3L	500	24/29	£1·93
QFY-060-M	FK 800/3L	800	24/29	£2·38



FK

FLASKS, conical.

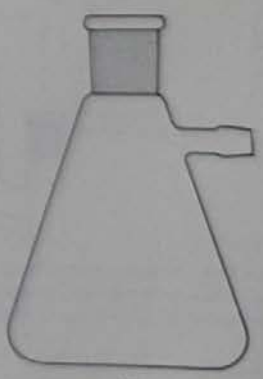
List No.	QUICKFIT No.	Capacity ml	Socket	Each
QFY-250-D	FE 5/0	5	10/19	£1·30
QFY-280-F	FE 10/1	10	14/23	£1·32
QFY-290-V	FE 25/0	25	10/19	£1·25
QFY-300-H	FE 25/1	25	14/23	£1·27
QFY-320-Q	FE 50/1	50	14/23	£1·25
QFY-330-J	FE 50/2	50	19/26	£1·27
QFY-340-C	FE 50/3	50	24/29	£1·21
QFY-350-S	FE 100/1	100	14/23	£1·39
QFY-360-L	FE 100/2	100	19/26	£1·30
QFY-370-E	FE 100/3	100	24/29	£1·32
QFY-390-N	FE 150/2	150	19/26	£1·56
QFY-400-W	FE 150/3	150	24/29	£1·56
QFY-420-Y	FE 250/2	250	19/26	£1·50
QFY-430-B	FE 250/3	250	24/29	£1·43
QFY-440-R	FE 250/4	250	29/32	£1·50
QFY-480-M	FE 250/5	250	34/35	£1·56
QFY-490-F	FE 500/3	500	24/29	£1·55
QFY-500-X	FE 500/4	500	29/32	£1·61
QFY-510-H	FE 500/5	500	34/35	£1·63
QFY-520-A	FE 1L/3	1000	24/29	£1·92
QFY-530-Q	FE 1L/4	1000	29/32	£2·08
QFY-540-J	FE 1L/5	1000	34/35	£2·16
QFY-560-S	FE 2L/5	2000	34/35	£3·35



FE/

FLASKS, Buchner or filtration.

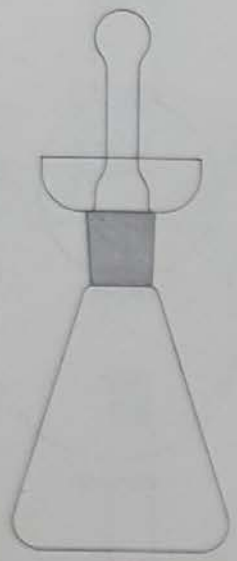
List No.	QUICKFIT No.	Capacity ml	Socket	Each
QFY-800-N	FB 100/2	100	19/26	£2·47
QFY-820-W	FB 250/3	250	24/29	£2·90
QFY-840-Y	FB 500/3	500	24/29	£3·34
QFY-860-R	FB 1L/3	1000	24/29	£4·40



FB

Filter flasks, 29/32 sockets See 1140-350

FLASKS



FIB

FLASKS, iodine, to BS 2735. **Without** stopper.

List No.	QUICKFIT No.	Capacity ml	Socket	Each
QFY-950-Q	FIB 250/3	250	24/29	£3·57
QFY-970-C	FIB 500/3	500	24/29	£3·89

Iodine flask stopper See QTE-720-H

PEAR-SHAPED SEMI-MICRO FLASKS

Single neck.

List No.	QUICKFIT No.	Capacity ml	Socket	Each
QGE-020-W	FP 5/0	5	10/19	£1·12
QGE-050-B	FP 10/1	10	14/23	£1·12
QGE-060-R	FP 25/0	25	10/19	£1·27
QGE-070-K	FP 25/1	25	14/23	£1·12
QGE-080-D	FP 50/1	50	14/23	£1·12
QGE-120-X	FP 100/2	100	19/26	£1·56



FP



FP 50/1/1A



FP 25/0AP

Two necks, side neck at angle.

List No.	QUICKFIT No.	Capacity ml	Socket	Each
QGE-250-Y	FP 50/1/1A	50	14/23	£2·61

Three necks, one side neck parallel, other angled.

List No.	QUICKFIT No.	Capacity ml	Socket	Each
QGE-300-M	FP 25/0AP	25	10/19	£4·08



MD 2/

Distillation.

List No.	QUICKFIT No.	Capacity ml	Socket and cone	Each
QGE-350-A	MD 2/10	10	14/23	£2·53
QGE-360-Q	MD 2/25	25	14/23	£2·23
QGE-370-J	MD 2/50	50	14/23	£2·53
QGE-380-C	MD 2/100	100	14/23	£2·91



MD 3/

Claisen.

List No.	QUICKFIT No.	Capacity ml	Socket and cone	Each
QGE-510-M	MD 3/0/25	25	10/19	£3·57
QGE-520-F	MD 3/25	25	14/23	£3·57
QGE-530-V	MD 3/50	50	14/23	£3·66
QGE-540-X	MD 3/100	100	14/23	£4·08

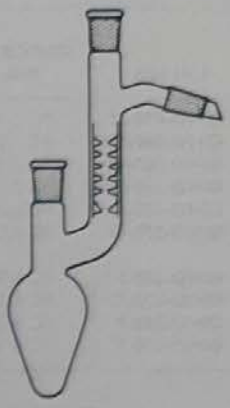
FLASKS

Claisen – Vigreux.

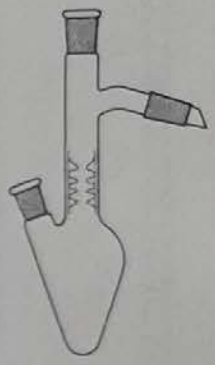
List No.	QUICKFIT No.	Capacity ml	Socket and cone	Each
QGE-680-B	MD 4/25	25	14/23	£4·60
QGE-690-R	MD 4/50	50	14/23	£4·92
QGE-700-D	MD 4/100	100	14/23	£5·00

Vigreux – with angled neck, main socket and side cone 14/23.

List No.	QUICKFIT No.	Capacity ml	Angle socket	Each
QGE-770-A	MD 7/10	10	10/19	£4·60
QGE-780-Q	MD 7/25	25	10/19	£4·60
QGE-790-J	MD 7/50	50	10/19	£4·83



MD 4/



MD 7/

Griffin

SEMI-MICRO ORGANIC SET

A set of semi micro apparatus with 14/23 ground glass joints

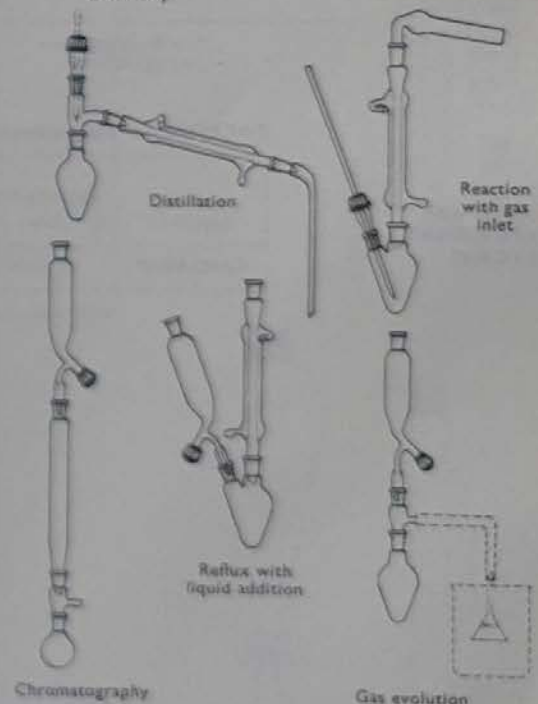


The set enables a wide variety of experiments to be carried out and is designed to ensure that the working area required is at a minimum.

See CHJ-200-M

QUICKFIT MULTI-JOINT SETS

For distillation and preparative organic chemistry



A comprehensive range of items supplied as a series of sets allowing work from the 30g up to 1 kg scales to be carried out.

See CHK-230-E et seq.

FRACTIONATION



FC 1/



FC 3/

FRACTIONATING COLUMNS

List No.	QUICKFIT No.	Type	Socket	Cone	Effective length mm	Each
QHD-030-X	FC 1/12	Dufton	19/26	19/26	150	£5·81
QHD-040-H	FC 1/22	Dufton	19/26	19/26	300	£6·56
QHD-060-Q	FC 2/23	Dufton	24/29	24/29	300	£7·59
QHD-150-P	FC 3/13	Vigreux	24/29	24/29	360	£5·35
QHD-160-Y	FC 3/23	Vigreux	24/29	24/29	600	£9·09
QHD-270-Q	FC 6/23A	Jacket only to take 12 bulbs (and bubbles)	34/35	24/29	225	£5·06
QHD-280-J	FC 6/00	Pear bulbs, for above	–	–	–	£0·54
QHD-290-C	FC 6/10	Bubbles, for above	–	–	–	£0·29
QHD-360-P	FC 8/23	Plain columns	34/35	24/29	250	£2·76
QHD-370-Y	FC 8/43	Plain columns	34/35	24/29	500	£3·80

Plain columns
Standard joint fractionating columns and stillheads

See QCH-060 et seq.
See page heading Distillation



FC 6/23A with 12 × FC 6/00 and 12 × FC 6/10

REFLUX HEADS

List No.	QUICKFIT No.	Description	Socket or Cup	Thermo socket	Cone or Ball	Each
QHD-600-K	FC 15/32	Sluice type head	19/26	14/23	24/29 S13	£5·06
QHD-620-T	FC 15/1	Distillate adapter with fine adjustment stopcock	S 13	–	14/23	£11·10
QHD-640-F	FC 15/2	Distillate adapter with fine adjustment stopcock	S 13	–	19/26	£11·10

Cold finger condenser
Joint clip, JC 13

See QCK-600-S
See QTL-800-H

PACKING, for plain columns.

List No.	QUICKFIT No.	Description	Diameter mm	Effective length mm	Pack of 1 litre
QHD-800-R	FC 8/06	Raschig rings, soda-lime glass	6	6	£5·81

Spiral supports for column packing

See QEH-590 et seq.



FC 8/23



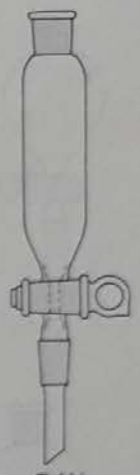
FC 15/32 + FC 15/1 + JC 13

FUNNELS

SEPARATING AND DROPPING FUNNELS

Cylindrical, with socket and plain stem.

List No.	QUICKFIT No.	Capacity ml	Socket	Each
QHK-020-U	D 11/25	25	14/23	£4·03
QHK-030-N	D 11/50	50	14/23	£4·08
QHK-040-G	D 12/100	100	19/26	£4·08
QHK-050-W	D 12/250	250	19/26	£5·52
QHK-060-P	D 12/500	500	19/26	£6·15



D 11/
D 12/

Cylindrical, with socket and cone.

List No.	QUICKFIT No.	Capacity ml	Socket and cone	Each
QHK-150-X	D 1/00	20	10/19	£5·06
QHK-160-H	D 1/01	25	14/23	£4·69
QHK-170-A	D 1/11	50	14/23	£4·69
QHK-180-Q	D 1/21	100	14/23	£5·15
QHK-190-J	D 1/22	100	19/26	£5·50
QHK-200-S	D 1/32	250	19/26	£7·22
QHK-210-L	D 1/42	500	19/26	£7·97
QHK-220-E	D 1/62	1000	19/26	£8·72

D 1/00 has a 10/13 cone.



D 1/



D 3/

Cylindrical, open top and 19/26 cone.

List No.	QUICKFIT No.	Capacity ml	Socket	Each
QHK-330-M	D 3/12	50	–	£5·29
QHK-340-F	D 3/22	100	–	£5·35
QHK-350-V	D 3/32	250	–	£5·87

Cylindrical dropping funnel, 14/15 joints

See FPM-310-E

Conical, with socket and short stem.

List No.	QUICKFIT No.	Capacity ml	Socket	Each
QHK-500-R	D 82/100	100	19/26	£5·12
QHK-510-K	D 83/250	250	24/29	£6·70
QHK-520-D	D 83/500	500	24/29	£7·94
QHK-530-T	D 84/1L	1000	29/32	£8·91



D 82/
D 83/
D 84/

FUNNEL STANDS

With single or double holders for conical and pear shaped funnels

See STA-200

Gallenkamp

FUNNELS



D 2/

Pear shape, with socket and cone.

List No.	QUICKFIT No.	Capacity ml	Socket and cone	Each
QHK-700-B	D 2/01	25	14/23	£4·92
QHK-710-R	D 2/11	50	14/23	£4·98
QHK-730-D	D 2/21	100	14/23	£5·15
QHK-740-T	D 2/22	100	19/26	£5·21
QHK-750-M	D 2/31	250	14/23	£5·87
QHK-760-F	D 2/32	250	19/26	£6·24
QHK-770-V	D 2/42	500	19/26	£6·24
QHK-780-X	D 2/62	1000	19/26	£8·63



D 22/

Pear shape, with socket and plain stem.

List No.	QUICKFIT No.	Capacity ml	Socket	Each
QHL-020-K	D 22/50	50	19/26	£4·40
QHL-030-D	D 22/100	100	19/26	£4·23
QHL-040-T	D 22/250	250	19/26	£5·21
QHL-050-M	D 22/500	500	19/26	£5·73
QHL-070-V	D 22/1L	1000	19/26	£7·53



D 62/50 with D 62/0

Plug type, with stem, 50ml capacity.

List No.	QUICKFIT No.	Part	Socket	Cone	Each
QHL-200-Y	D 60/50	Funnel	10/19	–	£2·91
QHL-230-K	D 62/50	Funnel	10/19	19/26	£3·40
QHL-240-D	D 62/0	Plug	–	10/19	£1·05

PRESSURE EQUALISATION FUNNELS

List No.	QUICKFIT No.	Type	Capacity ml	Cone and socket	Each
QHL-400-P	DE 100/22	Pear shape	100	19/26	£9·09
QHL-440-K	DE 250/33	Pear shape	250	24/29	£10·18
QHL-490-V	DEC 500/33	Cylindrical	500	24/29	£10·35



DE

MEMBRANE FILTER FUNNELS

- All-glass construction
- 24/29 or 29/32 cone joint
- Gravity, vacuum or pressure filtration

See FDC-500 et seq.

FUNNELS

FILTER FUNNEL, with perforated plate, Hirsch type, cone 19/26.

List No.	QUICKFIT No.	Disc dia.	Each
QHL-700-X	SF 42/2	24mm	£3·57

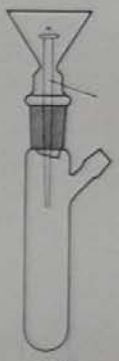


SF 42/2

WILLSTATTER FILTER
The precipitate is retained on a small circle of filter paper (cut with a cork borer) supported on the glass 'nail'. All joints 10/19.

List No.	QUICKFIT No.	Description	Each
QHM-100-G	17 MU	Assembly	£9·87
		Components	
QHM-140-B	MU 39/10/0	Filter funnel	£1·63
QHM-150-R	MU/WN	Willstatter nail	£0·53

Receiver tube — *See QRV-050-J*



17 MU

Sinta Glass

FILTER FUNNELS

- 24/29 or 29/32 cone on stems
- capacities 140 to 700ml
- porosities 3, 4 and 5

See FPJ-370-170N et seq.

HOMOGENISER
This homogeniser is suitable for breaking down tissues in small scale work.

List No.	QUICKFIT No.	Description	Each
QHX-100-L	BC 15P	Plunger, dia. 15mm	£2·55
QHX-120-U	BC 15/150	Tube, dia. 15mm, length 150mm	£1·13



BC 15P with BC 15/150

TISSUE GRINDERS

Comprising glass cup with protecting tube and glass plunger

See TKW-300



JOINTS

TO BS 572

CONE JOINTS

Borosilicate glass



CNB

Plain end.

List No.	QUICKFIT No.	Cone	Approx. tube ext. dia., mm	Each
QJF-050-E	CNB 5	5/13	4	£0·60
QJF-060-U	CNB 7	7/16	7	£0·52
QJF-070-N	CNB 10	10/19	9	£0·51
QJF-080-G	CNB 12	12/21	12	£0·51
QJF-100-Y	CNB 14	14/23	14	£0·48
QJF-110-B	CNB 19	19/26	18	£0·51
QJF-120-R	CNB 24	24/29	23	£0·59
QJF-130-K	CNB 29	29/32	28	£0·64



CAB



CBB

Angle drip end.

List No.	QUICKFIT No.	Cone	Approx. tube ext. dia. mm	Each
QJF-500-W	CAB 14	14/23	14	£0·62
QJF-520-Y	CAB 24	24/19	23	£0·71

Long tip.

List No.	QUICKFIT No.	Cone	Approx. tube ext. dia. mm	Each
QJF-700-G	CBB 7	7/16	7	£0·69
QJF-710-W	CBB 10	10/19	9	£0·59
QJF-720-P	CBB 14	14/23	14	£0·54
QJF-730-Y	CBB 19	19/26	18	£0·60
QJF-740-B	CBB 24	24/29	23	£0·66
QJF-750-R	CBB 29	29/32	28	£0·75



CND

Double cone, plain ends.

List No.	QUICKFIT No.	Cone	Approx. tube ext. dia. mm	Each
QJF-980-N	CND 1/80	14/23	14	£0·84
QJF-920-W	CND 3/95	24/29	23	£1·05

SOCKET JOINTS

Borosilicate glass

Bulged shoulder.

List No.	QUICKFIT No.	Socket	Approx. tube ext. dia. mm	Each
QJH-100-L	SBB 5	5/13	6	£0·97
QJH-110-E	SBB 7	7/16	7	£1·12



SBB

Plain shoulder.

List No.	QUICKFIT No.	Socket	Approx. tube ext. dia. mm	Each
QJH-250-X	SRB 7	7/16	11	£0·71
QJH-260-H	SRB 10	10/19	14	£0·60
QJH-290-J	SRB 14	14/23	18	£0·51
QJH-300-S	SRB 19	19/26	23	£0·51
QJH-310-L	SRB-24	24/29	28	£0·60
QJH-320-E	SRB 29	29/32	33	£0·69
QJH-330-U	SRB 34	34/35	40	£0·82
QJH-370-P	SRB 45	45/40	53	£1·17

JOINT SPRINGS

SPRINGS, for use on joints with hooks.

Length, mm	25	38	50
For joints from	7/16	14/23	40/38
to	12/21	34/35	55/44

QJH-860-F	Springs, 25mm	Pack of 10 £0·53
QJH-870-V	Springs, 38mm	Pack of 10 £0·56
QJH-880-X	Springs, 50mm	Pack of 10 £1·04



SRB

CARE OF GROUND GLASS JOINTS

A thin film of PTFE applied to ground joints by spraying with aerosol provides efficient lubrication.

For best results the film should be evenly deposited, and for this purpose the joint should be slowly rotated at steady speed whilst the aerosol is applied.

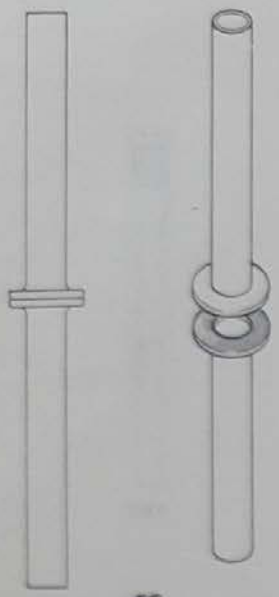
For a suitable aerosol lubricant See LUB-660-U

QUICKFIT VACUUM STOPCOCKS

- **Choice of single straight, double oblique or T-bores**
- **Versions listed with PTFE plug key**



See STA-600-030E et seq.



FG

FLAT FLANGE JOINTS

Borosilicate glass

List No.	QUICKFIT No.	Nominal bore mm	Approx. flange dia. mm	Each
QJL-050-N	FG 15	15	45	£2·16
QJL-060-G	FG 25	25	55	£2·45

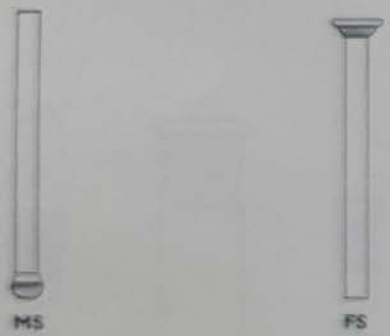
SPHERICAL JOINTS

Borosilicate glass

Designed to avoid joint rigidity. Complete joint comprises one ball with one cup.

Ball joint.

List No.	QUICKFIT No.	Nominal bore mm	Each
QJL-300-B	MS 13C	2	£0·91
QJL-310-R	MS 13	5	£0·91
QJL-320-K	MS 19	9	£1·01
QJL-330-D	MS 29	15	£1·32



MS FS

Cup joint.

List No.	QUICKFIT No.	Nominal bore mm	Each
QJL-550-T	FS 13C	2	£1·10
QJL-560-M	FS 13	5	£1·05
QJL-570-F	FS 19	9	£1·21
QJL-580-V	FS 29	15	£1·40

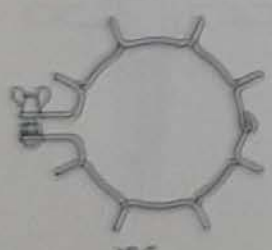


JC

JOINT CLIPS

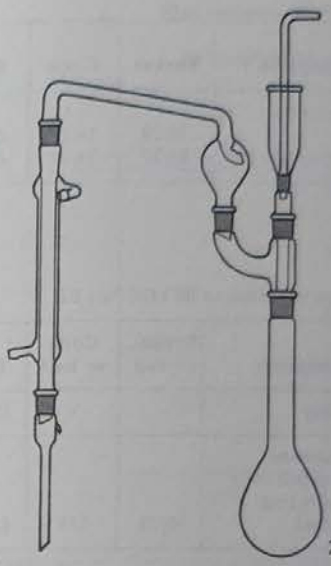
For holding flat flanges and spherical joints.

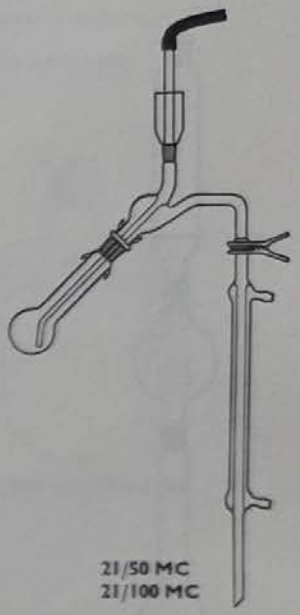
List No.	QUICKFIT No.	For ball and cup joint. Size	For flat flange. Bore mm	Each
QJL-800-H	JC 13	S13	2	£0·56
QJL-810-A	JC 19	S19	5	£0·67
QJL-820-Q	JC 29	S29	10	£0·74
QJL-830-J	JC 35	S35	15	£0·79
QJL-840-C	JC 41	S41	25	£0·85
QJL-900-W	JC 50F	–	50	£1·68
QJL-910-P	JC 75F	–	75	£1·78
QJL-920-Y	JC 100F	–	100	£1·88



JC-F

NITROGEN DETERMINATION


280 MC


21/50 MC
21/100 MC

MACRO KJELDAHL DISTILLATION UNIT

This assembly uses the same flask for distillation as for the digestion stage and conversion from one stage to the other can be done quickly. The distillation apparatus except for the flask is carrried on one rod by means of spring clips, and can be moved into position by adjusting one bosshead.

List No.	QUICKFIT No.	Description	Each
QNP-100-C	Q-280 MC	**Assembly**	£18·29
		Components	
		Condenser, 200mm jacket length	See QCH-320-M
		Plug dropping funnel 50ml	See QHL-230-K
		Kjeldahl flask, 500ml	See QFY-050-T
		Multiple adapter	See QAF-050-L
		2× Double spring clips	See QTY-850-Y
		Funnel plug	See QHL-240-D
		Delivery adapter	See QAH-410-K
		Splash head	See QSK-500-L

SEMI-MICRO KJELDAHL APPARATUS

List No.	QUICKFIT No.	Description	Socket or cup	Cone or ball	Each
QNP-300-J	21/50 MC	**Assembly 50ml**	–	–	£15·30
QNP-340-E	21/100 MC	**Assembly 100ml**	–	–	£15·64
		Components			
QNP-410-R	MC 1/F19	Liebig condenser, 280mm effective length	S19	–	£3·66
QNP-430-D	MC 21	Distillation head	10/19	19/26 and S19	£8·74
QNP-470-V	MC 22/50	Kjeldahl flask, 50ml	19/26	–	£1·52
QNP-480-X	MC 22/100	Kjeldahl flask, 100ml	19/26	–	£1·63
		Funnel plug, CNB 10			See QJF-070-N
		Stainless steel spring, 38mm			See QJH-870-V
		Spherical joint clip, IC 19			See QJL-810-A

GALLENKAMP Kjeldahl apparatus for macro and micro determination of nitrogen See NITROGEN

ABSORPTION TRAPS

Suitable for absorbing sulphur dioxide in Kjeldahl determinations or hydrogen chloride in Friedel-Crafts reactions.



MC 12/33 with MC 13/33

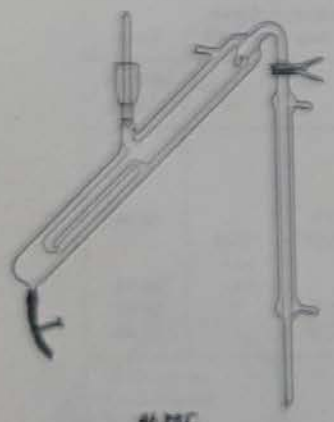
List No.	QUICKFIT No.	Description	Socket	Cone	Each
QNP-750-L	MC 12/33	Lower chamber, 250ml	24/29	24/29	£5·15
QNP-770-U	MC 13/33	Upper chamber	24/29	24/29	£5·98

MARKHAM STILL, for micro-Kjeldahl determination, to BS 1428 Part B2.

List No.	QUICKFIT No.	Description	Socket or cup	Cone or ball	Each
QNT-150-T	46 MC	**Assembly**	–	–	£23·81
QNT-190-X	MC 46	**Components** Markham still body with steam trap jacket 25ml	10/19	S19	£18·57
		Funnel plug			See QTE-650-R
		Liebig condenser			See QNP-410-R
		Spherical joint clip, JC 19			See QJL-810-A

LEURQUIN APPARATUS, for micro determination of nitrogen in blood, serum, urine, etc.

List No.	QUICKFIT No.	Description	Socket	Cone	Each
QNT-400-H	11 MC	**Alkalisation assembly**	–	–	£12·36
QNT-430-J	BC 11	**Components** Absorption head	–	24/29	£2·98
		Test tube, 70ml			See QTY-230-B
		Cone, CNB 10			See QJF-070-N



46 MC

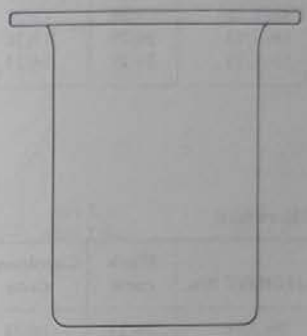


11 MC

REACTION VESSELS

Flat bottom (Culture Vessels). Not suitable for use under pressure or vacuum

For explanation of flat flange sizes and additional information see page 566



FV

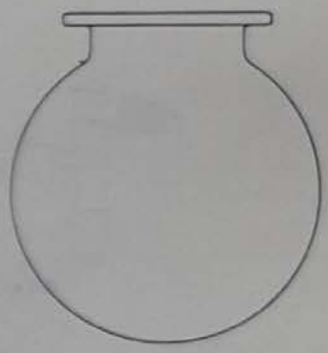


FR 700F with DA 4/100

List No.	QUICKFIT No.	Capacity ml	Flange i.d. mm	QUICKFIT clip to fit	Each
QRE-100-W	FV 500	500	75	JC 75F	£6-84
QRE-110-P	FV 1L	1000	100	JC 100F	£6-19

Round bottom.

List No.	QUICKFIT No.	Capacity ml	Flange i.d. mm	QUICKFIT clip to fit	Each
QRE-300-G	FR 100F	100	50	JC 50F	£3-71
QRE-320-P	FR 250F	250	75	JC 75F	£4-83
QRE-330-Y	FR 500F	500	75	JC 75F	£5-50
QRE-340-B	FR 700F	700	100	JC 100F	£6-92
QRE-350-R	FR 1LF	1000	100	JC 100F	£6-70
QRE-360-K	FR 2LF	2000	100	JC 100F	£8-34
QRE-380-T	FR 5LF	5000	100	JC 100F	£10-98
QRE-390-M	FR 10LF	10000	100	JC 100F	12-82
QRE-400-V	FR 20LF	20000	100	JC 100F	£20-82



FR-F

Lids for above vessels — See QAK-500 et seq.
Joint clips — See QJL-800 et seq.

RECEIVERS

Socket with vent.

List No.	QUICKFIT No.	Capacity approx. ml	Socket	Each
QRV-050-J	MD 60	5	10/19	£1-43
QRV-060-C	MD 61	10	14/23	£1-43
QRV-070-S	MD 62	25	14/23	£1-43



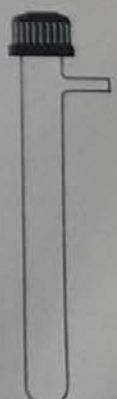
MD 60

Screw thread with vent. With plastics cap, sealing ring and washer.

List No.	QUICKFIT No.	Capacity approx. ml	Thread size	Each
QRV-250-Q	VT 24/8	30	24	£1-78



MD 61



VT 24/8

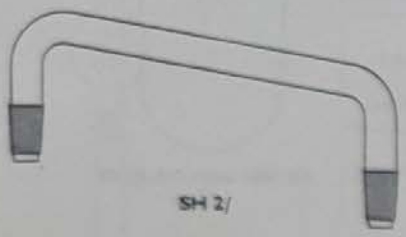
STILLHEADS



SH 1/

RECOVERY BENDS, sloping.

List No.	QUICKFIT No.	Flask cone	Condenser cone	Each
QSJ-030-R	SH 1/11	14/23	14/23	£1·13
QSJ-040-K	SH 1/22	19/26	19/26	£1·33
QSJ-060-T	SH 1/23	24/29	19/26	£1·52
QSJ-070-M	SH 1/33	24/29	24/29	£1·52



SH 2/

RECOVERY BENDS, vertical.

List No.	QUICKFIT No.	Flask cone	Condenser cone	Each
QSJ-200-W	SH 2/11	14/23	14/23	£1·48
QSJ-210-P	SH 2/22	19/26	19/26	£1·93
QSJ-220-Y	SH 2/23	24/29	19/26	£2·38
QSJ-230-B	SH 2/33	24/29	24/29	£2·46



SH 4/

PLAIN, with thermometer socket.

List No.	QUICKFIT No.	Flask cone	Condenser cone	Thermometer socket	Each
QSJ-500-V	SH 4/0	10/19	10/19	10/19	£2·14
QSJ-510-X	SH 4/1	14/23	14/23	14/23	£2·16
QSJ-520-H	SH 4/2	19/26	19/26	19/26	£2·60
QSJ-530-A	SH 4/22	19/26	19/26	14/23	£2·16
QSJ-540-Q	SH 4/23	24/29	19/26	14/23	£2·30
QSJ-550-J	SH 4/24	29/32	19/26	14/23	£2·08
QSJ-560-C	SH 4/25	34/35	19/26	14/23	£2·75
QSJ-580-L	SH 4/33	24/29	24/29	14/23	£2·23
QSJ-590-E	SH 4/35	34/35	24/29	14/23	£2·99



SH 6/

CLAISEN, sloping.

List No.	QUICKFIT No.	Flask cone	Condenser cone	Sockets	Each
QSK-050-Q	SH 6/1	14/23	14/23	14/23	£3·21
QSK-060-J	SH 6/22	19/26	19/26	14/23	£3·28
QSK-070-C	SH 6/23	24/29	19/26	14/23	£3·07
QSK-080-S	SH 6/25	34/35	19/26	14/23	£3·80
QSK-090-L	SH 6/33	24/29	24/29	14/23	£4·01

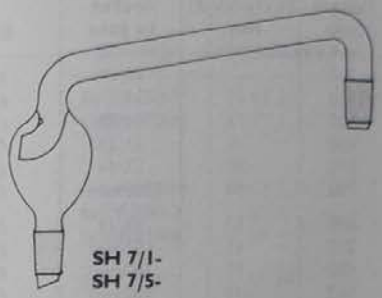


SH 7/0

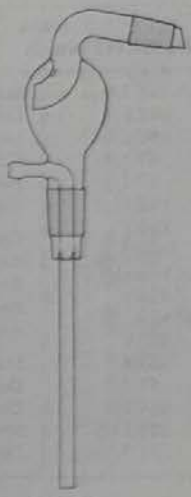
SPLASH HEADS, sloping.

List No.	QUICKFIT No.	Cone fitting flask or column	Cone fitting condenser	Each
QSK-300-E	SH 7/02	19/26	19/26	£4·08
QSK-310-U	SH 7/03	24/29	19/26	£3·69

STILLHEADS



SH 7/1-
SH 7/5-



SH 7/2-

SPLASH HEADS, vertical.

List No.	QUICKFIT No.	Cone fitting flask or column	Cone fitting condenser	Each
QSK-500-L	SH 7/12	19/26	19/26	£4-16
QSK-510-E	SH 7/13	24/29	19/26	£4-09
QSK-520-U	SH 7/53	24/29	24/29	£5-12



SH 14/23

STEAM DISTILLATION HEAD, sloping.

List No.	QUICKFIT No.	Cone fitting flask or column	Cone fitting condenser	Each
QSK-630-F	SH 7/23	24/29	19/26	£4-68

SPLASH HEAD, double bulb, sloping.

List No.	QUICKFIT No.	Description	Cone fitting flask or column	Cone fitting condenser	Each
QSK-700-S	SH 14/23	Splash head, double bulb, sloping, with 14/23 socket	24/29 Socket	19/26 Cone	£7-59
QSK-750-G	SH 17/23	Splash head adapter	19/26	24/29	£3-66



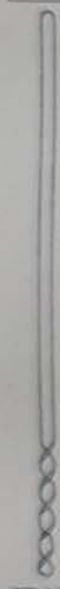
SH 17/23

GALLENKAMP Stillheads with standard joint

See DPR-220-550N

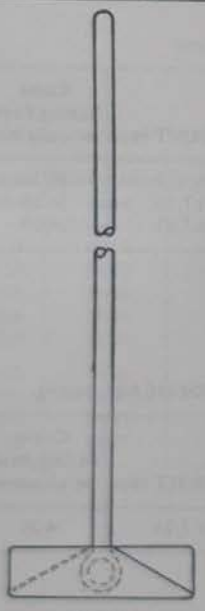
STIRRERS

List No.	QUICKFIT No.	Description	Shaft Dia. mm	Shaft Length mm	Blade width (extended) mm	Minimum socket to pass	Each
QSR-050-P	ST 1/0	Screw type, semi-micro	5	210	–	10/19	£1·13
QSR-070-B	ST 1/1	Link	6	450	75	24/29	£1·27
QSR-090-K	ST 1/24	Link	6	600	75	24/29	£1·41
QSR-110-M	ST 1/4	Collapsible paddle	6	450	70	24/29	£2·60
QSR-130-V	ST 1/2	Fixed paddle	6	610	50	55/44	£1·63
QSR-150-H	ST 11/2	Fixed paddle	11	750	80	100mm	£2·75
QSR-170-Q	ST 1/3	Centrifugal	6	600	52	55/44	£2·90
QSR-210-E	ST 1/05	Anchor	5	210	45	50mm	£1·20
QSR-230-N	ST 1/5	Anchor	6	450	95	100mm	£8·91
QSR-250-W	ST 1/6	Anchor	6	600	140	100mm	£1·93
QSR-270-Y	ST 1/8	Anchor	11	750	140	100mm	£2·60
QSR-390-J	ST 6/7	Shaft for ST 7/2 and ST 7/3	6	450	–	–	£1·86
QSR-440-N	ST 7/2	Detachable PTFE blade	–	–	52	19/26	£0·58
QSR-460-W	ST 7/3	Detachable PTFE blade	–	–	76	24/29	£1·07
QSR-480-Y	ST 11/5	Shaft for ST 7/3L	11	450	–	–	£2·76
QSR-510-D	ST 7/3L	Detachable PTFE blade	–	–	76	24/29	£1·27

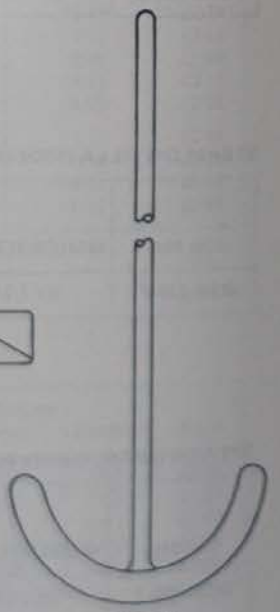

ST 1/0


ST 1/1
ST 1/24


ST 1/2
ST 11/2


ST 1/4


ST 1/3
ST 11/3


ST 1/05
to ST 1/8


ST 6/7 with ST 7/3


MU 8/0

SEMI-MICRO STIRRER, turbine drive.

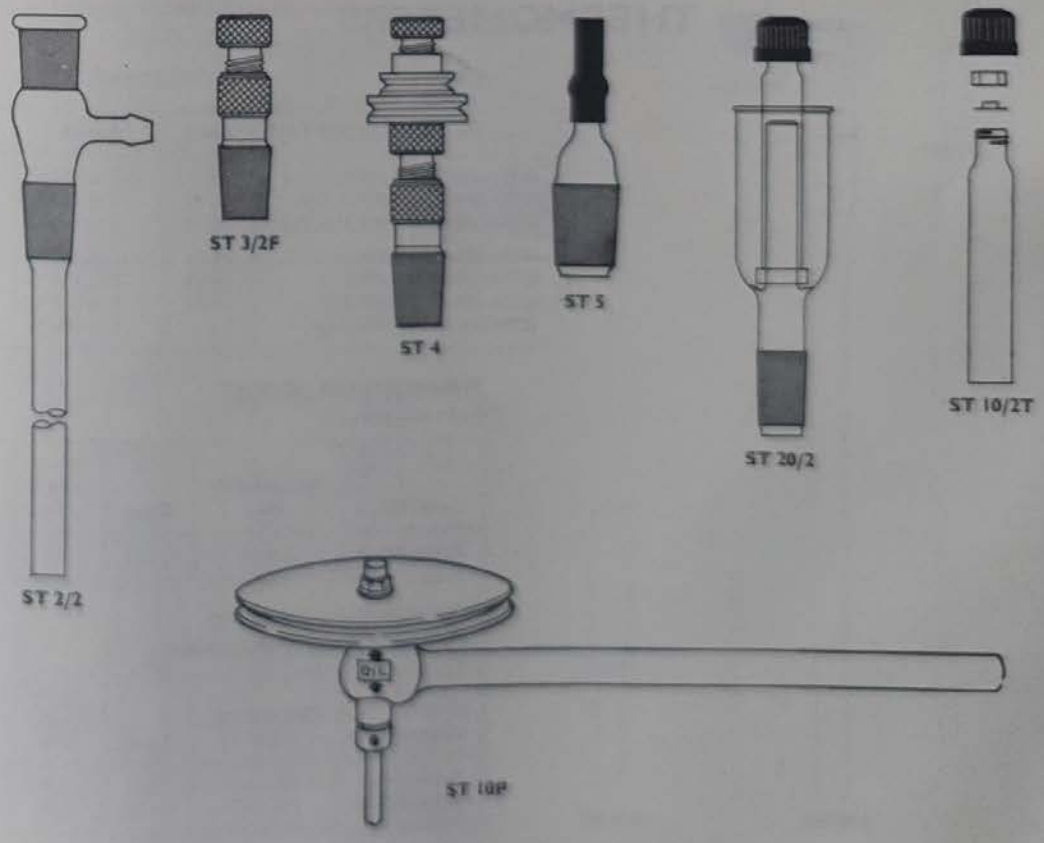
The stirrer unit has a 10/19 cone suitable for fitting directly to a suitable test tube or semi-micro reaction flask. Can be driven by water or air pressure applied to the upper connection or by the air flow induced by a vacuum pump applied to the lower connection.

List No.	QUICKFIT No.	Shaft dia.	Shaft length	Each
QSR-800-J	MU 8/0	2mm	90mm	£11·59

STIRRERS

STIRRER GUIDES AND GLANDS

List No.	QUICKFIT No.	Description	Shaft dia. mm	Each
QSV-050-V	ST 2/2	Stirrer guide, 19/26 socket and cone	6	£2·30
QSV-070-H	ST 2/33C	Stirrer guide, 24/29 socket and cone	11	£3·43
		Stirrer glands with stuffing box		
QSV-150-N	ST 3/2F	Without pulley, 19/26 cone	6	£8·77
QSV-190-Y	ST 4/2	Brass with pulley, 19/26 cone	6	£7·42
QSV-210-K	ST 4/2F	With pulley, 19/26 cone	6	£10·87
QSV-230-T	ST 4R	O-rings for ST 4/2 and ST 4/2F	6	Pack of 10 £0·90
QSV-250-F	ST 4W	Felt washers for stuffing box	6	Pack of 50 £1·78 Each
		Stirrer glands for rubber sleeve		
QSV-360-N	ST 5/2	Cone 19/26	6	£1·30
QSV-380-W	ST 5/3	Cone 24/29	6	£1·30
		Stirrer glands with ground sleeve and screw cap		
QSV-620-R	ST 20/2	Thread size 13, cone 19/26	6	£6·10
QSV-640-D	ST 20/3	Thread size 24, cone 24/29	11	£8·49
QSV-660-M	ST 20/4	Thread size 24, cone 29/32	11	£8·63
QSV-700-A	ST 10/2T	Spare ground sleeve screw cap with ring and washer	6	£2·99
QSV-720-J	ST 10/34T	Spare ground sleeve screw cap with ring and washer	11	£3·71
QSV-740-S	ST 10P	Drive pulley, 100mm dia., for QUICKFIT stirrer glands	–	£7·94



STOPPERS



SB



SB-H



FC 16B



SIB

Closed ends.

List No.	QUICKFIT No.	Cone	Each
QTE-050-T	SB 7	7/16	£1·16
QTE-060-M	SB 10	10/19	£0·52
QTE-070-F	SB 12	12/21	£0·52
QTE-090-X	SB 14	14/23	£0·49
QTE-100-A	SB 19	19/26	£0·54
QTE-120-J	SB 24	24/29	£0·59
QTE-130-C	SB 29	29/32	£0·59
QTE-140-S	SB 34	34/35	£0·81
QTE-150-L	SB 40	40/38	£1·27

Closed ends with hooks.

List No.	QUICKFIT No.	Cone	Each
QTE-400-W	SB 14H	14/23	£0·71
QTE-410-P	SB 19H	19/26	£0·81

Long handle.

List No.	QUICKFIT No.	Cone	Purpose	Each
QTE-650-R	FC 16B	10/19	Dropping funnel, straight	£0·75
QTE-720-H	SIB 24	24/29	Iodine flask	£1·50

Long handle stopper for dropping funnel — *See QHL-240-D*

QUICKFIT Stopcocks — *See SYA-600-030E et seq.*

STANDARD JOINT STOPPERS

Glass or polypropylene

See SYH-200

THERMOMETERS



MF 31/



MF 16/



SH 4A

List No.	QUICKFIT No.	Cone	Range	Each
QTH-200-Y	MF 31/0/110	10/19	−10 to 110°C	£6·56
QTH-210-B	MF 31/0/250	10/19	0 to 250°C	£6·93
QTH-220-R	MF 31/0/360	10/19	0 to 360°C	£7·13
QTH-250-T	MF 31/1	14/23	−10 to 110°C	£6·69
QTH-260-M	MF 31/2	14/23	0 to 250°C	£6·93
QTH-270-F	MF 31/3	14/23	0 to 360°C	£6·62
QTH-300-A	MU 31/3	–	0 to 360°C	£2·30

THERMOMETER POCKET

To fit stillheads

List No.	QUICKFIT No.	Cone	Stem length mm	Each
QTH-370-U	SH 4A	14/23	45	£1·24

THERMOMETER POCKETS

Long type for sealing to length required

List No.	QUICKFIT No.	Cone	Stem length mm	Each
QTH-410-Y	MF 16/1	14/23	200	£1·35
QTH-420-B	MF 16/2	19/26	200	£1·35

TUBES

THUNBERG TUBES

List No.	QUICKFIT No.	Description	Approx. capacity ml	Socket or cone	Each
QTX-020-L	BC 31/1	Thunberg stopper	2	14/23	£1·55
QTX-030-E	BC 32/1	Thunberg tube	6	14/23	£2·45
QTX-040-U	BC 31	Thunberg stopper	2	19/26	£1·55
QTX-050-N	BC 32	Thunberg tube	20	19/26	£2·45



BC 31 with BC 32

COMBUSTION TUBE

List No.	QUICKFIT No.	Thread	Dia. through cap mm	Length mm	Each
QTX-200-J	GS 6/24	24	6 to 7	230	£2·16

ANGLED TUBE

List No.	QUICKFIT No.	Description	Each
QTX-400-Q	GS 5	Plain angled tube	£0·30



GS 6/24



MF 15/

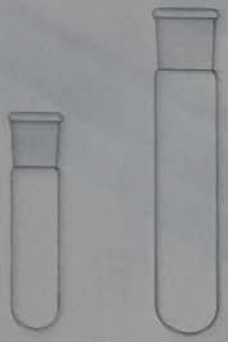
AIR LEAK OR GAS ENTRY TUBES, straight.

List No.	QUICKFIT No.	Cone	Socket	Stem length mm	Each
QTX-420-C	MU 9/00	10/19	10/19	–	£1·78
QTX-440-L	MF 15/0	10/19	–	100	£1·30
QTX-450-E	MF 15/1	14/23	–	150	£1·21
QTX-460-U	MF 15/2	19/26	–	150	£1·35
QTX-470-N	MF 15/3	24/29	–	150	£1·56

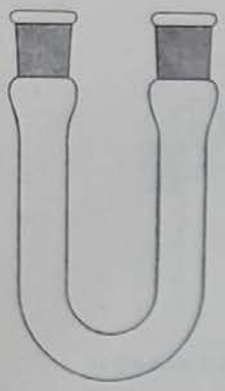
TEST TUBES, without stopper.

List No.	QUICKFIT No.	Socket	Overall length mm	Each
QTY-050-D	MF 24/0	10/19	65	£0·75
QTY-070-M	MF 24/0/4	10/19	100	£0·79
QTY-090-V	MF 24/12/4	12/21	100	£0·75
QTY-110-A	MF 24/1	14/23	100	£0·66
QTY-130-J	MF 24/1/5	14/23	125	£0·75
QTY-150-S	MF 24/1/6	14/23	150	£0·75
QTY-170-E	MF 24/2	19/26	100	£0·82
QTY-190-N	MF 24/2/6	19/26	150	£0·84
QTY-210-P	MF 24/3	24/29	150	£0·94
QTY-230-B	MF 24/3/8	24/29	200	£0·92
QTY-250-K	MF 24/5	34/35	250	£1·27

Stoppers — See Q78/0b0 et seq.
Test tubes with standard joints stocked — See 765-820-L



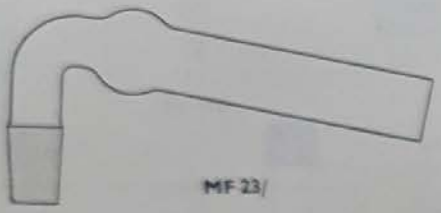
MF 24/



MF 21/



MF 22/



MF 23/



MU 23/0



MF 40/13/

U-TUBES

List No.	QUICKFIT No.	Type	Socket or cone	Each
QTY-400-G	MF 21/2	2 Sockets	19/26	£2·53
QTY-410-W	MF 22/2	2 Cones	19/26	£1·41

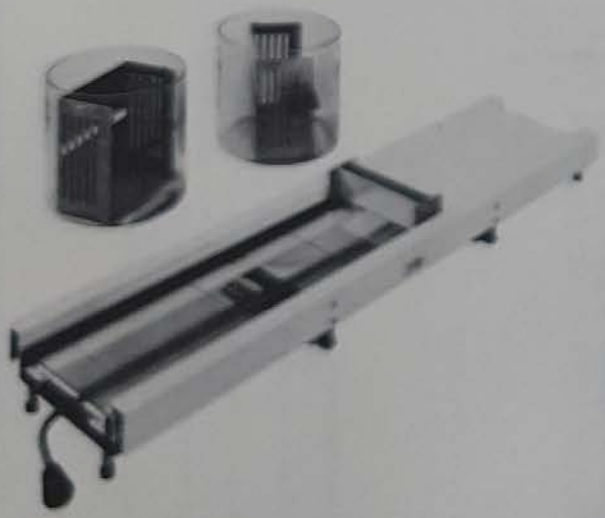
DRYING TUBES

List No.	QUICKFIT No.	Cone	Type	Each
QTY-600-N	MF 23/0	10/19	Angled	£1·48
QTY-610-G	MF 23/1	14/23	Angled	£1·52
QTY-620-W	MF 23/2	19/26	Angled	£1·71
QTY-630-P	MF 23/3	24/29	Angled	£2·04
QTY-680-D	MU 23/0	10/19	Straight	£0·90

CLIPS

DOUBLE SPRING CLIPS, chromium plated steel double ended clips of which one end fits the normal 13mm retort or scaffold rod. The other end takes glassware of sizes as shown.

List No.	QUICKFIT No.	To hold tube size mm	Pack of 5
QTY-800-U	MF 40/13/10	9 to 12	£1·71
QTY-830-W	MF 40/13/19	18 to 22	£1·71
QTY-850-Y	MF 40/13/24	24 to 28	£1·71



QUICKFIT
T. L. C. APPARATUS

Suitable for carrying out thin layer chromatography experiments quickly

See CJK-520-L

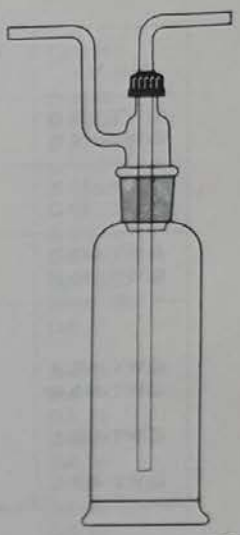
WASHBOTTLES

WASHBOTTLE HEADS for use with standard joint flasks.

List No.	QUICKFIT No.	Cone	For flasks	Each
QWF-030-N	MF 25/3	24/29	FE 500/3	£2·16
QWF-040-G	MF 25/3L	24/29	FF 1L/3M	£2·16

WASHBOTTLE HEAD, DRECHSEL, adjustable
A screw thread joint allows easy adjustment of the dip tube so that the head can be used with various sizes of Drechsel bottle.

List No.	QUICKFIT No.	Cone	Thread mm	To fit bottles	Each
QWF-090-R	MF 27/3/13	24/29	13	MF 29/3/125 MF 29/3/250	£3·07



MF 29/3/ with MF 27/3/

GAS WASH-HEADS and BOTTLES, DRECHSEL

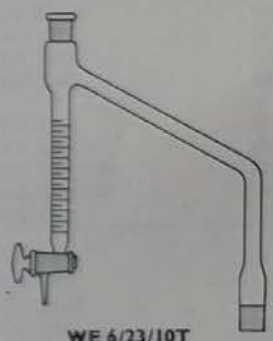
List No.	QUICKFIT No.	Description	Cone	Each
QWF-200-S		Head	19/26	£2·38
QWF-220-E	MF 28/3/125	Head	24/29	£2·12
QWF-230-U	MF 28/3/250	Head	24/29	£2·50
QWF-240-N	MF 28/3/500	Head	24/29	£2·38
QWF-350-V	MF 29/3/125	Bottle 125ml	24/29	£2·14
QWF-360-X	MF 29/3/250	Bottle 250ml	24/29	£2·32
QWF-370-H	MF 29/3/500	Bottle 500ml	24/29	£2·65

Drechsel bottles with plain or sintered distributor
See Gas Washing

WATER ESTIMATION

DEAN and STARK RECEIVER with stopcock.

List No.	QUICKFIT No.	Capacity ml	Cone	Socket	Each
QWF-800-F	WE 6/23/10T	10	24/29	19/26	£8·77



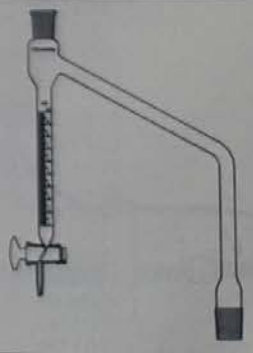
WE 6/23/10T

Condenser Flasks
See QCH-390-J
See QFH-230 et seq.

Gallenkamp DEAN AND STARK APPARATUS

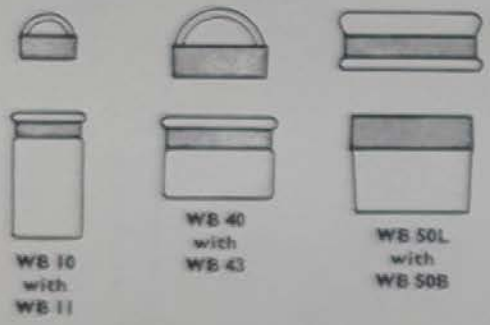
- Meets requirements of IP 74 and BS 756
- Range of receivers from 2 to 25ml capacity

See WES-300-G et seq.



WEIGHING AND DROPPING BOTTLES

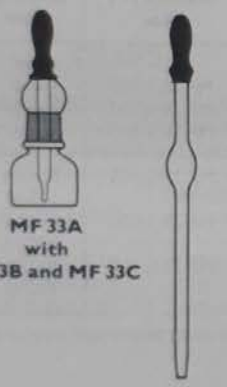
List No.	QUICKFIT No.	Description	Socket or Cone	Maximum mass, g	Each
QWT-100-B	WB 10	Weighing bottle lid	24/10	5	£11·62
QWT-110-R	WB 11	Weighing bottle base	24/10	15	£1·20
QWT-120-K	WB 40	Weighing bottle lid	40/13	10	£1·21
QWT-130-D	WB 43	Weighing bottle base	40/13	22	£1·30
QWT-140-T	WB 50L	Weighing bottle lid	50/14	25	£1·52
QWT-150-M	WB 50B	Weighing bottle base	50/14	30	£1·38
				Capacity ml	
QWT-400-A	MF 33A	Dropping bottle	–	25	£1·63
QWT-410-Q	MF 33B	Pipette	19/17	1·5	£2·12
QWT-420-J	MF 33C	Rubber teat	–	–	Pack of 10 £0·60
QWT-450-L	MU 33	Plain pipette	–	1·5	Each £0·71



WB 10 with WB 11

WB 40 with WB 43

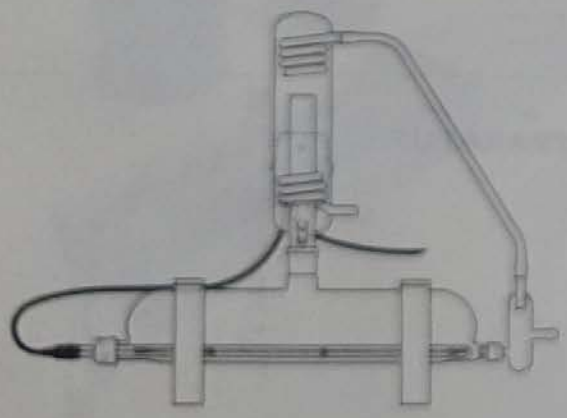
WB 50L with WB 50B



MF 33A with MF 33B and MF 33C

MU 33 with MF 33C

QUICKFIT WATER STILLS



- Electrically heated
- Output approximately 4 litres/h
- Automatic cut-out
- Requires 800 × 250 mm bench space

See WG5-600-G

QUICKFIT No. INDEX

Arranged in alphabetical sequence. Quickfit references commencing with a numeral are at the end of the index.

Cat. No.	page	Cat. No.	page	Cat. No.	page
BC 3CH	568	CR 7/2	149	D 62/0	582
BC 11	588	CR 7/3	149	D 62/50	582
BC 15P	583	CR 7/4	149	D 82/100	581
BC 15/150	583	CR 7/6	149	D 83/250	581
BC 31	595	CR 7/7	149	D 83/500	581
BC 31/1	595	CR 7/9	149	D 84/1L	581
BC 32	595	CR 12/10	568	DA 01	561
BC 32/1	595	CR 12/30	568	DA 5/75	566
BC 50/3H	568	CR 32/20	568	DA 5/100	566
C 1/00	569	CR 32/30	568	DA 12	[illegible]
C 1/11	569	CR 32/40	568	DA 13	561
C 1/12	569	CR 43/53	568	DA 14	561
C 1/13	569	CX 1/2/25	569	DA 23	561
C 1/22	569	CX 3/05	569	DA 24	561
C 1/23	569	CX 3/06	569	DA 25	561
C 1/55	569	CX 3/07	569	DA 26	561
C 2/00	569	CX 3/08	569	DA 27	561
C 2/11	569	CX 3/23	570	DA 29	561
C 2/12	569	CX 3/35	570	DA 34	561
C 2/22	569	CX 6/05	571	DA 35	561
C 3/12	569	CX 6/22	571	DA 36	561
C 3/13	569	CX 6/33	571	DA 37	561
C 3/22	569	CX 7/02	571	DA 38	561
C 3/23	569	CX 7/03	571	DA 39	561
C 4/12	570	CX 7/04	571	DA 45	561
C 4/13	570	CX 7/05	571	DA 56	561
C 5/00	569	CX 7/06	571	DA 58	561
C 5/12	569	CX 7/08	571	DA 59	561
C 5/13	569	CX 7/33	571	DE 100/22	582
C 5/22	569	CX 13/5	745	DE 250/33	582
C 5/23	569	D 1/00	581	DEC 500/33	582
C 6/12	570	D 1/01	581	EF 6T/33	567
C 6/13	570	D 1/11	581	EX 5/21	572
C 10/22	571	D 1/21	581	EX 5/32	572
C11/23	571	D 1/22	581	EX 5/43	572
C 13/55	570	D 1/32	581	EX 5/53	572
C 13/55/2	570	D 1/42	581	EX 5/55	572
CAB 14	584	D 1/62	581	EX 5/55/100	572
CAB 24	584	D 2/01	582	EX 5/55/200	572
CBB 7	584	D 2/11	582	EX 5/63	572
CBB 10	584	D 2/21	582	EX 5/75	572
CBB 14	584	D 2/22	582	EX 5/83	572
CBB 19	584	D 2/31	582	EX 5/105	572
CBB 24	584	D 2/32	582	EX 7/10	572
CBB 29	584	D 2/42	582	EX 7/13	572
CC 2/29	561	D 2/62	582	EX 7/15	572
CC 3/35	561	D 3/12	581	EX 7/20	572
CNB 5	584	D 3/22	581	EX 7/23	572
CNB 7	584	D 3/32	581	EX 7/30	572
CNB 10	584	D 11/25	581	EX 7/33	572
CNB 12	584	D 11/50	581	EX 13/12	572
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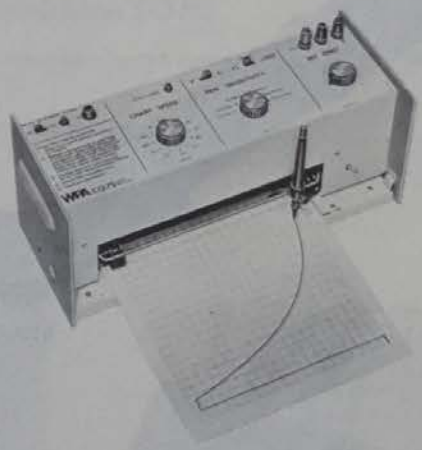
RECORDERS

CHART RECORDER, potentiometric, for general laboratory applications. Accepts foolscap, A4 sheets and strip chart paper up to 25cm wide. With 11 chart speeds from 5s/cm to 1h/cm and 24 input ranges from 1mV/cm to 5V/cm and from 1μA/cm to 5mA/cm. Includes a zero setting knob, event marker pen lift, paper release and ON-OFF switch. X and Y axis drive motors are of the brushless, stepping type. The fibre tip pen is driven in 0·5mm steps and the drive mechanism gives an audible warning when the pen reaches an end stop. Input impedance is 1MΩ (max. source resistance 10kΩ) on voltage ranges and 1kΩ on × 1 (10Ω on × 100) current ranges. Overall accuracy about ±2·5% f.s.d. Dimensions 360 × 155 × 160mm high. Mass 5·5kg. With one pen but **without** chart roll, graph paper or attachments. For 230–250V 50–60Hz single phase supplies.

RDS-240-L Chart recorder **£165·00**



RDS-240

ACCESSORIES

RDS-260-504P Chart roll attachment. **Without** chart roll. **£11·00**

Chart rolls, 25m long × 220mm wide, ruled in millimetres and centimetres.

RDS-260-512Q Chart rolls Pack of 4 **£8·25**

Graph paper *See PBH-200-L*

CHART RECORDER, potentiometric, *BRYANS* **28000,** for continuous single point recording on perforated 250mm strip chart. Incorporates 11 calibrated ranges of input sensitivity with variable control providing a choice of any sensitivity from 250μV to 100V f.s.d. Response time better than 0·5s f.s.d. Linearity 0·1%. Ten chart speeds from 0·5mm/min to 0·5mm/s. Complete with one chart roll. Overall dimensions 445 × 440 × 146mm high, mass 10kg. For 220–240V 50Hz single phase supplies.

RDS-430-C Chart recorder **£462·00**



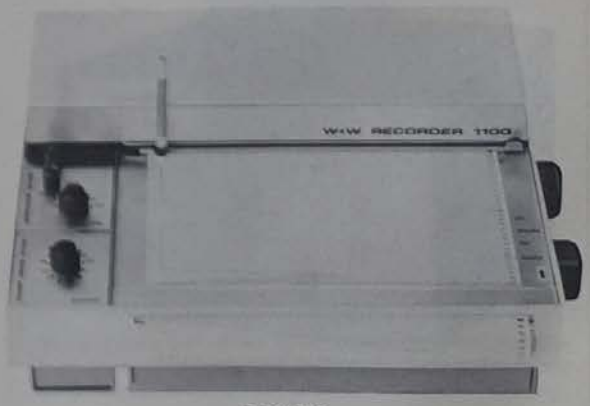
RDS-430

SPARE PART

RDS-450-030C Chart roll, 250mm × 30m long **£1·54**

CHART RECORDER, potentiometric, Model W+W 1100, for continuous single point recording on perforated 250mm strip chart. Incorporates input range selection from 1 to 100mV, span adjuster, zero shift, zero check button and variable 4× scale width zero suppression. Accuracy is ±0·25% f.s.d. Pen speed is 0·5s f.s.d. With 12 chart speeds from 0·05 to 30cm/min. Has stepping motor chart drive, automatic pen lift, connected with mains switch, and positive paper guide plate. Pre-amplifier and ranging circuits are in a compartment shielded from a.c. pick-up. Complete with one chart roll, set of three fibre pens, pen adapter, mains cable and measurement input cable. Overall dimensions 395 × 360 × 150mm high, mass 12kg. For 180–250V and 92·5–132·5V 50–60Hz single phase supplies. (F)

RDS-520-B Chart recorder **£754·60**



RDS-520

SPARE PARTS

RDS-540-030B Fibre pens Set of 3 **£2·20**

RDS-540-070M Chart roll **£2·20**

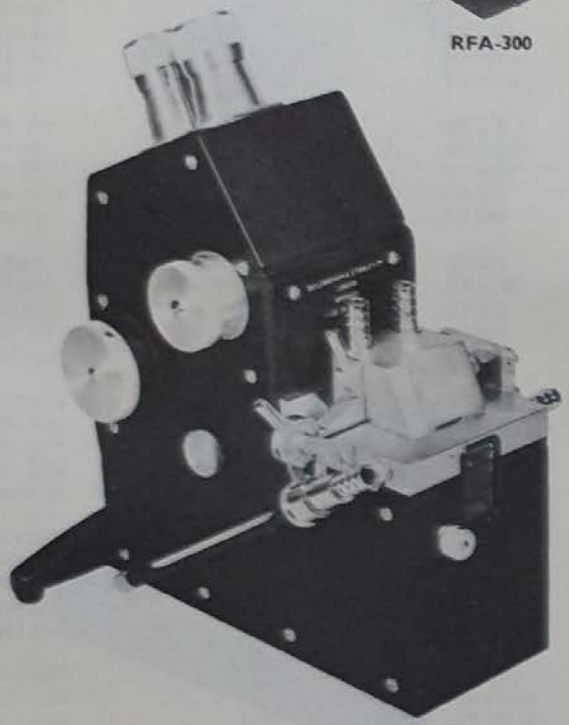
RECORDING HYGROMETER *See HYT-800-030W*

RECORDING THERMOMETER *See THV-600-010V*

REFRACTOMETERS



RFA-300



RFA-400

REFRACTOMETERS, pocket, for measurement of percentage sugar in solutions and solids. With conversion tables for refractive index readings. With case.

RFA-300-030T	Refractometer, 0 to 28 × 0·5% sugar	**£40·70**
RFA-300-050N	Refractometer, 0 to 50 × 1% sugar	**£33·00**
RFA-300-070H	Refractometer, 40 to 85 × 1% sugar	**£40·70**

REFRACTOMETER, Abbe, *BELLINGHAM & STANLEY,* for the examination of oils, fats, optical glass, sugar solutions, etc. The refractive index of substances between 1·300 and 1·700 is read directly to 0·001 and can be estimated to 0·0002 from the enclosed glass scale. An additional engraved glass scale, calibrated 0 to 95 × 0·5% sugar, is provided for estimation of soluble solids in sugar solutions and fruit pulp, etc. A sample of approximately 0·5ml is required. With protected thermometer, range 0 to 75°C, horizontal prism surface, water jackets and dust cover. For illumination by transmitted or reflected artificial light. With scale illuminator comprising 4V lamp, transformer, ON-OFF switch and mains connector. For a.c. single phase supplies.

RFA-340-010U	Refractometer, 220–240V	**£383·90**
RFA-340-030X	Refractometer, 110–120V	**£383·90**

SPARE PART

RFA-360-010G	Thermometer	**£1·33**

REFRACTOMETER, Abbe, *BELLINGHAM & STANLEY,* high accuracy, as RFA-340 but with linear scale and micrometer screw enabling refractive indices to be found with an accuracy of 0·00004 using the tables provided. For use with sodium light to eliminate border line colour. With protected thermometer, range 0 to 75°C, horizontal prism surface, water jackets, scale illuminator and dust cover. For a.c. single phase supplies.

RFA-400-010R	Refractometer, 220–240V	**£478·50**
RFA-400-030L	Refractometer, 110–120V	**£478·50**

SPARE PART

Thermometer	*See RFA-360-010G*

ACCESSORY

Sodium lamp	*See LCH-600-Q*

Gallenkamp THERMOSTATIC WATER CIRCULATOR



Applications include the maintaining of constant temperature for refractometry, viscosity measurement, spectrophotometry and polarimetry.

Range near ambient to 80°C

See TEH-750

REFRIGERATION

GENERAL PURPOSE REFRIGERATORS

A range of front loading cabinets with magnetic door catches and hermetically sealed compressors. For use in ambient temperatures up to 32°C

All capacities and dimensions quoted are nominal



RFP-200
RFP-250



RFP-300



RFP-350

REFRIGERATOR, *LEC*, capacity 115 litres, total shelf area 0·6m². With adjustable thermostat, manual defrost and two shelves. Overall dimensions 830mm high × 510mm wide × 510mm deep.

RFP-200-010V	Refrigerator, 220–240V 50Hz	**£63·22**
RFP-200-030P	Refrigerator, 110–120V 60Hz	**£63·22**

REFRIGERATOR, *LEC*, capacity 140 litres, total shelf area 0·9m². With adjustable thermostat, pushbutton defrost, automatic interior lighting and two shelves. Overall dimensions 900mm high × 510mm wide × 600mm deep.

RFP-250-010J	Refrigerator, 220–240V 50Hz	**£66·43**
RFP-250-030D	Refrigerator, 110–120V 60Hz	**£66·43**

REFRIGERATOR, *LEC*, capacity 210 litres, total shelf area 1m². With adjustable thermostat, pushbutton defrost, automatic interior lighting and three shelves. Overall dimensions 1200mm high × 510mm wide × 600mm deep.

RFP-300-010N	Refrigerator, 220–240V 50Hz	**£72·36**
RFP-300-030H	Refrigerator, 110–120V 60Hz	**£72·36**

REFRIGERATOR, *LEC*, dual temperature, capacity 180 litres, shelf area 0·96m², for normal refrigeration temperatures, with separate freezer compartment of 35 litres capacity. With automatic defrost system in the lower compartment and three shelves. Overall dimensions 1200mm high × 508mm wide × 578mm deep. For 215–240V 50Hz supplies.

RFP-350-E	Refrigerator	**£102·85**

REFRIGERATOR, *SADIA*, capacity 395 litres, total shelf area 1·4m². With adjustable thermostat, manual defrost and three shelves. Overall dimensions 1800mm high × 740mm wide × 660mm deep. For 230–250V 50Hz supplies.

RFP-400-Y	Refrigerator	**£283·80**



RFP-400

Refrigerators are subject to continuous improvements in both design and styling. The models supplied may therefore differ slightly in detail from those described and illustrated.

UPRIGHT FREEZER

For storage of frozen materials at temperatures in the region of −15°C in ambient temperatures up to 30°C

REFRIGERATOR, upright freezer, *SADIA*, 350 litres capacity. With white finished galvanised steel interior, ¼h.p. hermetically sealed compressor, fan convection for even temperature distribution, door operated fan cutout switch to reduce loss of cold air when door is opened, automatic defrost, interior thermostat, 11 shelf positions and 3 polythene coated grid shelves.
Minimum temperature −15°C. Internal dimensions 620×420×1200mm high. Overall dimensions 740×660×1800mm high. For 220–240V 50Hz single phase supplies.

RFP-450-T Refrigerator, upright **£400·40**



RFP-450



RFP-550
RFP-650 and RFP-700 are similar

CONSERVATOR

For storage of frozen materials at temperatures in the region of −20°C in ambient temperatures up to 30°C

REFRIGERATOR, conservator, *LEC*, 260 litres capacity, with aluminium storage compartment, hinged lid and ⅛h.p. hermetically sealed compressor. The thermostat controls the storage temperature at approximately −20°C. Internal dimensions 800×470×740mm deep. Overall dimensions 1300×660×920mm high. For 220–240V 50Hz single phase supplies.

RFP-550-L Refrigerator, conservator **£125·52**

LOW TEMPERATURE CABINETS

For operation at temperatures down to −30 and −40°C in ambient temperatures up to 30°C

REFRIGERATOR, low temperature, *LEC*, 260 litres capacity, with aluminium storage compartment, ¾h.p. hermetically sealed compressor and hinged lid. With indicating thermostat adjustable over the range 0 to −30°C.
Minimum operating temperature −30°C. Internal dimensions 800×470×740mm deep. Overall dimensions 1320×660×920mm high. For 220–240V 50Hz single phase supplies.

RFP-650-D Refrigerator **£568·13**

REFRIGERATOR, low temperature, *LEC*, 260 litres capacity. As RFP-650-D but with indicating thermostat adjustable over the range 0 to −40°C.
Minimum operating temperature −40°C. Internal dimensions 800×470×740mm deep. Overall dimensions 1350×770×1040mm high. For 220–240V 50Hz single phase supplies.

RFP-700-H Refrigerator **£1334·25**

LOW TEMPERATURE CABINETS

For operation at temperatures down to −70°C in ambient temperatures up to 30°C

REFRIGERATOR, low temperature, *LEC*, 260 litres capacity, with aluminium storage compartment, two hermetically sealed compressors, ½h.p. and ¼h.p. respectively operating in cascade, hinged counterbalanced lid with catch and mounted on castors. With temperature indicator and temperature controller adjustable over the range 0 to −70°C.
Minimum operating temperature −70°C. Internal dimensions 800×460×730mm deep. Overall dimensions 1600×850×1150mm high. For 220–240V 50Hz single phase supplies.

RFP-750-S Refrigerator **£1641·20**

REFRIGERATOR, low temperature, *LEC*, 370 litres capacity. As RFP-750-S but with ¾h.p. and ½h.p. compressors.
Minimum operating temperature −70°C. Internal dimensions 1150×460×730mm deep. Overall dimensions 1950×850×1150mm high. For 220–240V 50Hz single phase supplies.

RFP-800-W Refrigerator **£1800·70**



RFP-750
RFP-800 is similar

Refrigerated incubators See *INF-600 et seq*
Refrigerated water baths See *BLC-240 et seq*

REFRIGERATED PROBES

- **Suitable for air or liquid cooling**
- **Flexible connection to cooling coil**
- **Available in three sizes**

Comprises a sealed compressor mounted in a ventilated stove enamelled case and coupled by flexible armoured hose to an evaporator coil. In use, it is recommended that the refrigerated probe is run continuously and that thermostatic control of the bath or air space be effected by means of a heater and thermostat combination.

Technical data

Overall dimensions, mm (excluding flexible hose)	410 × 280 × 250	410 × 280 × 250	500 × 360 × 330
Dimensions of evaporator coil, mm	180 × 180 × 25	210 × 210 × 65	210 × 210 × 65
Type of coil	flat, vertical	triple helix	triple helix
Mass, kg	18	21	43
Power consumption, W	120	150	600



RFR-530
RFR-560

REFRIGERATED PROBE ASSEMBLY, *TOWNSON & MERCER,* as specified, suitable for maintaining a 32 to 45 litre capacity thermostatted bath at 5 to 10°C below ambient. For 220–240V 50Hz single phase supplies.

RFR-500-D Refrigerated probe assembly **£158·40**

REFRIGERATED PROBE ASSEMBLY, *TOWNSON & MERCER,* as specified, suitable for maintaining a 32 to 45 litre capacity thermostatted bath at 20 to 30°C below ambient. For 220–240V 50Hz single phase supplies.

RFR-530-F Refrigerated probe assembly **£225·50**

REFRIGERATED PROBE ASSEMBLY, *TOWNSON & MERCER,* as specified, suitable for maintaining a 45 litre capacity thermostatted bath at 40 to 50°C below ambient. For 220–240V 50Hz single phase supplies.

RFR-560-H Refrigerated probe assembly **£292·60**



RFR-650

FREEZER

FREEZER AEROSOL, for rapidly cooling small objects and specimens down to about −50°C. The spray material is non-toxic and non-flammable, and contains water repellent lubricant which first applies a thin protective film. Numerous laboratory applications include the cooling of melting point blocks and calorimeter bombs, rejoining mercury threads in thermometers, freezing of microtome knives and specimens, chilling of metallurgical samples, freezing of biological specimens for dissection, shrinking piece parts and cooling electronic and other components before, during and after soldering. In aerosol can containing approximately 340g.

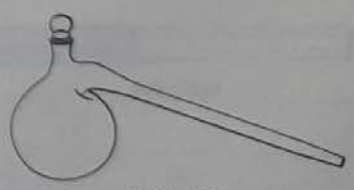
RFR-650-G Freezer aerosol **£1·28**
This item is not available for Export.

REFRIGERATED WATER CIRCULATORS
See TEH-830-010T and TEH-830-110P

RETORTS

RETORT, stoppered, resistance glass, capacity 250ml.

RGK-420-K Retort **£3·70**

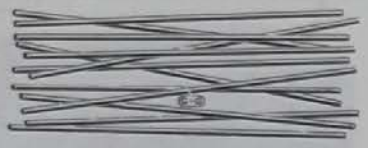


RGK-420

RETORT STANDS
Bases, rods, clamps and scaffolding *See STA-200 et seq.*

RODS

All dimensions and pack quantities quoted are nominal



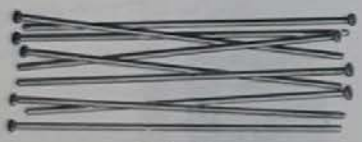
RND-450

RODS, soda-lime glass, in lengths of approximately 1·5m.

RND-300-010W	Rods, dia. 3±0·5mm	Pack of 40 **£2·25**
RND-300-030Q	Rods, dia. 4±0·5mm	Pack of 30 **£2·25**
RND-300-050K	Rods, dia. 5±0·5mm	Pack of 17 **£2·25**
RND-300-070E	Rods, dia. 6±0·5mm	Pack of 15 **£2·25**
RND-300-090V	Rods, dia. 8±0·5mm	Pack of 9 **£2·25**
RND-300-110S	Rods, dia. 10±0·5mm	Pack of 5 **£2·25**

RODS, *PYREX* **borosilicate glass,** in lengths of approximately 1·5m.

RND-380-030G	Rods, dia. 3·5±0·4mm	Pack of 11 **£3·32**
RND-380-050A	Rods, dia. 3·5±0·4mm	Pack of 245 **£40·08**
RND-380-070R	Rods, dia. 4·5±0·4mm	Pack of 6 **£2·87**
RND-380-090L	Rods, dia. 4·5±0·4mm	Pack of 145 **£36·28**
RND-380-110Y	Rods, dia. 5·5±0·4mm	Pack of 8 **£3·24**
RND-380-130C	Rods, dia. 5·5±0·4mm	Pack of 155 **£33·64**
RND-380-150T	Rods, dia. 7±0·8mm	Pack of 5 **£3·09**
RND-380-170N	Rods, dia. 7±0·8mm	Pack of 95 **£31·22**
RND-380-190H	Rods, dia. 9±0·8mm	Pack of 3 **£3·22**
RND-380-210E	Rods, dia. 9±0·8mm	Pack of 55 **£32·60**
RND-380-230V	Rods, dia. 11±0·8mm	Pack of 3 **£4·12**
RND-380-250P	Rods, dia. 11±0·8mm	Pack of 35 **£28·87**
RND-380-270J	Rods, dia. 13±0·8mm	Pack of 2 **£4·23**
RND-380-290D	Rods, dia. 13±0·8mm	Pack of 25 **£31·86**



RND-480
RND-510
RND-560

STIRRING RODS

RODS, STIRRING, glass, 200mm long, 7mm diameter, with fused ends.

RND-450-F	Rods, stirring	Pack of 10 **£0·54**

RODS, STIRRING, glass, 230mm long, 6mm diameter, one end rounded, other end with flat button for crushing small crystals.

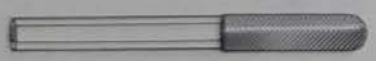
RND-480-H	Rods, stirring	Pack of 6 **£1·64**

ROD, STIRRING, glass, 300mm long, 8mm diameter, with button end.

RND-510-C	Rod, stirring	**£0·51**

RODS, STIRRING, polypropylene, 150mm long, 6mm diameter, one end rounded, other end with flat button.

RND-560-N	Rods, stirring	Pack of 6 **£1·41**



RND-800

POLICEMEN

POLICEMEN, PVC tubes, approximately 40mm long, closed at one end for stirring rods, etc. and for use as temporary closures when glassblowing. Dimension given is the internal diameter.

RND-800-030W	Policemen, 3mm	Pack of 25 **£1·14**
RND-800-050Q	Policemen, 4·5mm	Pack of 25 **£1·14**
RND-800-070K	Policemen, 6mm	Pack of 25 **£1·14**
RND-800-090E	Policemen, 10mm	Pack of 25 **£1·26**

POLICEMEN, in pack containing 10 each RND-800 3, 4·5, 6 and 10mm sizes.

RND-830-K	Policemen	Pack **£2·00**

RUBBER AND PLASTICS SUNDRIES

See products under headings:

Bags, Bellows, Rods, Sealants and Sheet

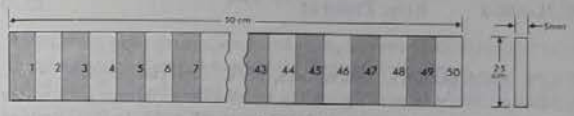
RULES



RUL-240



RUL-320



RUL-280



RUL-340

RULES, boxwood, horizontal reading, length 300mm, width 29mm. With two bevelled edges, one divided in centimetres and millimetres, the other in 10ths of an inch. The reverse side has four scales in 4ths, 8ths, 12ths and 16ths of an inch and a protractor reading from 30° to 90°.

RUL-240-J Rules, 300mm Pack of 6 **£1·35**

RULE, half-metre, BS 4093, hardwood, width 28mm, with alternate coloured and natural centimetre divisions.

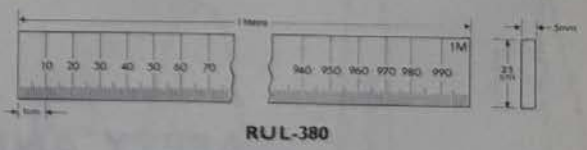
RUL-280-E Rule, half-metre **£0·77**

RULE, metre, maplewood, vertical reading, width 25mm, for barometer tubes, etc. With millimetre divisions figured every 2cm on both edges.

RUL-320-P Rule, metre **£0·99**

RULE, metre, as RUL-320-P but having central scale with millimetre divisions figured every centimetre up and down.

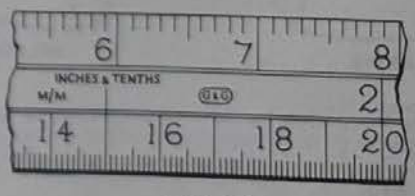
RUL-340-B Rule, metre **£0·99**



RUL-380

RULE, metre, BS 4093, maplewood, horizontal reading, width 25mm, with scale divided in millimetres, figured every 10mm.

RUL-380-T Rule, metre **£1·06**

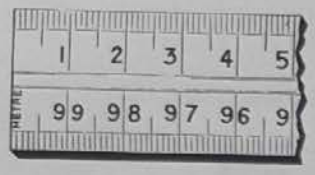


RUL-410

RULES, maplewood, horizontal reading, width 25mm, one edge divided in millimetres, the other in 10ths of an inch.

RUL-410-030F Rule, half-metre **£0·51**

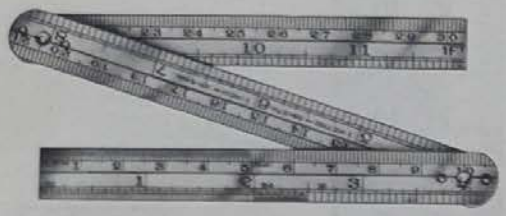
RUL-410-050W Rule, metre **£0·99**



RUL-450

RULE, metre, maplewood, width 25mm, both edges divided in millimetres figured every centimetre, one edge reading left to right, the other right to left.

RUL-450-J Rule, metre **£0·73**



RUL-600

RULE, three-fold, carbon steel, length 300mm, width 13mm, machine divided on one side, one edge divided in centimetres, millimetres and 0·5mm, the other in 8ths, 16ths, 32nds and 64ths of an inch.

RUL-600-F Rule, 300mm **£0·55**



RUL-630

RULES, stainless spring steel, width 19mm, one edge divided in centimetres, millimetres and 0·5mm, the other in 16ths, 32nds and 64ths of an inch. The reverse side is divided in 8ths and 16ths of an inch.

RUL-630-030V Rule, 150mm **£0·46**
RUL-630-050P Rule, 300mm **£0·79**

RULE, flexible steel, length 2m, width 13mm, one edge graduated in millimetres, the other every 5mm and figured in black every 10mm with whole metre figures in red, in accordance with BS 4484. With hooked end, in plastics case having flat edge to facilitate internal measurements.

RUL-660-J Rule, 2metres **£0·70**



RUL-660

TAPE MEASURES, fibreglass, PVC surfaced, width 14mm, graduated every 10mm, figured in black every 100mm with whole metre figures in red, in accordance with BS 4484. In PVC bonded steel case with plated handles and fittings.

RUL-690-030C Tape measure, 20metres **£7·67**
RUL-690-050T Tape measure, 30metres **£11·43**



RUL-690

SAFETY AND PROTECTION

SECTION INDEX

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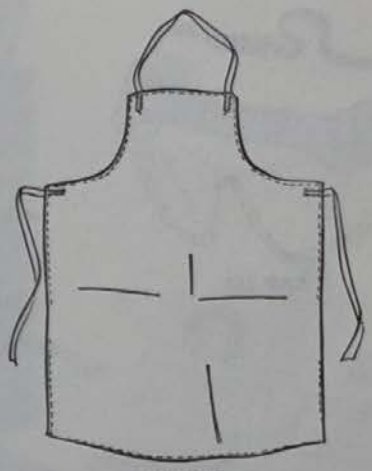
Aprons	611	Gloves	614
Coats	611	Incinerator	615
Eye protection	612	Respirators	615
Fire control	613	Screen	615
First aid	613	Washbottle	612

Other useful items will be found under page headings. Furniture, Glove Box, Labels and Pipettes.



SAM-200



SAM-240
SAM-280

APRONS

APRONS, polythene, expendable, bib-fronted. Intended to be thrown away when contaminated. Size 900 × 650mm.

SAM-200-F	Aprons	Pack of 25	**£2·42**

APRON, PVC, white bib-fronted. Size 1000 × 900mm.

SAM-240-A	Apron	**£2·31**

APRON, fabric supported acrylonitrile, bib-fronted. Size 1000 × 900mm.

SAM-280-S	Apron	**£4·50**

COATS

COATS, LABORATORY, white drill, for men. Front fastening with removable buttons. With two side pockets and breast pocket. Length approximately 118cm (46in.).

Chest, cm	96	100	108	112	
in.	38	39·5	42·5	44	
SAM-440-030V	Coat, 96cm				**£7·35**
SAM-440-050P	Coat, 100cm				**£7·35**
SAM-440-070J	Coat, 108cm				**£7·35**
SAM-440-090D	Coat, 112cm				**£7·35**



SAM-440



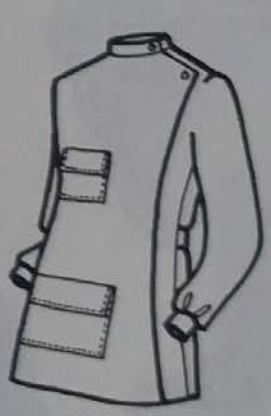
SAM-460

COATS, LABORATORY, white drill, for women. As SAM-440 but belted and with step collar. Length approximately 115cm (45in.).

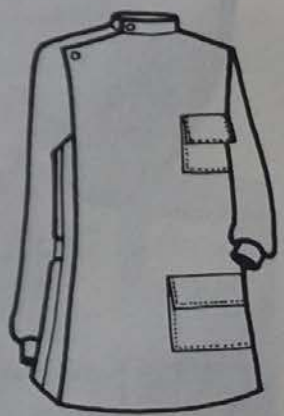
Bust, cm	88	92	96	100	
in.	34·5	36	38	39·5	
SAM-460-030H	Coat, 88cm				**£6·56**
SAM-460-050B	Coat, 92cm				**£6·75**
SAM-460-070S	Coat, 96cm				**£6·75**
SAM-460-090M	Coat, 100cm				**£6·75**

COATS, LABORATORY, white polyester/cotton, for men. Side fastening by press studs with overlap, high neck, elasticated cuffs and inverted pleat at back. With top pocket and large front pocket both VELCRO sealed. Length approximately 107cm (42in.).

Chest, cm	96	100	108	112	
in.	38	39·5	42·5	44	
SAM-500-030S	Coat, 96cm				**£7·71**
SAM-500-050M	Coat, 100cm				**£8·74**
SAM-500-070G	Coat, 108cm				**£8·74**
SAM-500-090A	Coat, 112cm				**£8·74**



SAM-500



SAM-520

COATS, LABORATORY, white polyester/cotton, for women. As SAM-500 but length approximately 100cm (39in.).

Bust, cm	88	92	96	100	
in.	34	36	38	39·5	
SAM-520-030E	Coat, 88cm				**£8·36**
SAM-520-050V	Coat, 92cm				**£8·36**
SAM-520-070P	Coat, 96cm				**£8·36**
SAM-520-090J	Coat, 100cm				**£8·36**

EYE PROTECTION



SAP-210

EYESHIELDS, simple form with adjustable headband. Fold flat for storage.

SAP-210-X	Eyeshields	Pack of 12 **£3·12**

EYESHIELD, polycarbonate, with clear lenses, brow-guard and hinged sidepieces. Can be worn over spectacles. Conforms to BS 2092 (general purpose and impact grade 2).

SAP-290-E	Eyeshield	**£1·24**



SAP-290

GOGGLES, with clear polycarbonate curved lenses, ventilated plastics frame and adjustable nosebridge and headband. Conforms to BS 2092 (general purpose, impact grade 1).

SAP-370-K	Goggles	**£2·03**

GOGGLES, full view, with single clear polycarbonate lens, indirectly ventilated flexible PVC frame and adjustable headband. Conforms to BS 2092 (general purpose, impact grade 1).

SAP-420-X	Goggles	**£1·67**

GOGGLES, full view, with double clear polycarbonate lens, non-ventilated PVC frame and adjustable headband. Can be worn over spectacles. Conforms to BS 2092 (general purpose, impact grade 1).

SAP-450-Q	Goggles	**£1·64**



SAP-370

FACE SHIELD, with curved polycarbonate visor, glass fibre brow-guard and adjustable headband. The visor can be raised from the face when not required. Can be used over spectacles. Conforms to BS 2092 (general purpose, impact grade 1). Dimension given is the depth of the visor.

SAP-570-030Y	Face shield, 150mm	**£3·90**
SAP-570-050C	Face shield, 200mm	**£4·28**

SPARE PARTS

SAP-590-030R	Visor, 150mm	**£1·16**
SAP-590-050L	Visor, 200mm	**£1·54**



SAP-420

EYE-WASH BOTTLE, polythene, comprising eye-wash cup with fine spray and cap mounted on a 500ml squeeze bottle. A vent below the cup allows air to refill the free space in the bottle after squeezing, thus preventing contaminated wash being sucked into the bottle. A drain tube removes contaminated wash from the cup. (F)

SAP-710-U	Eye-wash bottle	**£3·49**



SAP-450



SAP-570



SAP-710

FIRE

FIRE EXTINGUISHER, bromochlorodifluoromethane (BCF). Effective for small solvent fires. Must be used with caution in confined spaces. In handy aerosol container with mounting bracket.

SAP-850-H Fire extinguisher **£1·82**

FIRE BLANKET, woven glass fibre 1800 × 1200mm in open-ended wall mounting metal canister.

SAP-970-Y Fire blanket **£25·71**



SAP-850

FIRST AID

FIRST AID CABINET, white plastics, 230 × 180 × 80mm high, with hinged lid.

Contents:

1	Bottle of sal volatile, 50ml
1	Pressure bandage, rubber
3	Medium lint dressings, No. 8
1	Large lint dressing, No. 9
2	Triangular bandages
4·5m	Adhesive plaster, 12·5mm wide
4	Cotton wool pads, 15g
3	Bandages 5·4m × 76mm wide
12	Safety pins, large
1	Pair of dressing scissors, stainless steel, 125mm
1	Tube of antiseptic cream

SAR-280-X First aid cabinet **£8·83**


SAR-280

FIRST AID CABINET, for up to 50 persons. In white plastics cabinet 320 × 230 × 100mm high, with hinged lid.

Contents:

12	Small lint dressings, No. 7
6	Medium lint dressings, No. 8
6	Large lint dressings, No. 9
24	Adhesive dressings
4	Triangular bandages
9m	Adhesive plaster, 25mm wide
3	Cotton wool pads, 15g
4	Eye pads, sterile, No. 16
1	Pressure bandage, rubber
12	Assorted safety pins
1	Tube of sulphacetamide eye ointment
1	Copy of *Advice on First Aid Treatment*
1	First aid notice card

SAR-310-J First aid cabinet **£23·34**



SAR-310

FIRST AID CABINET, for 50 to 100 persons. In metal cabinet 310 × 130 × 420mm high with hinged front.

Contents:

24	Small sterilised dressings
12	Medium sterilised dressings
12	Large sterilised dressings
36	Adhesive wound dressings
8	Triangular bandages
1	25mm × 10m zinc oxide plaster
6	15g sterilised cotton wool
1	Tube eye ointment
8	Sterilised eye pads
1	Rubber pressure bandage
2	Packets safety pins
1	Pair of dressing scissors, 125mm
1	Pair forceps
1	Kidney tray
1	Eye bath
1	Tube of antiseptic cream
1	Bottle T.C.P.

SAR-340-L First aid cabinet **£43·81**



SAR-340





SAR-550



SAR-570



SAR-590



SAR-620



SAR-660







SAR-760
SAR-810

SAR-870

SAR-890

GLOVES

FINGER COTS, asbestos, for thumb and index finger.

SAR-550-L	Finger cots	Pack of 4 pairs **£3·53**

GLOVES, asbestos, cotton lined mitts with separate thumb. Length 300mm.

SAR-570-U	Gloves, asbestos	Pair **£3·97**

GLOVES, asbestos, cotton lined with individual fingers and thumb. Length 300mm.

SAR-590-G	Gloves, asbestos	Pair **£5·40**

GLOVES, chrome leather. Length 200mm.

SAR-620-B	Gloves, leather	Pair **£1·58**

GLOVES, polythene, expendable, provide an inexpensive hand covering which can be worn once and thrown away if contaminated. In dispensing pack. (F)

SAR-660-030K	Gloves, small	Pack of 100 **£1·18**
SAR-660-050E	Gloves, normal	Pack of 100 **£1·36**

GLOVES, latex rubber, surgical type with good finger sensitivity.

SAR-710-030X	Gloves, size 7	Pack of 10 pairs **£4·35**
SAR-710-050Y	Gloves, size 8	Pack of 10 pairs **£4·35**
SAR-710-070C	Gloves, size 9	Pack of 10 pairs **£4·35**

GLOVES, acrylonitrile, light duty, flock lined, with good finger sensitivity. Length 270mm.

SAR-760-030C	Gloves, size 7	Pair **£0·56**
SAR-760-050T	Gloves, size 8	Pair **£0·56**
SAR-760-070N	Gloves, size 9	Pair **£0·56**

GLOVES, PVC, light duty, flexible, with cotton interlock lining. Length 270mm.

SAR-810-030G	Gloves, size 8	Pair **£1·13**
SAR-810-050A	Gloves, size 9	Pair **£1·13**
SAR-810-070R	Gloves, size 10	Pair **£1·13**

GLOVES, PVC, medium duty, flexible with cotton interlock lining. Length 270mm.

SAR-870-030K	Gloves, size 7½	Pair **£1·24**
SAR-870-050E	Gloves, size 8½	Pair **£1·24**
SAR-870-070V	Gloves, size 9½	Pair **£1·24**

GLOVES, PVC, as SAR-870 but gauntlet pattern. Length 400mm.

SAR-890-050N	Gloves, size 8½	Pair **£1·77**
SAR-890-070H	Gloves, size 9½	Pair **£1·77**

HOW TO MEASURE FOR GLOVES

Hold the right hand flat with fingers touching each other and with thumb raised. Measure around widest part of the hand, over knuckles, not including the thumb. Pull tape measure close, but not tight. Number of inches is glove size. For industrial gloves where loose fit is preferred to give 'working room', order 1 or 2 sizes larger than measurement.

Safety grip for inserting tubing or thermometers into corks or rubber stoppers See GTB-400-L



SAT-300



SAT-360

RESPIRATORS

FACE MASKS, for limited use in low concentrations of most non-toxic dusts. Comprises pliable aluminium frame with elastic side straps and disposable cotton wool filter pad covered by gauze.

SAT-300-T	Face masks	Pack of 5 **£1·64**

SPARE PARTS

SAT-320-010C	Filter pads	Pack of 25 **£0·80**

RESPIRATOR, moulded rubber body with 65mm diameter anodised aluminium screw retainer and one yellow spot filter. Fitted with two relief valves and an adjustable elastic headband.

SAT-360-A	Respirator	**£3·21**

SPARE PARTS

	Filters, yellow spot, for limited use in low concentration of non-toxic dusts.	
SAT-380-010G	Filters, yellow	Pack of 3 **£1·69**
	Filters, red spot, for limited use in low concentrations of paint vapours.	
SAT-380-502Y	Filters, red	Pack of 3 **£1·69**
	Filters, green spot, for limited use in low concentrations of common organic vapours and acid gases.	
SAT-380-508T	Filters, green	Pack of 3 **£1·69**
SAT-380-520G	Filters set, one each yellow, red and green	Set **£1·69**



SAT-610

SAFETY SCREEN, comprises toughened glass panel mounted in an enamelled steel frame. Overall dimensions 695mm wide × 770mm high.

SAT-610-L	Safety screen	**£42·00**

Gallenkamp LOOP FLAMING INCINERATOR

LOOP FLAMING INCINERATOR, *GALLENKAMP,* for flame-sterilising platinum loops. Comprises a batswing burner in a steel hood mounted on a heavy metal base. The loop is inserted through the slit on the side of the case and can be observed in the flame through the mica window. The cover is a removable perforated disc. Overall dimensions 80mm diameter × 180mm high.

SAV-700-030E	Incinerator, coal gas	**£16·43**
SAV-700-050V	Incinerator, natural gas	**£16·43**

PLATINUM WIRE
See PRF-400-030X et seq.

HOLDER FOR PLATINUM WIRE
See DKD-430-N



SAV-700

Gallenkamp

Gallenkamp SALT SPRAY APPARATUS

to BS 3900 Part F4 and DEF 1053 Method 24



SBL-360 with accessories

SALT SPRAY APPARATUS, *GALLENKAMP*, for testing the resistance of paints and allied materials to continuous salt spray. Comprises glass panels set in a nylon coated iron frame to form a tank having internal dimensions 600 × 300 × 290 mm deep. With plate glass cover, having central 20 mm diameter thermometer hole and 25 mm diameter vent hole, glass atomiser fitted through the end wall and glass baffle plate to prevent spray from playing directly on test panels. The tank will accept one drainage tray SBL-380-504E and up to four sample racks SBL-380-514B. **Without** racks, tray and thermometer.

SBL-360-A	Salt spray apparatus	**£54·90**

SPARE PART

SBL-380-030A	Atomiser	**£1·74**

ACCESSORIES

Drainage tray, acrylic plastics, to accommodate four racks SBL-380-514B.

SBL-380-504E	Drainage tray	**£4·61**

Rack, acrylic plastics, to accommodate six test panels.

SBL-380-514B	Rack	**£3·38**

See THL-210-030C

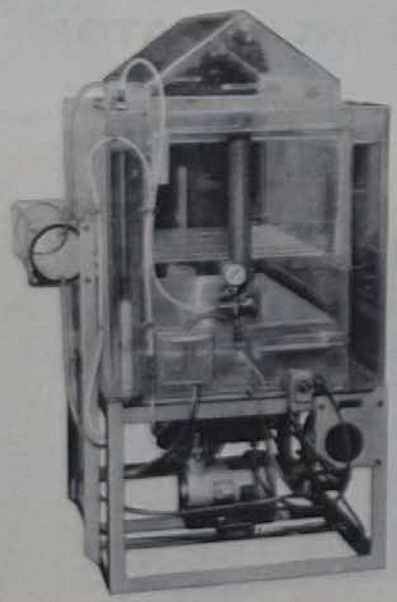
Gallenkamp

HUMIDITY CABINETS

Suitable for conditioning and climatic tests on materials and components

Non-injection model *See OVR-200-010W et seq.*

Steam-injection model *See OVR-400-010G et seq.*



SBL-450

SALT SPRAY CABINET

to BS 1224, ASTM B117/73 and ASTM B287/62

SALT SPRAY CABINET, for testing the resistance to corrosion of electroplated materials by salt spray or acetic acid-salt spray. Comprises a clear plastics cabinet 760 × 510 × 510 mm high, jacketed on three sides and a plastics cover, all mounted on a steel base frame. The water in the jacket is heated by two 1·25 kW immersion heaters, and a thermometer indicates the temperature of the spray cabinet. A small pump continually draws brine from an external tank and discharges it into the brine reservoir which incorporates an overflow. A humidifier tower is built into one side and a pair of nozzles set at right angles cause the formation of a fine mist. A diaphragm type compressor is driven by a 0·5 h.p. motor. The constant level facility provides a period of unattended operation of approximately 100 hours. Supplied with a set of rods on which specimens may be mounted. Overall dimensions 1130 × 915 × 1450 mm high. For 220-240 V 50 Hz single phase supplies.

SBL-450-W	Salt spray cabinet	**£1362·90**

SAMPLING

SAMPLING STICKS

SAMPLING STICK, brass, with three apertures for sampling grain in sacks at different depths. Overall length approximately 900mm, diameter 25mm.

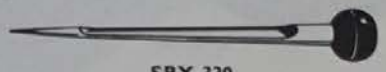
SBX-300-X Sampling stick **£63-23**



SBX-300

SAMPLING STICK, Belgian pattern, overall length approximately 300mm.

SBX-330-Q Sampling stick **£15-21**

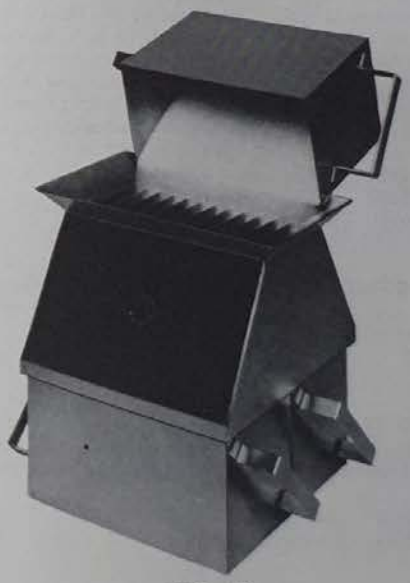


SBX-330

Sample jars *See JAR-610*
Sample tubes *See TUL-460*

SAMPLE DIVIDERS

For dividing powdered or granular materials into two or more portions of similar particle size distribution to that of the bulk sample



SBX-480



SBX-550

SAMPLE DIVIDER, riffle pattern, gravity operated, stainless steel, based on the design recommendations of BS 812 'Methods for sampling and testing of mineral aggregates sands and fillers', BS 1377 'Methods of testing soils for civil engineering purposes' and BS 1796 'Methods for the use of BS fine mesh test sieves'. With twelve ¼in. (6·35mm) apertures and three sample collecting containers, each container having a capacity of approximately 300ml.

SBX-450-R Sample divider **£39-07**

SAMPLE DIVIDER, as SBX-450-R but with twelve ½in. (12·7mm) apertures and three sample collecting containers, each container having a capacity of approximately 1500ml.

SBX-480-T Sample divider **£48-40**

SAMPLE DIVIDER, riffle pattern, gravity operated, tinned steel, to BS 1017 Part 1 'The sampling of coal' Fig. 13. With twelve 1in. (25·4mm) apertures and three sample collecting containers, each container having a capacity of approximately 10 litres.

SBX-550-J Sample divider **£96-75**

Sample crushers and grinders *See Mills*
Shaking machines and sieves *See Shakers and Sieves*

SCALES

SCALE, ADHESIVE TAPE, in roll 66m long × 12·7mm wide, with alternate 10mm sections of different colours and successive 1dm sections on either edge.

SCJ-340-A Scale, adhesive tape — Roll **£1·72**



SCJ-340



SCJ-420



SCJ-380



SEL-430 in use



SEL-530 in use



SEL-640

SCALE, glass vertical reading, 0 to 15cm × 1mm. Length 180mm, width 25mm.

SCJ-380-S Scale, glass — **£1·10**

SCALE, mirror glass, vertical reading, 0 to 50cm × 1mm, with engraved figures and divisions. Width 30mm.

SCJ-420-G Scale, mirror glass — **£5·06**

Scissors — *See DKH-230 et seq. and TOJ-790*

Scoops — *See SMJ-200 et seq.*

SEALANTS

SEALING WAX, best quality, in 110g sticks.

SEL-300-J Sealing wax — Pack of 4 **£1·45**

SOFT RED WAX, made to the specification of the British Scientific Instrument Research Association. Ideal for temporary fixing. In 28g sticks.

SEL-340-E Soft red wax — **£1·29**

SEALING TISSUE, *GALLENKAMP* **PARAFILM,** a flexible, single-way stretch, waterproof, thermoplastic material formulated for use in a wide range of ambient temperatures. Once wrapped round an article, it can be sealed into position by the heat and pressure of the hand. It can be used to seal irregularly shaped articles. PARAFILM is resistant to most common dilute acids, alkalis and inorganic solutions and it has a low water vapour permeability. In roll of 15m, interleaved with paper to prevent sticking. Each roll is individually sealed and wrapped. Dimension given is the width.

SEL-430-010A	Sealing tissue, 50mm	Roll **£0·79**
SEL-430-030R	Sealing tissue, 165mm	Roll **£2·61**
SEL-430-050L	Sealing tissue, 500mm	Roll **£7·81**

SEALING TISSUE, PARAFILM, similar to SEL-430 but having two-way stretch properties. Width 100mm, in roll of 38m interleaved with paper to prevent sticking. (F)

SEL-460-F Sealing tissue — Roll **£5·15**

SEALING TAPE, PTFE, which can easily be stretched over stoppers and ground joints or the mouths of tubes, bottles, etc. Can be sterilised in steam. In 10m roll. Dimension given is the width.

SEL-530-010P	Sealing tape, 50mm	Roll **£2·40**
SEL-530-030J	Sealing tape, 100mm	Roll **£4·84**

SEALING COMPOUND, silicone rubber, cures at room temperature to a rubber suitable for sealing purposes and for making flexible joints between glass components. The cured rubber is flexible between −60 and 300°C. Supplied in collapsible tube containing 85g.

SEL-600-Y Sealing compound — **£2·90**

PLASTICINE, plastic moulding clay.

SEL-640-010A	Plasticine, blue	Pack of 500g **£0·53**
SEL-640-030R	Plasticine, grey	Pack of 500g **£0·53**
SEL-640-050L	Plasticine, terra-cotta red	Pack of 500g **£0·53**
SEL-640-070F	Plasticine, white	Pack of 500g **£0·53**

CHATTERTON'S COMPOUND, a black electrical insulating material. Solid at room temperatures; heated to softening point for application.

SEL-730-C Chatterton's compound — Pack of 500g **£3·49**

Griffin BOTTLE SHAKER



SGL-200

For efficient shaking of bottles, flasks, Kahn tubes etc., using a short throw at a shaking speed of approximately 275 strokes/min. For two bottles of up to 2500ml capacity in the Winchester series or several bottles of smaller capacity. The carrier accepts four racks each holding 30 Kahn tubes.

Construction

The carrier is a wood box provided with two adjustable partitions one of which clamps the bottles. The carrier is suspended on a rigid casting to which the motor is clamped and which must be bolted on to a firm support.

Shaking drive

The carrier is mounted on a suspension having bearings sheathed with a tough resilient material. The cradle is vee-belt driven by a ¼h.p. motor, and can be made to travel 12·5, 25 or 37·5mm at each throw by a simple adjustment.

Dimensions

Carrier, internal	430×280×130mm high
Overall	840×330×300mm high

SHAKER, *GRIFFIN*, as specified, comprising wood carrier box with adjustable partitions mounted on rigid casting with motor. For 220–240V 50Hz single phase supplies.

SGL-200-S Shaker **£216·00**

ACCESSORY

Rack, Kahn, with perforated rubber shelves to hold 30 tubes 12mm diameter.

SGL-220-500H Rack **£22·84**

Gallenkamp ELECTRICALLY HEATED SAND BATH, 325°C

- **Working area 470×270mm**
- **Temperature controlled by energy regulator**
- **Efficient insulation to protect bench top**
- **Even heating without the presence of fluids**



See BLD-350-U

Gallenkamp

Gallenkamp FLASK SHAKER

Suitable for dissolving, dispersing, extracting and other applications

- Accepts up to six 500ml flasks
- Variable speed – solid state circuit
- Speed range from 100 to 800 oscillations/min
- Integral 0 to 20min timer with continuous run position
- Seats firmly on the bench at all speeds
- Robustly constructed
- Positive grip clamps
- Designed for minimum maintenance



SGL-700 with flasks

The flask shaker will shake loads of up to six 500ml flasks, each about half full of liquid, at speeds between approximately 100 and 800 oscillations/min.

Construction and operation

Comprises a diecast aluminium alloy outer case which houses the drive mechanism, an oscillating shaft fitted with six positive grip clamps, and a heavy steel base fitted with vibration absorbing feet to keep the shaker firmly seated on the bench or floor. The oscillating shaft runs in robust self-lubricating bearings and the oscillating action is transmitted via an eccentric and quiet-running ball bearing linkages. The minimum number of moving parts is utilised to reduce maintenance, and the shaker runs cool at all loads.

The clamps accept objects between 5 and 80mm diameter and can be used to hold test tubes, conical and round bottom flasks, reagent bottles and beakers, etc. Shaking action is side to side in the two end positions, assisted by an up and down motion in the case of the other four positions.

The built-in 0 to 20min timer has a continuous run position and also an OFF position which isolates the shaker motor.

Dimensions

Overall, without flasks	710 x 260 x 230mm high
Clearance between bench and clamps	200mm
Mass	15kg

FLASK SHAKER, *GALLENKAMP,* as specified, variable speed, with six clamps, solid state circuit, timer with continuous run and OFF positions and instructions. For single phase supplies.

SGL-700-010V	Flask shaker, 220–240V 50Hz	**£112·50**
SGL-700-030P	Flask shaker, 110–120V 60Hz	**£118·13**



Gallenkamp

SHAKING WATER BATHS

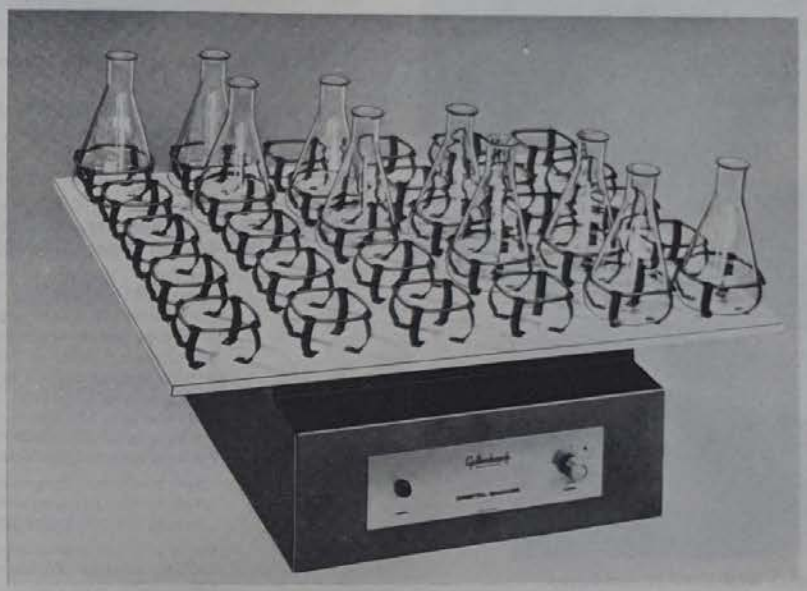
- 15, 20 and 70 litres capacity
- Variable shaking speeds

See BKS-300-010F

Gallenkamp ORBITAL SHAKER

For bottles and flasks

An orbiting base with accessory platforms used for growing cultures of micro-organisms and tissue cells. The orbiting motion of the platform minimises accretion of material on the sides of bottles and flasks, provides good transfer of gas to the samples and avoids undue buffeting of the organisms and cells



SGM-300 with SGM-320-540 and flasks

- **Tachogenerator speed controller with solid state circuitry**
- **Calibrated speed control scale 40 to 400/min**
- **Adjustable counterbalancing of loads**
- **Choice of eight platforms to accept conical flasks**
- **Bottle shaker platform**
- **Built for reliability over long operating periods**

Operation

Conical culture flasks are mounted on a platform which is driven in a circular orbital motion at a speed closely regulated by a solid state controller with tachogenerator feedback. The controlled motion of the platform provides the conditions required for the efficient transfer of oxygen or other gases between the gaseous and liquid phases in the culture flasks.

Long term reliability and quiet running result from the platform being mounted on accurately aligned double row rigid ball journals. A manually adjustable counterbalancing system is provided so that vibration can be reduced for any given load. Conical flasks up to 2 litre capacity may be used.

The shaker is suitable for use in ambient temperatures from 0 to 40°C.

Design details

The interchangeable accessory platforms are covered with a white plastics laminate for ease of cleaning and are fitted with robust plastics covered spring clips to hold conical flasks. The platforms are secured to the orbiting base plate by quick-release fasteners. The platform drive motor is brushless and the bearings and reduction gear-box are grease packed for life.

The accessory bottle shaking platform SGM-340-S accepts six 2000 ml capacity Winchester bottles held horizontally and is useful for the preparation of culture media and other purposes.

Technical data

Orbiting speed range	40 to 400/min continuously variable
Diameter of orbit	32 mm
Ambient temperature limits	0 to 40°C
Flask and bottle loads	*See Accessories* For efficient agitation and aeration each flask or bottle should be not more than approximately one quarter full.
Plan dimensions	
with small platform	720 mm wide × 650 mm deep
with large platform	950 mm wide × 780 mm deep
Overall height	
to top surface of platform	280 mm
to top of fitted 2 litre flask	570 mm
Mass, including platform and counterbalance masses, approximate	50 kg
Power rating	150 W

Continued overleaf

Gallenkamp



SGM-300 with SGM-320-540 and flasks



SGM-300 with SGM-340 and bottles

ORBITAL SHAKER, *GALLENKAMP*, as specified, with tacho-generator solid state speed controller, range 40 to 400/min, adjustable counterbalancing system, mains indicator lamp and cable. With instructions but **without** platform. For single phase supplies.

SGM-300-010U	Orbital shaker, 220–240V 50Hz	**£362·25**
SGM-300-030X	Ortibal shaker, 110–120V 60Hz	**£365·63**



SGM-300 with INR-270-514 and flasks

ACCESSORIES

Flask platforms, interchangeable, 920 × 735mm, fitted with clips and where necessary retaining springs to accept conical flasks to ISO R1773 and BS 2734. The number and size of the flasks accommodated is given.

SGM-320-500M	Flask platform, 77 × 250ml	**£96·75**
SGM-320-520G	Flask platform, 53 × 500ml	**£83·81**
SGM-320-540A	Flask platform, 30 × 1000ml	**£85·50**
SGM-320-560R	Flask platform, 20 × 2000ml	**£109·13**

Flask platforms, interchangeable, 685 × 480mm to accept smaller numbers of flasks
See INR-270-514N to INR-270-528C

Bottle platform, interchangeable, will accommodate six 2000ml capacity Winchester pattern bottles held horizontally. With clamping devices and quick-release fasteners.

SGM-340-S	Bottle platform	**£67·50**

Bottles, Winchester pattern 2000ml capacity
See BTF-350-152E

Flasks, conical 250 to 2000ml *See FHB-370*

Flasks, conical with side indents for increased aeration, capacities 500 to 2000ml *See FHC-280*

Griffin VORTEX SHAKER/STIRRER

- **Powerful swirling action**
- **Brushless induction motor**



SGP-300

VORTEX STIRRER, *GRIFFIN*, a compact machine for the rapid stirring of liquids in test tubes and other small vessels. A very vigorous vortex motion is imparted to the contents when the test tube is held in contact with a rubber cup which is eccentrically rotated at high speed by an induction motor. The stirring action can be varied by altering the angle of the tube or the contact pressure.

The motor is enclosed in a polypropylene moulding and mounted on soft rubber feet. A mains ON-OFF switch is fitted. The oscillating parts are counterbalanced and the machine is practically vibration free. Overall dimensions of case 100mm high × 125mm diameter of base. Mass 1·35kg. With instructions. For 220–240V 50Hz single phase supplies.

SGP-300-Q	Vortex shaker/stirrer	**£23·63**

SHEET

All dimensions quoted are nominal.

SHEET, acrylic, transparent, colourless, 750 × 500 × 5 mm.
SHC-200-F Sheet **£6-82**

SHEET, polythene, porous. Average pore size 50 μm. Suitable for gas or liquid filtration or dispersion and as a support plate in chromatography columns. Can be cut and welded. Size 250 × 250 × 2 mm.
SHC-250-Q Sheet **£2-10**

SHEET, PVC, transparent, 1220 × 610 × 0·5 mm.
SHC-300-U Sheet **£4-79**

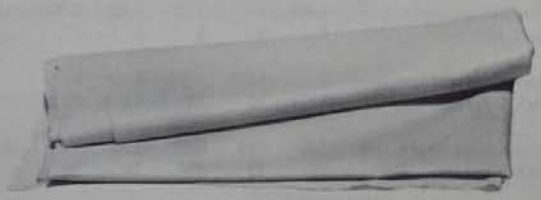
SHEET, plastics, non-slip. A high density material, with the appearance of rubber, which has high non-slip properties when in contact with most other materials. Can be placed under instruments or on moving or sloping surfaces to prevent sliding movement. Supplied as a pad, diameter 250 mm, thickness 5 mm.
SHC-400-M Sheet **£1-38**

SHEET, plastics, non-slip, as SHC-400-M but thickness 0·6 mm and supplied in roll form.
SHC-430-050W Sheet, width 200 mm Roll of 2 m **£2-77**
SHC-430-090K Sheet, width 400 mm Roll of 2 m **£4-32**

SHEET, rubber, flexible, 900 × 900 × 0·25 mm.
SHC-500-E Sheet **£12-33**



SHC-430 in use



SHC-500

COMMERCIAL SIEVES

Mesh numbers quoted are nominal.

SIEVING OUTFIT, INTERCHANGER, a portable outfit comprising a polished brass body, cover and receiver with four rimmed sieving discs fitted with commercial quality woven wire gauzes of 36, 72, 100 and 120 mesh respectively. Complete with sieve brush. Dimensions, 100 mm diameter, approximate depth 40 mm.
SIH-300-F Sieving outfit **£8-71**

SIEVES, brass wire gauze mounted in 200 mm diameter tinned metal frame.

SIH-340-110Q	Sieve, 10 mesh	£4-62
SIH-340-160B	Sieve, 22 mesh	£4-62
SIH-340-180S	Sieve, 30 mesh	£4-62
SIH-340-200P	Sieve, 44 mesh	£4-62
SIH-340-220J	Sieve, 60 mesh	£4-62
SIH-340-240D	Sieve, 85 mesh	£4-62
SIH-340-250A	Sieve, 100 mesh	£4-62
SIH-340-280X	Sieve, 160 mesh	£4-62
SIH-340-290L	Sieve, 200 mesh	£4-62
SIH-340-310Y	Sieve, 300 mesh	£5-28

ACCESSORY

SIH-350-502P Cover and receiver £2-42

Siphons See CDC-380 et seq.
Slide rules See CAH-300 et seq.



SIH-300



SIH-340 with SIH-350

STANDARD SIEVES, BS 410



SIH-400
SIH-460

Each sieve is marked with the BS nominal aperture.

Nominal aperture, mm	5·60	4	3·35	2·80	2·35	
Mesh, nearest	3	4	5	6	7	
Nominal aperture, mm	2	1·70	1·40	1·18	1	
Mesh, nearest	8	10	12	14	16	
Nominal aperture, μm	850	710	600	500	425	355
Mesh, nearest	18	22	25	30	36	44
Nominal aperture, μm	300	250	212	180	150	125
Mesh, nearest	52	60	72	85	100	120
Nominal aperture, μm	106	90	75	63	53	45
Mesh, nearest	150	170	200	240	300	350

SIEVES, BS 410, brass mesh mounted in 200mm diameter polished brass frame. Dimension given is the nominal aperture.

SIH-400-050F	Sieve, 5·60mm	£8·10
SIH-400-060C	Sieve, 4mm	£8·10
SIH-400-070W	Sieve, 3·35mm	£6·82
SIH-400-080T	Sieve, 2·80mm	£6·82
SIH-400-090Q	Sieve, 2·35mm	£6·82
SIH-400-100Q	Sieve, 2mm	£6·82
SIH-400-110N	Sieve, 1·70mm	£6·82
SIH-400-120K	Sieve, 1·40mm	£6·82
SIH-400-130H	Sieve, 1·18mm	£6·82
SIH-400-140E	Sieve, 1mm	£6·82
SIH-400-150B	Sieve, 850μm	£6·82
SIH-400-160V	Sieve, 710μm	£6·82
SIH-400-170S	Sieve, 600μm	£6·82
SIH-400-180P	Sieve, 500μm	£6·82
SIH-400-190M	Sieve, 425μm	£6·82
SIH-400-200M	Sieve, 355μm	£6·82
SIH-400-210J	Sieve, 300μm	£6·82
SIH-400-220G	Sieve, 250μm	£6·82
SIH-400-230D	Sieve, 212μm	£6·82
SIH-400-240A	Sieve, 180μm	£6·82
SIH-400-250U	Sieve, 150μm	£6·82
SIH-400-260R	Sieve, 125μm	£6·82
SIH-400-270X	Sieve, 106μm	£6·82
SIH-400-280L	Sieve, 90μm	£6·82
SIH-400-290Y	Sieve, 75μm	£6·82
SIH-400-300Y	Sieve, 63μm	£7·00
SIH-400-310F	Sieve, 53μm	£7·57
SIH-400-320C	Sieve, 45μm	£7·66

ACCESSORY

SIH-410-502M	Cover and receiver set, polished brass	£5·76

SIEVES, BS 410, stainless steel mesh mounted in 200mm diameter stainless steel frame. Dimension given is the nominal aperture.

SIH-460-100U	Sieve, 2mm	£10·23
SIH-460-140Y	Sieve, 1mm	£10·23
SIH-460-180T	Sieve, 500μm	£10·23
SIH-460-200Q	Sieve, 355μm	£10·23
SIH-460-220K	Sieve, 250μm	£10·23
SIH-460-250B	Sieve, 150μm	£10·23
SIH-460-270S	Sieve, 106μm	£10·23
SIH-460-280P	Sieve, 90μm	£10·23
SIH-460-290M	Sieve, 75μm	£10·23
SIH-460-300M	Sieve, 63μm	£10·49
SIH-460-310J	Sieve, 53μm	£11·35
SIH-460-320G	Sieve, 45μm	£11·48

ACCESSORY

SIH-470-502Q	Cover and receiver set, stainless steel	£8·65

SIEVING ACCESSORIES

SIEVE ANALYSIS GRAPH PAPER, in pad of 25 sheets 300 × 240mm. The upper half of the sheet can be used for drawing a graph of the analysis and the lower half is ruled for tabulation of the results of up to four analyses. Suitable for use with any standard sieve series.

SIH-550-A	Sieve analysis graph paper	£1·31
	Sieve brush	*See BUR-750-C*

SIEVE SHAKERS

Impart a circular motion to the material being sieved so that it slowly travels round over the sieve gauze. Superimposed on this is a high speed vertical vibratory motion of small amplitude which continually clears the sieve apertures. The combination of these two motions provides a very effective sieving action.

SIEVE SHAKER, as specified, with integral 0 to 60min time switch. Accommodates 12 sieves of 100mm diameter or 8 sieves of 200mm diameter. Overall dimensions 550 × 550 × 800mm high. For 220–240V 50Hz supplies. **Without** sieves.

SIH-780-J	Sieve shaker	£243·65

SIEVE SHAKER, as SIH-780-J but accommodates 16 sieves of 100mm diameter or 12 sieves of 200mm diameter or 6 sieves of 300mm diameter.

SIH-800-L	Sieve shaker	£258·50



SIH-800

SintAGlass SINTERED GLASSWARE

Apparatus incorporating SINTAGLASS plates will be found under the following page headings:

ABSORPTION	FILTERS	GAS GENERATORS
CHROMATOGRAPHY	FUNNELS	GAS WASHING
CRUCIBLES	GAS ANALYSERS	GAUGES
EXTRACTION	GAS COLLECTION	PLATES

TECHNICAL INFORMATION

- **Porosities controlled to well within requirements of BS 1752**
- **Non-friable sintered plates**
- **Made from borosilicate glass**
- **Porosities colour coded for easy identification**
- **Excellent uniformity of pore size**
- **Robust construction**

GALLENKAMP have been making high quality sintered glassware for over 25 years. This experience, together with the production control techniques employed, enables us to manufacture filters to closer porosity tolerances than those specified in BS 1752 'Laboratory Sintered or Fritted Filters'. In the table shown below, it will be noted that there is no possibility of overlap between adjacent ranges of maximum pore diameters with SINTAGLASS and therefore the performance of each porosity is significantly different from the performance of those on either side. This is an important refinement on the wider tolerances permitted by BS 1752.

POROSITIES AND APPLICATIONS

Porosity	Colour code	BS 1752 specified range of maximum pore dia.	SINTAGLASS range of maximum pore dia.	Principal uses
		μm	μm	
0	White	150 to 250	**200 to 250**	Coarse distribution of gas in liquids.
1	Yellow	90 to 150	**100 to 120**	Filtration of very coarse precipitates. Support for absorptive layers for filtering gelatinous precipitates. Gas distributors in liquids. Extraction of coarse grain material.
2	Green	40 to 90	**40 to 50**	Preparative work with crystalline precipitates. Medium gas filters. Mercury filters. Extraction of medium grain material.
3	Black	15 to 40	**20 to 30**	Preparative work with fine precipitates. Analytical work with medium precipitates. Fine gas filters. Mercury filters. Extraction of fine grain material.
4	Orange	5 to 15	**5 to 10**	Analytical work with very fine precipitates (e.g. barium sulphate, cupric oxide). Preparative work with finest precipitates. Safety valves for mercury.
*5	Blue	Not greater than 2	**1 to 1·8**	Bacteriological filtration.

* See Note on Bacteriological Filters on page 626.

Gallenkamp

SintAGlass SINTERED GLASSWARE

TECHNICAL INFORMATION

ADVANTAGES OF USE

For filtration

Not affected by reagents such as ammonia or sulphuric acid which destroy filter paper.

Tedious preparation of asbestos filter beds eliminated.

Reproducible analytical results assured due to close tolerance control of porosity in manufacture.

Constant mass quickly attained by drying at 110°C.

Easily cleaned for re-use.

Filtration process visible all the time.

For gas absorption and washing

Resistant to wet, corrosive gases.

Low back pressure on gas line, particularly when using coarse porosity discs.

High velocity with relatively low pressure.

Cleans the gas stream of suspended material as well as dispersing the gas.

DRYING AND IGNITION

Sintered crucibles are specially suitable for precipitates which have to be dried to constant mass at 110°C. They can be used with boiling liquids and placed directly in a drying oven up to 150°C, then left to cool in a desiccator or in the open air. When ignition is required an electric furnace is necessary. The crucibles should be placed in the cold furnace, slowly heated to a temperature not exceeding 580°C and allowed to cool down again to at least 200°C before removal from the furnace. When using filters with porosity 5 plates, greater care is needed when heating, especially when the filter plate is wet. These filters should always be placed in a cold oven and heated gradually, since the sudden evolution of steam from the fine pores may set up sufficient pressure within the filters to crack them.

SIZE OF PLATES

All diameters specified for sintered filter plates are nominal and may vary up to ±5%. Shrinkage during firing increases with decreasing pore size so that in general a fine porosity plate will have a smaller diameter than a coarse one of the same nominal size.

GAS PRESSURE TEST

The approximate pressure necessary to pass air through plates wetted with water at 20°C.

SINTAGLASS Porosity	Pressure, torr
0	10
1	20
2	50
3	90
4	350
5	1800

CLEANING AND CARE OF SINTERED FILTERS

Caution

Avoid immersing the complete item of sintered glassware for prolonged periods in solutions containing either hydrochloric acid, as this may discolour the enamel of the inscription or caustic alkalis, or strongly alkaline detergents which will attack the porous glass plate.

It is not good practice to immerse sintered glassware in any strong cleansing agent; it is always preferable to wash the plate through with a mild reagent and then rinse with several washes of distilled water.

Before use

Wash new filters thoroughly with hot hydrochloric acid and then with water until a neutral filtrate is obtained. This will remove any loose glass particles and accumulated dust.

After use

To ensure long and satisfactory service wash filters with water immediately after use, in the reverse direction from that used in filtration, and then thoroughly clean. Do not connect to a water tap to back flush as excessive pressure can rupture the sintered disc. The following chemicals will be found useful for removing stubborn compounds.

General cleaning	Laboratory detergents such as CMD-300-J
Organic substances	Laboratory surfactants such as CMD-400 or potassium permanganate (see below)
Fat	Carbon tetrachloride
Albumen	Warm ammonia or hydrochloric acid
Cupric oxide	Hydrochloric acid (hot) with potassium chlorate
Barium sulphate	Sulphuric acid conc. (hot)
Mercury residues	Aqua regia (hot)
Silver chloride	Ammonia

Finally rinse the filters well with distilled water, dry, and store in a dust-free place.

Use of potassium permanganate

Potassium permanganate is a satisfactory reagent for removing organic (and many inorganic) deposits; it cleans efficiently without damaging the filter.

Treat the plate with a 1% aqueous solution of potassium permanganate followed by a few drops of concentrated sulphuric acid. The resulting heat of reaction enhances the oxidising power of the mixture.

Then wash and dry the filter and remove any stain from precipitated manganese dioxide by treatment with acidified 20 vol. hydrogen peroxide. A final rinse with distilled water normally leaves the plate chemically clean.

NOTE ON BACTERIOLOGICAL FILTERS, POROSITY 5

Pore Size

Filter plates of porosity 5 will retain bacteria of sizes greater than 1·8 μm but owing to the size range of different organisms it is impossible for us to guarantee these filters bacteriologically.

Filtration Rate

To provide the fastest rate of filtration the very fine porosity 5 plate is made very thin and is supported by a layer of porosity 3. This construction is to be understood throughout our catalogue whenever reference is made to porosity 5.

Certification

Each filter of porosity 5 is supplied complete with a test certificate showing the maximum pore size and permeability as determined by methods described in BS 1752 'Laboratory Sintered or Fritted Filters'.

SOIL HYDROMETERS

SOIL HYDROMETER, BS 1377, for determining particle size distribution in soils. Range 0·995 to 1·030g/ml. Calibrated at 20°C. Overall length approximately 350mm.
SLR-220-E Soil hydrometer **£6·08**

SOIL HYDROMETER, ASTM D422 designation 152H, for determining particle size distribution in soils. Range −5 to +60g/litre. Calibrated at 68°F. Overall length approximately 280mm.
SLR-250-G Soil hydrometer **£6·08**

HYDROMETER JAR, BS 1377.
SLR-280-Y Hydrometer jar **£3·68**

SOIL PENETROMETER

SOIL PENETROMETER, a small, portable instrument for measuring the compactness of soils. In use, the probe is pushed into the compacted soil a standard distance and the unconfined compressive strength of the soil read directly from the scale.

Comprises a spring-loaded piston able to move in a cylindrical handle with scales calibrated 0·5 to 4·5kg/cm² and 1000 to 9000lbf/ft² unconfined compressive strength. The piston rod is extended to form a flat ended probe 6mm diameter with a mark 6mm from the end. Overall dimensions 180 × 20mm. In plastics wallet.
SLR-410-S Soil penetrometer **£15·86**


SLR-410

Other apparatus for soil testing will be found under the following page headings:

Density	Ovens
Mills	Sampling
Moisture	Sieves

SOIL SAMPLING

SOIL AUGER, cylindrical, for withdrawing unbroken samples of soil for analysis, population counts, etc. Steel sample cylinder 220 × 40mm with adapter, extension rod and detachable handle.
SLR-580-H Soil auger **£17·10**

SOIL AUGER, helical, suitable for heavy soils. Helix 200mm long × 38mm diameter on stem, with eye for tommy bar. Overall length 650mm.
SLR-620-S Soil auger **£9·00**


SLR-580


SLR-620

SAMPLE DIVIDER, riffle pattern, based on design recommendations of BS 1377 'Methods of testing soils for civil engineering purposes'

See SBX-450-R

Gallenkamp

Gallenkamp SOIL MOISTURE TENSIOMETERS

For the determination of the force which a root must overcome in order to draw water from soil

- **Continuous reading of soil moisture tension**
- **Independent of electrical properties of the soil**
- **Supplied with comprehensive instructions for use**



SLR-750
(SLR-790 is similar)



SLR-770

Principle

The reading on the gauge indicates the moisture tension of the soil and is directly related to the effort plants must exert to extract water from the soil. Tensions so measured are directly comparable and any particular tension indicates the same degree of water availability. The moisture tension in soil varies with the moisture content, the soil particle size and the packing of the soil. In any given position, the last two factors tend to remain constant so that variations in soil moisture tension reflect the changes in moisture content.

Specification

Comprises a porous pot connected to a 60mm diameter dial vacuum gauge calibrated 0–60cm Hg. Each is despatched filled with water, the porous pot being enclosed in a waterproof wrapping to prevent loss of water by evaporation during transit and storage. When in use the gauge is protected from chemical sprays and water by a polythene cover. **The tensiometer must be protected from freezing.**

SOIL MOISTURE TENSIOMETER, *GALLENKAMP*, **growers model,** as specified, for maximum depth of 300mm. Filled with water ready for use, with gauge cover and instructions.

SLR-750-M	Tensiometer	£24·41

SOIL MOISTURE TENSIOMETER, *GALLENKAMP*, **bench model,** for use in shallow benches or troughs, minimum depth 75mm, as specified, but with L-shaped stem. Filled with water ready for use, with gauge cover and instructions.

SLR-770-V	Tensiometer	£25·88

SOIL MOISTURE TENSIOMETER, *GALLENKAMP*, **orchard model,** as specified, for maximum depth of 600mm. Filled with water ready for use, with gauge cover and instructions.

SLR-790-H	Tensiometer	£25·88

SPARE PARTS

SLR-810-030A	Porous pot, in waterproof cover	£0·74
SLR-810-050R	Top washers, rubber	Pack of 10 £0·46
SLR-810-070L	Bottom gaskets, rubber	Pack of 10 £0·68
SLR-810-090F	Protective cover, polythene	£0·36

ACCESSORIES

Filler, a screw capped plastics bottle with a flexible tube for topping up tensiometers.

SLR-810-502Y	Filler	£0·12

Spanner, $\frac{5}{16}$in. Whit., for unscrewing both connections of tensiometers.

SLR-810-514B	Spanner	£0·52

SOIL AUGER, steel 40mm diameter, 900mm overall length, with 12mm diameter shaft and welded cross handle.

SLR-810-526R	Soil auger	£9·45



SLT-300



SLT-340



SLT-660

SOIL TEST KITS

SOIL TEST KIT, a self-contained kit for determination of soil pH and percentage deficiency of nitrogen, phosphorus and potassium. Comprises the necessary test solutions (each approximately 25ml, sufficient for approximately 40 tests), pure tin rod for phosphorus test, colour comparator chart, four graduated test tubes and comprehensive instructions.

SLT-300-N Soil test kit **£3·96**

SOIL TEST KIT, as SLT-300-N but with test solutions sufficient for approximately 120 tests. Includes three filter funnels, filter paper, test tube rack, eight test tubes, 84×13mm each with colour-coded cork. Complete in metal carrying case 320×130×114mm.

SLT-340-Y Soil test kit **£20·39**

SOIL TEST KIT, *BDH*, a self-contained kit for determination of pH on difficult soil suspensions which take several hours to settle. Comprises 12 test tubes, cleaning brush, 24 rubber stoppers, 100g $BaSO_4$, 100ml *BDH* soil pH indicator, 500ml distilled water, a small spatula and a pH colour chart in wooden case.

SLT-390-T Soil test kit **£24·75**

SPARE PART

SLT-410-010S Soil pH indicator, *BDH*, 100ml **£1·42**

SOIL THERMOMETERS

SOIL THERMOMETER, range −5 to 40°C. Comprises mercury-in-glass thermometer fitted into a stout glass sheath with the bulb embedded in a layer of paraffin wax to ensure correct readings on drawing thermometer to surface. For use with steel tubes SLT-610 driven into the soil.

SLT-590-D Soil thermometer **£14·34**

ACCESSORIES

Steel tubes, seamless, with copper cap and length of chain for suspending thermometer. Dimensions given are for maximum depth.

SLT-610-502E Steel tubes, 300mm **£13·64**

SLT-610-508P Steel tubes, 1200mm **£20·08**

SOIL THERMOMETER, range 10 to 110°C. Comprises copper tube 380×25mm with removable mercury-in-glass thermometer held in rubber mount. Maximum depth 300mm.

SLT-660-Q Soil thermometer **£5·12**

ACCESSORY

SLT-680-504U Auger, 25mm diameter, with eye for tommy bar. **£4·88**

Gallenkamp

SPATULAS

All dimensions quoted are nominal



SMJ-200
SMJ-230

SCOOP, aluminium, 100 x 30mm overall length x width.

SMJ-200-S	Scoop, 100 x 30mm	**£0·56**

SCOOP, stainless steel, 100 x 30mm overall length x width.

SMJ-230-U	Scoop, 100 x 30mm	**£0·97**



SMJ-280

SCOOPS, stainless steel, cylindrical with handle. Dimensions given are overall length x maximum width. (F)

SMJ-280-030W	Scoop, 190 x 50mm	**£5·09**
SMJ-280-050Q	Scoop, 260 x 75mm	**£5·57**
SMJ-280-070K	Scoop, 320 x 100mm	**£6·41**
SMJ-280-090E	Scoop, 350 x 115mm	**£7·02**



SMJ-340

SCOOPS, polythene, rigid, with handle. Dimensions given are overall length x maximum width.

SMJ-340-030T	Scoop, 135 x 48mm	Pack of 5 **£0·77**
SMJ-340-050N	Scoop, 180 x 60mm	Pack of 5 **£0·94**
SMJ-340-070H	Scoop, 240 x 82mm	Pack of 5 **£2·20**
SMJ-340-090B	Scoop, 300 x 118mm	Pack of 5 **£4·18**

SPATULA, horn, rigid, with spoon end, 150 x 25mm length x spoon width.

SMJ-400-C	Spatula	**£1·13**

SPATULAS, polypropylene, taper shape with chamfered edge. Flexible, virtually unbreakable and can be autoclaved. Length 200mm.

SMJ-450-N	Spatulas	Pack of 5 **£0·84**



SMJ-400

SPATULAS, polythene, flexible, with blade at one end. 220 x 15mm length x blade width.

SMJ-490-Y	Spatulas	Pack of 10 **£0·27**

SPATULAS, nickel, drawn out flat to form narrow, bent blade at one end. Length 165mm.

SMJ-550-F	Spatulas	Pack of 3 **£2·01**



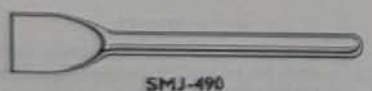
SMJ-450

SPATULAS, stainless steel, lightweight, flat with rounded ends. Dimensions given are length x maximum width.

SMJ-600-030A	Spatula, 90 x 20mm	**£0·36**
SMJ-600-050R	Spatula, 120 x 25mm	**£0·43**
SMJ-600-090F	Spatula, 150 x 30mm	**£0·70**

SPATULAS, stainless steel, heavyweight, with one spatulate and one spoon end. Dimensions given are overall length x maximum width.

SMJ-660-030E	Spatula, 150 x 18mm	**£0·75**
SMJ-660-070P	Spatula, 210 x 18mm	**£1·18**



SMJ-490



SMJ-600



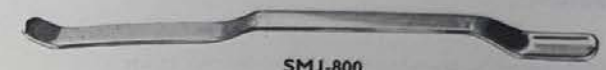
SMJ-550



SMJ-660



SMJ-730



SMJ-800

SPATULAS, stainless steel, Chattaway pattern. Dimensions given are overall length × maximum width.

SMJ-730-030R	Spatulas, 100 × 5 mm	Pack of 3 **£1·32**
SMJ-730-050L	Spatulas, 130 × 5 mm	Pack of 3 **£1·38**
SMJ-730-070F	Spatulas, 150 × 8 mm	Pack of 3 **£1·52**
SMJ-730-090W	Spatulas, 200 × 10 mm	Pack of 3 **£1·82**

SPATULA, stainless steel, Nuffield pattern, with scoop at one end and narrow, bent blade at the other. 140 × 10 mm overall length × width.

SMJ-800-Q	Spatula	Pack of 6 **£1·31**

SPATULA, (TRULLA), *GRIFFIN*, stainless steel, with spoon 19 mm wide at one end and spoon 10 mm wide at the other. Overall length 175 mm.

SMJ-850-E	Spatula	Pack of 3 **£1·54**

SPATULA, stainless steel, with deep offset spoon at one end which can reach any point inside the common sizes of reagent bottles and a chisel type blade at the other, having one square and one rounded corner suitable for scraping adherent material or lifting single particles. 190 × 20 mm overall length × spoon width.

SMJ-890-W	Spatula	**£1·45**

SPATULAS, (palette knives), with parallel sided, flexible stainless steel blade set in handle. Dimensions given are blade length × width.

SMK-400-030G	Spatula, 100 × 20 mm	**£2·00**
SMK-400-050A	Spatula, 150 × 25 mm	**£2·32**
SMK-400-070R	Spatula, 200 × 30 mm	**£3·34**
SMK-400-090L	Spatula, 250 × 40 mm	**£4·82**
SMK-400-110Y	Spatula, 300 × 45 mm	**£6·63**

SPATULAS, (palette knives), with tapered, flexible stainless steel blade set in handle. dimensions given are blade length × width.

SMK-460-030K	Spatula, 75 × 15 mm	**£1·60**
SMK-460-050E	Spatula, 100 × 20 mm	**£1·74**
SMK-460-070V	Spatula, 150 × 25 mm	**£2·03**

SPATULA, (filling knife) with steel blade set in handle. Blade 130 × 50 mm length × width.

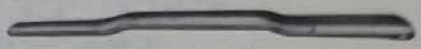
SMK-510-A	Spatula	**£2·03**

SPATULA and pocket knife, combined, with stainless steel blades. Overall length, closed 80 mm, open 180 mm.

SMK-600-W	Spatula	**£2·93**

VIBRO-SPATULA, *METTLER*, for rapidly dispensing small quantities of powdered or granular material. Vibration is started and stopped by depressing and releasing a button on the handle and the amplitude of vibration is varied by adjusting a milled ring. With four sizes of interchangeable, stainless steel spatula blades, including one for dispensing into narrow-necked vessels, and a cleaning brush all packed in a plastics storage tray. For a.c. single phase supplies. (F)

SMK-750-030Q	Vibro-spatula, 200–250 V	**£41·14**
SMK-750-050K	Vibro-spatula, 100–125 V	**£41·14**



SMJ-850



SMJ-890



SMK-400



SMK-460



SMK-510



SMK-600



SMK-750

Gallenkamp

CECIL CE303 SERIES GRATING SPECTROPHOTOMETERS

325 to 1000nm

Versatile, single beam instruments for measurement of absorbance, transmittance and concentration



SPT-260

- **Diffraction grating monochromator**
- **350mm long wavelength scale**
- **Automatic stray light filter insertion**
- **Recorder and printer outlets**

The CE303 is a grating spectrophotometer with high stability which makes it ideal for continuous monitoring applications.

The CE373 linear readout spectrophotometer offers convenience of operation. Measurements may be made on weakly absorbing samples in relatively short pathlength because of the scale expansion facilities.

The CE393 spectrophotometer offers essentially the same advantages as the CE373 coupled with direct digital readout of results. An auto zero controller available as an accessory provides for pushbutton setting of absorbance zero.

Technical data

Wavelength range	325 to 1000nm
Bandwidth	10nm
Wavelength accuracy	Better than 2nm
Wavelength scale	350mm long set by dual ratio control giving both coarse and fine adjustment
Stray light	Less than 0·5% at 340nm
Stray light filter	Automatically inserted between 325 and 390nm
Meter readout	Scaled in both absorbance and transmittance with antiparallax mirror
Linearity	Better than 0·25% at accessory terminals
Absorbance zero	Set by a single dual ratio control giving both coarse and fine setting
Zero drift	Less than ±0·1% transmittance, short term (15min)
Absorbance zero stability	Better than ±0·001 absorbance units short term
Recorder output	10mV full scale deflection
Printer output	1V full scale deflection
Source	Air cooled 36W tungsten lamp
Sample cells	Up to 40mm optical pathlength
Overall dimensions	540 × 240 × 380mm

Additional technical data for Model CE373

Linear readout in concentration, absorbance and transmittance.

20:1 Absorbance scale expansion in five ranges, 0–2, 0–1, 0–0·5, 0–0·2, 0–0·1A full scale

10:1 Transmittance scale expansion

Concentration calculation – direct reading of any required concentration for samples with absorbance values of 0·1 to 2·5A set by a ten turn control.

Additional technical data for Model CE393

Readout	Bright co-planar seven segment display
Readout range	−1998 to +1998
Readout resolution	1 digit up to 1200
Concentration factor	Set between 0 and 1 by ten turn control with display of factor
BCD output	For digital printer
Ranges	Concentration, concentration × 10, absorbance and transmittance

SPECTROPHOTOMETER, *CECIL* **CE303 System 1,** as specified, scaled linear in transmittance and non-linear in absorbance. Wavelength range 325 to 1000nm, with tungsten lamp, stabilised power supply, four-position cell slide, four cell holders with 10mm optical pathlength glass cells. Includes spare tungsten lamp, spare fuse, dust cover and instructions manual. Fitted with 2·5m of mains cable. For single phase supplies.

SPT-240-010P	Spectrophotometer, 220–240V 50Hz	**£465·30**
SPT-240-030J	Spectrophotometer, 100–120V 60Hz	**£465·30**

SPECTROPHOTOMETER, *CECIL* **CE373 System 1,** as SPT-240 but scaled linear in absorbance, transmittance and concentration. For single phase supplies.

SPT-260-010B	Spectrophotometer, 220–240V 50Hz	**£646·80**
SPT-260-030S	Spectrophotometer, 110–120V 60Hz	**£646·80**

SPECTROPHOTOMETER, *CECIL* **CE393 System 1,** as SPT-240 but with digital readout of absorbance, transmittance and concentration. For single phase supplies.

SPT-290-010D	Spectrophotometer, 220–240V 50Hz	**£855·80**
SPT-290-030U	Spectrophotometer, 110–120V 60Hz	**£859·10**

SPARE PARTS

SPT-320-010V	Lamp, tungsten, 220–240V	**£3·08**
SPT-320-030P	Lamp, tungsten, 110–120V	**£3·08**

ACCESSORIES

Cells, glass. BS 3875 Type 3, 45mm high. The dimension given is the optical pathlength.

SPT-320-504T	Cell, glass, 5mm	**£3·20**
SPT-320-508L	Cell, glass, 10mm	**£3·20**
SPT-320-512U	Cell, glass, 20mm	**£3·99**
SPT-320-516M	Cell, glass, 40mm	**£5·05**

Cell holder, for 5 and 10mm optical pathlength cells. With water jacket, for use with constant temperature water circulator.

SPT-320-532X	Cell holder	**£67·65**

Microcell, glass, 10mm optical pathlength. Must be used with SPT-320-546D.

SPT-320-542L	Microcell, glass	**£5·72**

Microcell holder, four-position with hinged lid.

SPT-320-546D	Microcell holder	**£67·10**

CECIL CE202 SERIES GRATING SPECTROPHOTOMETERS

220 to 900nm and 200 to 900nm

Versatile, single beam instruments for measurement of absorbance, transmittance and concentration

- **Diffraction grating monochromator**
- **350mm long wavelength scale**
- **Automatic stray light filter insertion**
- **Recorder and printer outlets**



SPT-430

Technical data

Wavelength range	220 to 900nm
Bandwidth	5nm
Wavelength accuracy	Better than 2nm
Wavelength scale	350mm long set by dual ratio control giving both coarse and fine adjustment
Stray light	Less than 0·5% at 220nm
Stray light filter	Automatically inserted between 290 and 390nm
Meter readout	Scaled in both absorbance and transmittance with antiparallax mirror
Linearity	Better than 0·25% at accessory terminals
Absorbance zero	Set by a single dual ratio control giving both coarse and fine adjustment
Zero drift	Less than ±0·1% transmittance, short term (15min)
Absorbance zero stability	Better than ±0·001 absorbance units short term
Recorder output	10mV full scale deflection
Printer output	1V full scale deflection
Sources	Air cooled deuterium arc and tungsten lamp selected by control knob
Sample cells	Up to 40mm optical pathlength
Overall dimensions	
Spectrophotometer	540×240×380mm
Deuterium power supply	200×150×170mm

Additional technical data for Model CE272

Wavelength range	200 to 900nm

Linear readout in concentration, absorbance and transmittance

20:1 Absorbance scale expansion in five ranges, 0–2, 0–1, 0–0·5, 0–0·2, 0–0·1A full scale.

10:1 Transmittance scale expansion

Concentration calculation – direct reading of any required concentration for samples with absorbance values of 0·1 to 2·5A set by a ten turn control.

Additional technical data for Model CE292

Readout	Bright co-planar seven segment display
Readout range	−1998 to +1998
Readout resolution	1 digit up to 1200
Concentration factor	Set between 0 and 1 by ten turn control with display of factor
BCD output	For digital printer
Ranges	Concentration, concentration × 10, absorbance and transmittance

The CE202 spectrophotometer is rapid in operation and stability is of a high order making it suitable for continuous monitoring.
The CE272 linear readout spectrophotometer has a low noise level and high energy throughput which enables it to be used with special flowcells of 30 microlitre volume and 10mm optical pathlength for liquid chromotography detection. Concentration calculation and wide scale expansion facilities make this a versatile instrument.
The CE292 spectrophotometer offers essentially the same facilities as the CE272 with all results displayed in digital form.

SPECTROPHOTOMETER, *CECIL* **CE202 System 1,** as specified, scaled linear in transmittance and non-linear in absorbance. Wavelength range 220 to 900nm. With deuterium and tungsten lamps, stabilised power supply for deuterium lamp, stabiliser for tungsten lamp, four-position cell slide, four cell holders with 10mm optical pathlength silica cells. Includes one each spare deuterium and tungsten lamps, spare fuses, dust cover and instructions manual. Fitted with 2·5m of mains cable. For single phase supplies.

SPT-410-010U	Spectrophotometer, 220–240V 50Hz	**£878·90**
SPT-410-030X	Spectrophotometer, 100–120V 60Hz	**£878·90**

SPECTROPHOTOMETER, *CECIL* **CE272 System 1,** as SPT-410 but scaled linear in absorbance, transmittance and concentration. Wavelength range 200 to 900nm. For single phase supplies.

SPT-430-010G	Spectrophotometer, 220–240V 50Hz	**£1098·90**
SPT-430-030A	Spectrophotometer, 110–120V 60Hz	**£1098·90**

SPECTROPHOTOMETER, *CECIL* **CE292 System 1,** as SPT-410 but with digital readout of absorbance, transmittance and concentration. For single phase supplies.

SPT-460-010Y	Spectrophotometer, 220–240V 50Hz	**£1284·80**
SPT-460-030C	Spectrophotometer, 110–120V 60Hz	**£1284·80**

SPARE PARTS

SPT-490-010K	Lamp, deuterium, 220–240V	**£31·68**
SPT-490-030E	Lamp, deuterium, 110–120V	**£31·68**
	Lamp, tungsten	*See SPT-320-010V and SPT-320-030P*

ACCESSORIES

Cells, silica, BS 3875 type 1A, 45mm high. The dimension given is the optical pathlength.

SPT-490-504Y	Cell, silica, 5mm	**£12·31**
SPT-490-508A	Cell, silica, 10mm	**£12·31**
SPT-490-512J	Cell, silica, 20mm	**£15·50**
SPT-490-516B	Cell, silica, 40mm	**£16·83**
SPT-490-542A	Microcell, silica, 10mm optical pathlength **Must be used with SPT-320-546D.**	**£12·87**
	Microcell, silica	
	Microcell holder	See SPT-320-546D
	Cells, glass	See SPT-320-504T
	Cell holder	See SPT-320-532X

Gallenkamp

CECIL CE212 VARIABLE WAVELENGTH UV MONITOR

220 to 400 nm

With a continuously variable wavelength range 220 to 400nm and can be used with a wide range of flowcells. A typical flowcell used for general monitoring has a 75µl volume and 10mm optical pathlength. For high resolution liquid chromatography, special cells of 10µl capacity with a 10mm optical pathlength are available. These are accurately located in the beam by means of a micrometer adjustment cell holder. Eight linear absorbance ranges are provided from 0–2 to 0–0·01 A full scale, making full use of the high stability and low noise level.

Wavelength accuracy	Better than 2nm
Stray light	0·5% at 220nm
Linear absorbance ranges	Eight from 0–2 to 0–0·01 A
Linear transmission ranges	0 to 100% and 0 to 10%
Zero stability	±0·1%
Absorbance zero stability	±0·001/h after warm up
Output	1V or 10mV linear in A or T
Noise level	±0·0002 Absorbance units

UV MONITOR, VARIABLE WAVELENGTH, *CECIL* **CE212,** range 220 to 400nm, as specified. With deuterium lamp, stabilised supply for deuterium lamp, hinged lid for cell compartment and instructions manual. Fitted with 2·5m of mains cable but **without** cells or holder. For single phase supplies.

SPT-630-010N UV monitor, 220–240V 50Hz **£980·10**
SPT-630-030H UV monitor, 110–120V 60Hz **£980·10**

SPARE PARTS

SPT-640-010G Lamp, deuterium, 220–240V **£42·68**
SPT-640-030A Lamp, deuterium, 110–120V **£42·68**

ACCESSORIES

Stream analysis flowcell outfit, silica, 10mm optical pathlength, 75µl capacity.
SPT-640-504E Stream analysis flowcell outfit **£65·45**

Continuous flowcell outfit, silica, 10mm optical pathlength, 10µl capacity, for liquid chromatography.
SPT-640-524V Continuous flowcell outfit **£92·95**

CECIL CE230 CELL PROGRAMME CONTROLLER AND CELL CHANGER

An accessory for use with any of the spectrophotometers in the CE303 or CE202 series listed whereby up to four 10mm optical pathlength cells may be introduced sequentially into the light beam for studies into reaction kinetics. The instrument has four operational modes, viz: manual, single cycle, repetitive cycle with delay up to 15min. Liquid from a thermostatically controlled source may be passed through the cell holder to keep the cells at constant temperature.

The cell changer must be factory installed.

CELL PROGRAMME CONTROLLER, *CECIL* **CE230,** as specified. Includes four-position cell changer, cell programme controller, four-position cell holder, cell compartment hinged lid and link mechanism to drive cell holder.

SPT-690-010R Cell programme controller, 230–250V 50Hz **£356·40**
SPT-690-030L Cell programme controller, 110–120V 60Hz **£356·40**

Gallenkamp LINEAR SCALE COLORIMETERS

Suitable for wide range of chemical and biochemical determinations



- **Range 540 to 670nm**
- **Choice of digital or meter readout**
- **Interchangeable filters**
- **Flowthrough cell accessory**
- **Recorder output**

See COL-400 et seq.

CECIL CE505 DOUBLE BEAM UNIFIED SPECTROPHOTOMETER SYSTEM

200 to 700 or 200 to 800nm

A versatile system for manual or automatic wavelength scanning, with seven options of readout, linear in concentration, absorbance or transmittance

- **Readout on meter or recorder**
- **Up to 20 times absorbance scale expansion**
- **Zero offset of ±1 absorbance unit**
- **Wide range of cells includes stream analysis cells**



SPT-840



Digital readout on SPT-880

CE505 SPECTROPHOTOMETER

Source: Deuterium lamp and tungsten filament lamp
Automatic filter selection

Range: 200 to 700nm or 200 to 800nm

Wavelength accuracy: Better than 1nm

Wavelength reproducibility: Better than ±0·25nm

Presentation: Meter readout scaled with three ranges

Photometric ranges: 0–2, 0–1, 0–0·5, 0–0·2, 0–0·1
Linear absorbance ranges
Linear concentration readout
Linear transmittance readout

Stray light: Less than 1% at 200nm

Automatic lamp changeover – basic but optional manual changeover

Beam balance: Typically better than ±0·005A throughout the range

Photometric accuracy: Better than ±1% of full scale on all ranges

Baseline reproducibility: Typically better than ±0·001 absorbance

Absorbance zero offset: ±1A continuously variable

Recorder and printer outputs: 10mV and 1V

Sample compartment: 283 × 130mm with sampling facility to accommodate micro sampling, programmed cell changer, gel scanner, etc.

CE500 CONTROL RECORD MODULE

Scan speeds: 0·25, 0·5, 1, 2·5, and 5nm/s

Wavelength scale expansion: 5, 10 and 20nm/cm

Scan lengths: 20, 50, 100, 200 and 300mm

Synchronised scan: Start wavelength set by key code switch

Scans: Single, sequential and superimposed selected by a switch

Fixed wavelength scan speeds: 1, 5, 20 and 60s/10mm

SPECTROPHOTOMETER, double beam, *CECIL* **CE505** range 200 to 700nm as specified, manual scanning, **without** test cells. For 110–240V 50–60Hz single phase supplies.
SPT-800-V Spectrophotometer CE505 **£2112·00**

SPECTROPHOTOMETER, double beam, *CECIL* **CE505 R** range 200 to 800nm as specified, manual scanning, **without** test cells. For 110–240V 50–60Hz single phase supplies.
SPT-820-H Spectrophotometer CE505 R **£2277·00**

SPECTROPHOTOMETER, double beam, *CECIL* **CE505 System 1** comprising CE505 LS automatic scanning spectrophotometer range 200 to 700nm, CE500 control record module, two 10mm silica cells, spare lamps, fuses and dust covers. For 110–240V 50–60Hz single phase supplies.
SPT-840-Q Spectrophotometer CE505 System 1 **£3236·20**

SPECTROPHOTOMETER, double beam, *CECIL* **CE505 R System 1** comprising CE505 RLS automatic scanning spectrophotometer range 200 to 800nm, CE500 control record module, two 10mm silica cells, spare lamps, fuses and dust covers. For 110–240V 50–60Hz single phase supplies.
SPT-860-C Spectrophotometer CE505 R System 1 **£3401·20**

SPECTROPHOTOMETER, double beam, *CECIL* **CE595 R System 1** as SPT-860-C but with digital readout instead of meter readout on the basic spectrophotometer. For 110–240V 50–60Hz single phase supplies.
SPT-880-L Spectrophotometer CE595 R System 1 **£3676·20**

SPECTROSCOPES


SRW-300

SPECTROSCOPE, *GRIFFIN*, **direct vision,** for student use, comprising lightweight metal cylinder 116mm long × 25mm diameter with 0·25mm off-axis slit and eyepiece incorporating diffraction grating and plano-convex plastics lens. Enables first, second and third order spectra to be seen. Complete with two 0·7ml square section solution tubes and instructions.

SRW-300-J Spectroscope **£3·56**

SPARE PARTS

SRW-320-010P Solution tubes Pack of 25 **£1·29**


SRW-370

SPECTROSCOPE, direct vision, to produce a spectrum dispersed through 11° of arc. The sodium D lines 589·0 and 589·6nm are clearly separated and Fraunhofer lines are visible. Polished metal tube 80mm long × 19mm diameter with glass-covered fixed slit and adjustable drawtube, in case. (F)

SRW-370-G Spectroscope **£18·00**


SRW-410

SPECTROSCOPE, *EALING*, **wavelength,** prism, for taking direct wavelength readings and having a dispersion of 10°. Scale reading is viewed in the same field as the spectrum, each division of the scale representing 10nm. With adjustable slit and focusing control. The scale position in relation to the spectrum is also adjustable. Overall length approximately 90mm. With case.

SRW-410-R Spectroscope **£132·00**

SPECIFIC GRAVITY *See Density and Hydrometers*
SPECIMEN bottles *See Bottles*
SPECIMEN boxes *See Boxes*
SPECIMEN jars *See Jars*
SPECIMEN tubes *See Tubes*
SPECTACLES *See Safety*

REVERSION SPECTROSCOPE

For spectroscopic examination of haemoglobin and measurement of carboxyhaemoglobin in blood


SRW-600

The reversion method ensures great accuracy in setting. One spectrum moves across another so that an absorption band or emission line in one can be set to coincide with the same band, or line, in the other. Readings are taken on a graduated drum with 100 divisions in steps of 1Å. An index scale has divisions representing one drum revolution. Scale range 3000 to 7000Å. The slit is symmetrical and the width is controlled by the rotation of a graduated ring. A cylindrical condensing lens concentrates the light so that the slit aperture is filled.

SPECTROSCOPE OUTFIT, *EALING*, **Hartridge Reversion,** comprising spectroscope, stand with lamp, holders for glass troughs and test tubes, troughs 5 and 10mm, baffle plate and case. For 200–240V a.c. single phase supplies.

SRW-600-Y Spectroscope outfit **£357·50**

BURETTE AND FUNNEL STANDS

BURETTE AND FUNNEL STANDS, hardwood, with interchangeable components. Single type bases are 205 × 110mm and double type are 290 × 110mm, all are fitted with rubber feet. Rods are 460mm high × 16mm diameter. Burette clamps have lined jaws and funnel holders are slotted for ease of funnel entry, all are fitted with a plastics screw.

STA-200-010F	Burette stand, single	£3·79
STA-200-020C	Burette stand, double	£4·44
STA-200-060N	Funnel stand, single	£3·76
STA-200-070K	Funnel stand, double	£4·34
STA-200-130S	Burette/Funnel stand	£4·07

SPARE PARTS

STA-220-010X	Burette clamp, single	£1·65
STA-220-020L	Burette clamp, double	£2·36
STA-220-060W	Funnel clamp, single	£1·50
STA-220-070T	Funnel clamp, double	£1·96
STA-220-130E	Burette/Funnel clamp	£2·16



STA-200-010



STA-200-020

SLOTTED BASE

SLOTTED BASE, to support flat objects such as boards, manometers, etc., up to 34mm thick in the vertical position and for general laboratory use. Cast metal, finished in acid-resistant paint, with jaws 40mm high and fitted with thumbscrew. Dimensions of base 95 × 75mm, mass 1·4kg.

STA-400-P Slotted base — Pack of 4 **£8·39**



STA-400

RETORT STANDS

All dimensions quoted are nominal

BASES

RETORT STAND BASES, iron, with stoved enamel finish. Threaded M10 × 1·5. The dimensions given are length × width.

STA-440-030B	Retort stand base, 160 × 100mm	£1·04
STA-440-050S	Retort stand base, 200 × 125mm	£1·52
STA-440-070M	Retort stand base, 250 × 160mm	£1·89
STA-440-090G	Retort stand base, 315 × 200mm	£3·15

RETORT STAND BASES, iron, with white stoved resin finish. Threaded M10 × 1·5. The dimensions given are length × width.

STA-470-030D	Retort stand base, 160 × 100mm	£1·52
STA-470-050U	Retort stand base, 200 × 125mm	£1·89
STA-470-070X	Retort stand base, 250 × 160mm	£2·30
STA-470-090Y	Retort stand base, 315 × 200mm	£3·87

RETORT or BURETTE STAND BASE, double, iron, with white stoved resin finish, 280 × 125mm, with central hole threaded M10 × 1·5.

STA-520-Q Retort or burette stand base — £3·87



STA-440 with rod



STA-520 with rod

Gallenkamp



STA-570



STA-650

RETORT STAND BASES, A-shape, iron, with stoved enamel finish. Shape enables like sizes to be nested. With hole part threaded M10 × 1·5 for threaded rods and fitted with thumbscrew to accept plain rods up to 13 mm diameter. The dimension given is the distance apart of the feet.

STA-570-030S	Retort stand base, 180 mm	**£2·90**
STA-570-050M	Retort stand base, 230 mm	**£3·63**

RETORT STAND BASES, tripod shape, iron, with corrosion resistant finish. Threaded M10 × 1·5. The dimension given is the spread of the feet from the centre.

STA-610-010M	Retort stand base, 110 mm	**£1·01**
STA-610-030G	Retort stand base, 140 mm	**£1·58**
STA-610-050A	Retort stand base, 165 mm	**£2·21**



STA-610 with rod

RETORT STAND BASE, *GRIFFIN*, heavy cast metal, 58 × 58 × 45 mm high, with pear-shaped axial hole with thumbscrew to support vertical rod up to 13 mm diameter and with two slots at right angles on underside to fit over a rule up to 27 mm wide.

STA-650-K	Retort stand base	**£1·49**

RODS

Threaded M10 × 1·5

RETORT STAND RODS, cadmium plated mild steel.

STA-800-030U	Retort stand rod, 500 × 10 mm	**£0·63**
STA-800-050X	Retort stand rod, 600 × 10 mm	**£0·68**
STA-800-070Y	Retort stand rod, 750 × 12 mm	**£1·04**
STA-800-090C	Retort stand rod, 1000 × 12 mm	**£1·24**

RETORT STAND RODS, bright aluminium alloy.

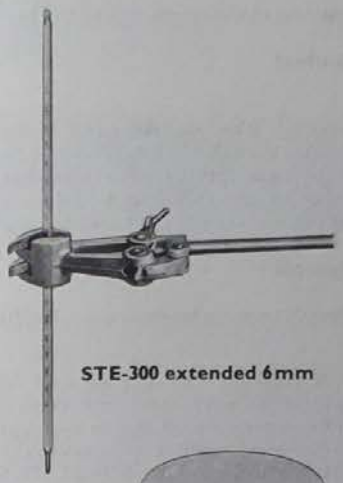
STA-830-030W	Retort stand rod, 500 × 12 mm	**£0·65**
STA-830-050Q	Retort stand rod, 600 × 12 mm	**£0·70**
STA-830-070K	Retort stand rod, 750 × 12 mm	**£0·82**
STA-830-090E	Retort stand rod, 1000 × 12 mm	**£1·01**

RETORT STAND RODS, bright stainless steel.

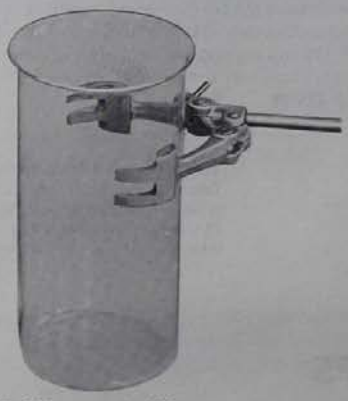
STA-860-030B	Retort stand rod, 500 × 10 mm	**£1·81**
STA-860-050S	Retort stand rod, 600 × 10 mm	**£2·13**
STA-860-070M	Retort stand rod, 750 × 12 mm	**£3·83**
STA-860-090G	Retort stand rod, 1000 × 12 mm	**£4·79**

Rod and Tubing, aluminium alloy, plain, 13 mm diameter
See STH-710 and STH-740

Technico CLAMP AND BOSSHEAD

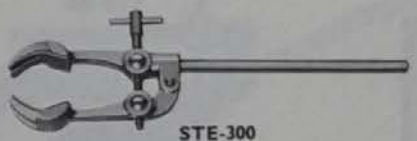


STE-300 extended 6mm



STE-300 extended 90mm

- No iron parts to rust
- Clamp accepts articles from 2 to 90mm diameter
- Well secured cork jaw-liners
- Bosshead takes rods up to 16mm diameter in each jaw



STE-300



STE-330

CLAMP, RETORT STAND, *TECHNICO*, enables articles from 2 to 90mm diameter to be clamped securely. Comprises alloy pressure diecastings with other parts of plated brass. The design of the jaw ensures a firm grip at all angles of opening. The cork liners for the jaws are well secured. With 8mm diameter rod suitable for use in bossheads STE-330-Y, STE-480-L and STE-520-W.

STE-300-010D Clamp **£1·54**
STE-300-012W Clamps Pack of 10 **£14·02**

BOSSHEAD, *TECHNICO*, with offset jaws for great strength. Comprises alloy pressure diecasting with clamping screws of plated brass. The vee-grooves in the body are true and give a firm grip in either jaw on rods up to 16mm diameter.

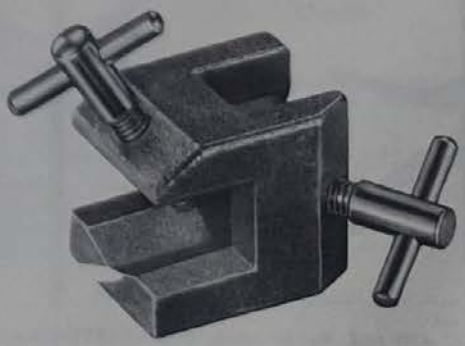
STE-330-010F Bosshead **£0·91**
STE-330-012B Bossheads Pack of 10 **£7·61**

Griffin MULTIPURPOSE BOSSHEAD

- Accepts rods up to 16mm diameter
- Accepts square-section rods or boards up to 16mm
- Will connect rods in line

BOSSHEAD, *GRIFFIN*, multipurpose, square-section aluminium alloy diecasting fitted with plated screws with tommy bars. Two rectangular slots at right angles accommodate square and circular section rods and tubes up to 16mm across. Will also allow rods to be attached to table edges and boards up to 16mm thick.

STE-410-X Bosshead **£1·35**



BOSSHEADS



STE-450

BOSSHEAD, aluminium alloy, accepts rods up to 19mm in each jaw.

STE-450-J Bosshead **£1·33**

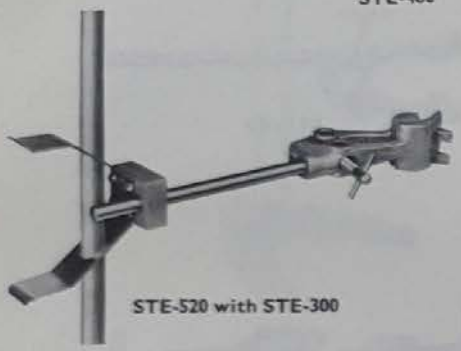


STE-480

BOSSHEAD, aluminium alloy, to take range of clamps and support plates STE-300-G and STE-970-B to STF-410 and rings STF-490-R and STF-520. The jaw accepts rods up to 16mm diameter and the bosshead is drilled to take rods from 6 to 8mm diameter, secured by a socket headed screw at right angles to the support rod.

STE-480-L Bosshead **£0·66**

Wrench, for socket headed screws *See STH-270-518L*



STE-520 with STE-300

BOSSHEAD, quick release, with stainless steel leaf spring clamp which grips a 13mm diameter support rod. When the spring clamp is held under finger pressure, the grip on the support rod is released and the position of the bosshead may easily be altered. The bosshead accepts STE-300-G, STE-970-B to STF-410, STF-490-R and STF-520 and any rod from 6 to 8mm diameter at right angles to the support rod, secured by a socket headed screw.

STE-520-W Bosshead **£3·68**

Wrench, for socket headed screws *See STH-270-518L*

Two-way connector, LABLOX, for fixing two rods or tubes mutually at right angles *See STH-250-S*

Three-way connector, LABLOX, for fixing three rods or tubes mutually at right angles *See STH-310-P*

CLAMPS



STE-660

CLAMP, for supporting beakers up to 5 litres capacity. Cadmium plated iron, with asbestos covered rod jaws, opening up to 180mm maximum. The 9·5mm diameter horizontal support rod is offset so that large vessels are secured in line with the axis of the vertical support rod.

STE-660-J Clamp **£5·32**



STE-690

CLAMPS, for supporting burettes. Comprises two polythene coated spring clips mounted 50mm apart on a plate attached to a rod 150×8mm diameter, to fit bossheads STE-330-Y, STE-480-L and STE-520-W.

Clip size, mm	6	10	13
For burette, ml	1 and 2	5 and 10	25 and 50
STE-690-030C	Clamp, 6mm		**£0·75**
STE-690-050T	Clamp, 10mm		**£0·75**
STE-690-070N	Clamp, 13mm		**£0·75**



STE-740 with rod



STE-770 with rod

CLAMPS, for supporting 50ml burettes. One-piece acetal resin, which accepts one burette and can be mounted on a vertical rod 12·5 to 13mm diameter.

STE-740-P Clamps Pack of 10 **£4·59**

CLAMP, *GALLENKAMP,* for supporting two burettes providing a positive grip and release. The burettes are held firmly in rubber-lined jaws without obscuring the graduations. The offset mounting of the spring-loaded clamp arms prevents downward motion through the clamp. A single thumbscrew secures the clamp to rods of nominal 13mm diameter which may be vertical or horizontal.

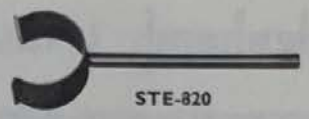
STE-770-R Clamp **£2·51**

SPARE PARTS

STE-780-010H Rubber cushions Pack of 10 **£0·28**

CLAMPS, for supporting condensers, etc. Comprises spring clip attached to a rod 115 × 8mm diameter, to fit bossheads STE-330-Y, STE-480-L and STE-520-W.

STE-820-030M	Clamp, 20mm dia.	**£0·59**
STE-820-050G	Clamp, 35mm dia.	**£0·70**
STE-820-070A	Clamp, 40mm dia.	**£0·73**


STE-820

CLAMP, for supporting two electrodes and a thermometer or other groups of similar glass apparatus of small diameters. Comprises one each polythene coated spring clips, 6, 10 and 13mm diameter mounted 15mm apart on a plate attached to a rod 150 × 8mm diameter to fit bossheads STE-330-Y, STE-480-L and STE-520-W.

STE-850-A	Clamp	**£0·80**


STE-850

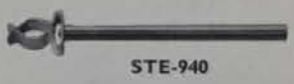
CLAMP, for supporting *QUICKFIT* reaction vessels having wide necks and flat flange joints. Cadmium plated iron, with asbestos fabric covered jaws opening up to 180mm maximum. Supplied with two interchangeable offset support rods, one for use with vessels up to 5 litres capacity and the other with 10 and 20 litre reaction vessels. The 9·5mm diameter rods are secured by socket headed screws for which a wrench is provided.

STE-890-S	Clamp	**£5·32**


STE-890

CLAMPS, for supporting semi-micro apparatus and glass tubing. Comprises polythene coated spring clip attached to a rod 115 × 8mm diameter to fit bossheads STE-330-Y, STE-480-L and STE-520-W.

STE-940-030N	Clamp, 7mm dia.	**£0·70**
STE-940-050H	Clamp, 13mm dia.	**£0·70**
STE-940-070B	Clamp, 20mm dia.	**£0·73**


STE-940

CLAMP, for supporting semi-micro apparatus and glass tubing. Stainless steel, with three-pronged rubber sleeved jaws and 6mm diameter rod. The sliding hinge permits the clamp to grip apparatus up to 40mm diameter.

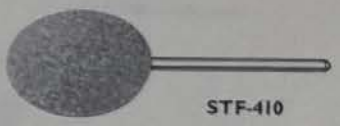
STE-970-B	Clamp	**£5·03**


STE-970

PLATES

SUPPORT PLATES, iron, with rod.

Diameter, mm	75	100
Rod length × dia., mm	115 × 8	125 × 11
STF-410-030S Support plate, 75mm		**£0·97**
STF-410-050M Support plate, 100mm		**£1·38**


STF-410

RINGS

RING, open, vinyl covered, internal diameter 35mm with rod 130 × 8mm diameter to fit bossheads STE-330-Y, STE-480-L and STE-520-W.

STF-490-R	Ring	**£0·97**


STF-490

RINGS, closed, plated mild steel with 8mm diameter stem. To fit bossheads STE-330-Y, STE-480-L and STE-520-W.

Internal dia., mm	50	70	100	130	160
Stem length, mm	140	125	115	100	90
STF-520-010J Ring, 50mm					**£0·46**
STF-520-030D Ring, 70mm					**£0·59**
STF-520-050U Ring, 100mm					**£0·61**
STF-520-070X Ring, 130mm					**£0·63**
STF-520-090Y Ring, 160mm					**£0·65**


STF-520


STF-550

RINGS, closed, as STF-520 but with integral bosshead to accept rods from 8 to 12·5mm diameter.

Internal dia., mm	50	75	100	130
Centre to centre distance, mm	90	95	105	120
STF-550-010L Ring, 50mm				**£1·23**
STF-550-030F Ring, 75mm				**£1·61**
STF-550-050W Ring, 100mm				**£1·79**
STF-550-070Q Ring, 130mm				**£2·28**

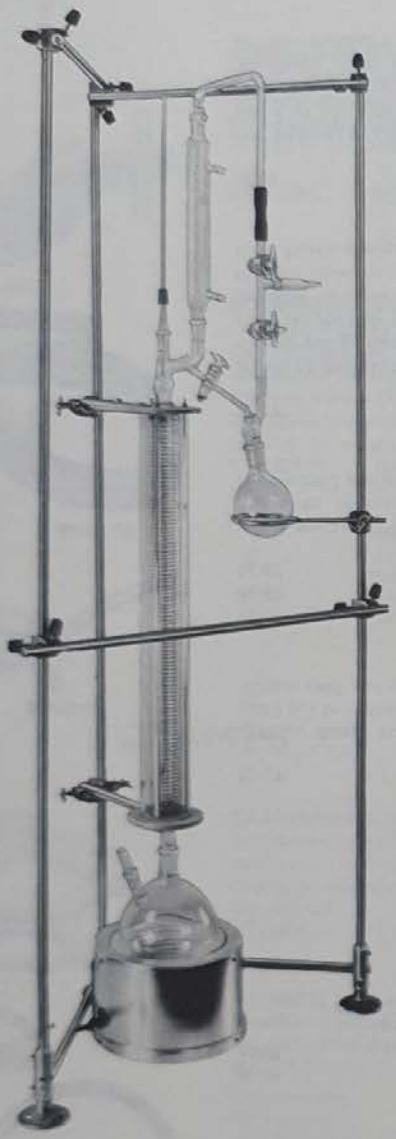
Asbestos yarn, for wrapping retort stand rings See ASB-570

Cork rings for supporting flasks, etc. See CSD-340

Gallenkamp

Gallenkamp LABLOX SCAFFOLDING

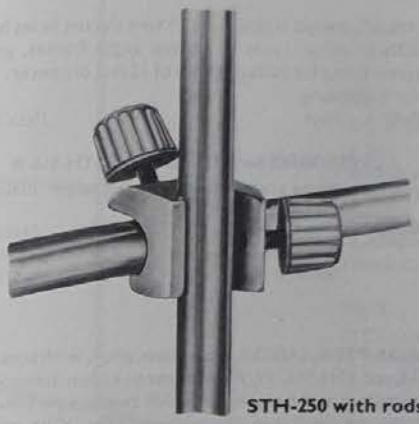
A series of versatile components for assembling rigid scaffolding supports for laboratory and pilot plant use



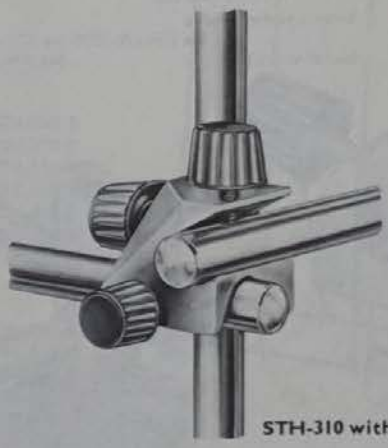
- Lightweight, strong, rigid scaffolding easily assembled using rods or tubing
- Infinite variety of assembly shapes and dimensions
- Floor, bench and wall mounting facilities
- Components are aluminium or zinc based alloy
- Simple thumbscrew or socket headed screw fixing
- Versatile swivels and connectors for difficult mountings
- Connectors accept rod and tubing from 6 to 13mm diameter and standard retort clamps
- Skew orientation of individual rods or tubes easily achieved
- Flexible tubings and wires kept neatly in place by clipping along rods or run through tubes
- Connectors and brackets available for mounting instruments or brackets directly on scaffolding

Gallenkamp LABLOX SCAFFOLDING COMPONENTS

In diecast aluminium alloy except where otherwise specified



STH-250 with rods



STH-310 with rods

CONNECTOR, two-way, *LABLOX*, with thumbscrews for hand tightening. Used for fixing two rods or tubes mutually at right angles. Accepts rods or tubes from 6 to 13mm diameter.

STH-250-S Connector, 2-way **£0·26**

ACCESSORIES

Screws, socket headed to replace thumbscrews. Suitable for use with rods or tubes of 13mm diameter.

STH-270-502D Screws Pack of 10 **£0·23**

Screws, socket headed as STH-270-502D but for use with rods or tubes of 6mm diameter.

STH-270-506S Screws Pack of 10 **£0·38**

Socket wrench, 2·5mm A/F, for tightening STH-270-502D and STH-270-506S.

STH-270-518L Socket wrench Pack of 10 **£0·46**

Swivel adapter *See STH-410-H*



STH-340 with rods

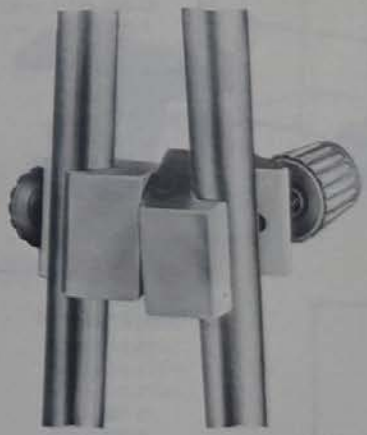
CONNECTOR, three-way, *LABLOX*, as STH-250-S but for fixing three rods or tubes mutually at right angles. Accepts rods or tubes from 6 to 13mm diameter.

STH-310-P Connector, 3-way **£0·36**

ACCESSORIES

Screws, socket headed *See STH-270-502D and STH-270-506S*

Socket wrench *See STH-270-518L*



STH-360 with rods

CONNECTOR, in-line, *LABLOX*, with socket headed screw. For butt-joining two lengths of rod or tube end-to-end. Accepts rods or tubes from 6 to 13mm diameter. Includes one 4mm A/F socket wrench.

STH-340-R Connector, in-line **£0·36**

CONNECTOR, swivel, two-way, *LABLOX*, with thumbscrews for hand tightening. For holding two rods or tubes at any angle to each other. The two components are restrained from swivelling freely by an intermediate tension washer. Accepts rods or tubes from 6 to 13mm diameter.

STH-360-D Connector, swivel, 2-way **£0·68**

CONNECTOR, plane swivel, *LABLOX*, with steel strap, with thumbscrews for hand tightening. For connecting two rods or tubes which converge at any angle. Suitable for making triangular or square frames for supporting large flanged items such as heating mantles, funnels, etc. Accepts rods or tubes from 6 to 13mm diameter.

STH-390-F Connector, plane swivel **£0·36**



STH-390 with rods

ADAPTER, swivel, *LABLOX*, with thumbscrew for hand tightening. Enables connector STH-390-F to be used as swivel connector which can be clamped at any required angle for various applications including diagonal bracing.

STH-410-H Adapter **£0·50**

ACCESSORIES

Screws, socket headed — *See STH-270-502D and STH-270-506S*

Socket wrench — *See STH-270-518L*



STH-410



STH-480 with STH-640 and rods



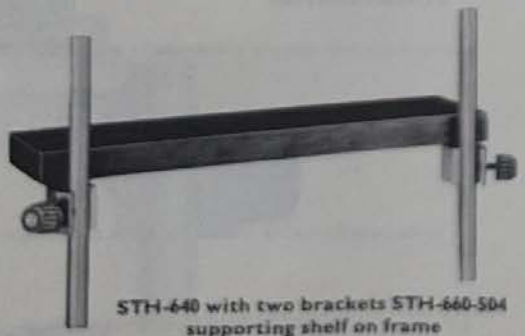
STH-510



STH-610 with rod



STH-640 supporting instrument case



STH-640 with two brackets STH-660-504 supporting shelf on frame

FEET, *LABLOX*, with three countersunk holes for screwing foot to bench, floor or wall, and socket headed screw fixing for rods or tubes of 13mm diameter. With one wrench for tightening.

STH-480-E Feet — Pack of 4 **£1·35**

FEET, *LABLOX*, diecast zinc alloy with two slotted holes for bolting to DEXION or other types of slotted angle frames, and socket headed screw fixing for rods or tubes of 13mm diameter. With one wrench for tightening.

STH-510-W Feet — Pack of 4 **£0·82**

ACCESSORIES for STH-480-E and STH-510-W

Wood screws, stainless steel, length 20mm. For use with STH-480-E.

STH-530-502H Wood screws — Pack of 12 **£0·34**

Screws, socket headed — *See STH-270-502D*

Socket wrench — *See STH-270-518L*

FOOT ADAPTER, *LABLOX*, aluminium alloy, with boss to fit feet STH-480-E and STH-510-W. Accepts three 13mm diameter rods or tubes mutually at right angles, of which two are perpendicular to the boss and the third is in line with the boss. With socket head screw fixings for rods or tubes. With one wrench for tightening.

STH-550-R Foot adapter **£1·06**

ACCESSORIES

Screws, socket headed — *See STH-270-502D*

Socket wrench — *See STH-270-518L*

G-CLAMP, *LABLOX*, enamelled cast iron, for clamping to edge of bench. With socket headed screw fixing for rods or tubes of 13mm diameter. With one wrench for tightening.

STH-610-X G-clamp **£4·61**

CONNECTOR, accessory, *LABLOX*, with thumbscrew for hand tightening. With two holes for fixing instrument cases, control panels, brackets, safety screens, etc. to scaffold framework by means of two self-tapping screws supplied. A central 6mm diameter fixing hole is also provided. Can be mounted on rods or tubes from 6 to 13mm diameter.

STH-640-Q Connector **£0·42**

ACCESSORIES

Brackets, for fixing to STH-640-Q. Can be assembled for horizontal or vertical fixing. With drilled holes 20mm apart.

STH-660-504U Brackets — Pair **£0·26**

Screws, socket headed — *See STH-270-502D and STH-270-506S*

Socket wrench — *See STH-270-518L*

RODS, aluminium alloy, approximately 13mm diameter.

STH-710-030U	Rod, 100mm long	**£0·32**
STH-710-050X	Rod, 200mm long	**£0·42**
STH-710-070Y	Rod, 400mm long	**£0·61**
STH-710-090C	Rod, 600mm long	**£0·84**
STH-710-110W	Rod, 900mm long	**£1·22**
STH-710-130Q	Rod, 1200mm long	**£1·60**
STH-710-150K	Rod, 1800mm long	**£2·25**

TUBES, aluminium alloy, approximately 13mm diameter, without end plugs.

STH-740-070K	Tubes, 1m long	**£0·68**
STH-740-130S	Tubes, 2m long	**£1·31**

ACCESSORIES

STH-770-502J	Tube cutter	**£2·64**
STH-770-516V	End plugs, nylon	Pack of 10 **£0·14**

TYPICAL LABLOX SCAFFOLDING ASSEMBLIES

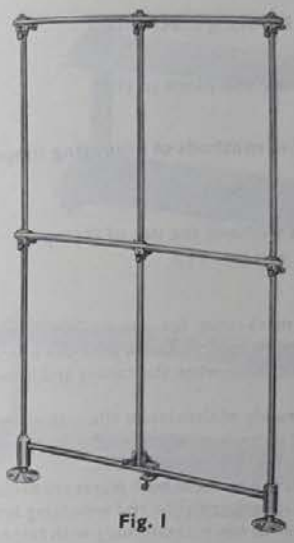


Fig. 1

Fig. 1

6 Connectors, 2-way. ...	STH-250-S
1 Swivel connector, plane	STH-390-F
3 Rods 600mm	STH-710-090C
3 Rods 900mm	STH-710-110W
2 Feet	STH-480-E
2 Adapters..	STH-550-R

Wood screws STH-530-502H also required

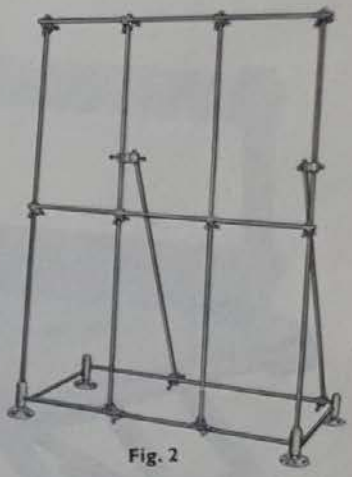


Fig. 2

Fig. 2

10 Connectors, 2-way. ...	STH-250-S
2 Swivel connectors, 2-way	STH-360-D
2 Swivel connectors, plane	STH-390-F
2 Rods 400mm	STH-710-070Y
6 Rods 900mm	STH-710-110W
4 Rods 1200mm.	STH-710-130Q
4 Feet	STH-480-E
4 Adapters..	STH-550-R



Fig. 3

Fig. 3

12 Connectors, 2-way. ...	STH-250-S
4 Connectors, 3-way. ...	STH-310-P
4 Swivel connectors, 2-way	STH-360-D
4 Rods 400mm	STH-710-070Y
2 Rods 900mm	STH-710-110W
8 Rods 1200mm.	STH-710-130Q
4 Feet	STH-480-E

Wood screws STH-530-502H also required



Fig. 4

Fig. 4

18 Connectors, 2-way. ...	STH-250-S
10 Swivel connectors, 2-way	STH-360-D
1 Swivel connector, plane	STH-390-F
4 Rods 600mm	STH-710-090C
1 Rod 900mm	STH-710-110W
5 Rods 1200mm.	STH-710-130Q
9 Rods 1800mm.	STH-710-150K
6 Feet	STH-480-E
6 Adapters..	STH-550-R



Fig. 5

Fig. 5

9 Connectors, 2-way. ...	STH-250-S
4 Swivel connectors, 2-way	STH-360-D
1 Swivel connector, plane	STH-390-F
1 Clamp	STH-610-X
1 Rod 100mm	STH-710-030U
4 Rods 600mm	STH-710-090C
2 Rods 900mm	STH-710-110W
3 Rods 1800mm.	STH-710-150K
3 Feet	STH-480-E
3 Adapters..	STH-550-R

Wood screws STH-530-502H also required



Fig. 6

Fig. 6

4 Connectors, 2-way. ...	STH-250-S
1 Connector, 3-way	STH-310-P
4 Rods 400mm	STH-710-070Y
1 Rod 600mm	STH-710-090C
3 Rods 1200mm.	STH-710-130Q
3 Feet	STH-480-E
3 Adapters..	STH-550-R

Gallenkamp

Gallenkamp LABORATORY JACK

- **Smooth raising and lowering mechanism**
- **Negligible tendency for top plate to tilt**
- **Two useful alternative methods of mounting support rod**
- **Rigid in all positions without the use of clamping screws**



STK-220

The laboratory jack has many uses for raising and lowering equipment with smooth precise control. It also provides a variable height platform for apparatus even when the raising and lowering facility is not required.

The jack is constructed mainly of aluminium alloy; all rivets are rust resistant and the lifting screw is stainless steel. A large plastics knob operates the scissor action lifting mechanism.

Either plate can be used as the base and both plates are drilled to accept a 13mm diameter support rod. The rod mounting system allows the support rod either to remain stationary with respect to the bench or to move up and down with the top plate.

Minimum height of top plate	50mm from bench
Maximum height of top plate	270mm from bench
Maximum load	25kg between heights 100 and 270mm 10kg between heights 50 and 100mm
Plate dimensions	170 × 160mm

LABORATORY JACK, *GALLENKAMP*, as specified, with scissor action mechanism, drilled plates and components for mounting a 13mm diameter support rod. **Without** support rod.

STK-220-J Laboratory jack **£12·94**

ACCESSORIES

Support rods *See STA-800, STA-830 and STA-860*

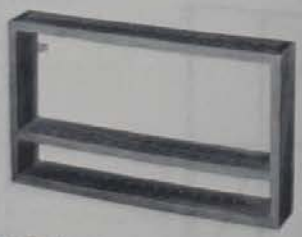
PIPETTE STANDS



STK-310



STK-340



STK-380

PIPETTE STAND, hardwood, to hold 12 pipettes horizontally, six on either side.

STK-310Y Pipette stand **£3·04**

PIPETTE STAND, to hold 28 pipettes vertically. Comprises polypropylene support, cadmium plated rod and iron tripod base. The height of the support on the rod is adjustable.

STK-340K Pipette stand **£9·74**

PIPETTE RACK, hardwood, for wall fixing. To hold fourteen 10ml and twelve 25ml pipettes. Overall dimensions 460 × 76 × 270mm high.

STK-380-F Pipette rack **£11·61**

TEST TUBE STANDS



STK-440-030



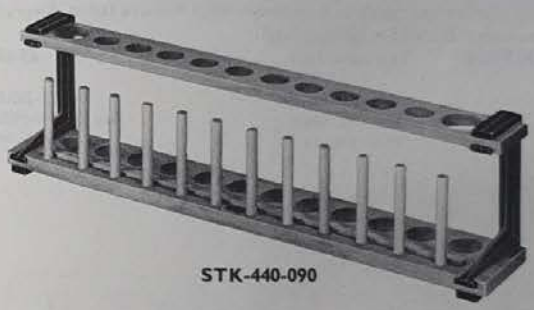
STK-440-110



STK-440-070



STK-480



STK-440-090

TEST TUBE RACKS, hardwood, single row, pack flat type comprising hardwood top and bottom members with moulded polypropylene supports which clip into position. Occupy only about one-third of the space required by a conventional rack when dismantled for packing or storage.

Pattern	A	B	C	D	E
No. of 22mm holes	4	4	10	10	–
No. of 32mm holes	2	2	2	2	6
No. of pegs	–	6	–	12	–

STK-440-030Q	Test tube rack, pattern A	**£1·15**
STK-440-050K	Test tube rack, pattern B	**£1·79**
STK-440-070E	Test tube rack, pattern C	**£1·68**
STK-440-090V	Test tube rack, pattern D	**£2·84**
STK-440-110S	Test tube rack, pattern E	**£2·08**

TEST TUBE RACKS, Nuffield pattern, hardwood block 170 × 60 × 30mm high, with six holes for 16mm diameter tubes and four holes for 25mm diameter tubes.

STK-480-U	Test tube racks	Pack of 6 **£7·09**

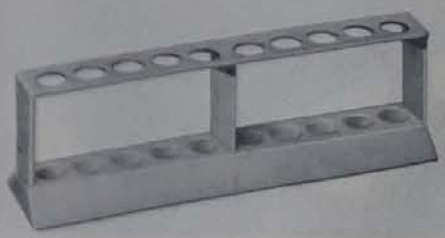


STK-530

TEST TUBE RACKS, rigid polythene, hold test tubes securely yet give good all-round visibility. (F)

For tubes, dia., mm	10	13	19
No. of tube places	13	10	8

STK-530-030P	Test tube rack, 10mm	**£1·21**
STK-530-050J	Test tube rack, 13mm	**£1·21**
STK-530-070D	Test tube rack, 19mm	**£1·21**



STK-560

TEST TUBE RACK, rigid polythene, with ten 19mm diameter holes. (F)

STK-560-D	Test tube rack	**£1·43**



STK-590

TEST TUBE RACK, rigid polythene, with twelve 20mm diameter holes in two rows and five 11mm diameter draining pegs.

STK-590-F	Test tube rack	**£2·59**

TEST TUBE RACKS, nylon coated steel wire. Will withstand steam sterilisation up to 120°C. Minimum tube length 50mm for STK-640-030A and 100mm for remainder.

Pattern	A	B	C	D	E
For tubes, dia., mm	10 to 14	13 to 18	13 to 18	13 to 21	13 to 21
No. of tube places	36	12	24	18	36

STK-640-030A	Test tube rack, pattern A	**£2·03**
STK-640-050R	Test tube rack, pattern B	**£1·22**
STK-640-070L	Test tube rack, pattern C	**£1·45**
STK-640-090F	Test tube rack, pattern D	**£1·45**
STK-640-110C	Test tube rack, pattern E	**£2·18**



STK-640

TEST TUBE RACK, aluminium, stackable Z-pattern with five 28mm, six 19mm and eight 13mm diameter holes arranged in three rows.

STK-680-E	Test tube rack	**£1·65**

TEST TUBE RACK, Kahn, *GALLENKAMP*, stainless steel, with 30 holes 14mm diameter to take Kahn or culture tubes which are held in position by wire springs. May be used in shaking machines for Kahn tests or vertically in incubators with culture tubes. Overall dimensions 275 × 75 × 100mm high.

STK-740-B	Test tube rack	**£5·63**

Kahn rack shaker — *See SGL-200-S*
Kahn test tubes — *See TES-240-090S*
Water bath racks — *See Baths*



STK-680



STK-740



BOTTLE RACK, for Winchester pattern bottles — *See FXS-514-A*

STERILISING RACK, for McCartney bottles — *See SVF-680J*

WATER BATH RACKS, for test tubes — *See BKA-360-030W*

TRIPOD STANDS

TRIPOD STAND, triangular top, low form. Length of side 127mm, height 150mm.

STK-880-L	Tripod stand	**£1·29**

TRIPOD STANDS, triangular top, cast iron, with splayed steel legs. Height 210mm.

STK-910-030U	Tripod stand, 120mm side	**£1·46**
STK-910-050X	Tripod stand, 150mm side	**£2·55**

TRIPOD STANDS, circular top, cast iron, with splayed steel legs. Height 210mm.

STK-940-030W	Tripod stand, 120mm i.d.	**£1·71**
STK-940-070K	Tripod stand, 180mm i.d.	**£3·38**

Gauzes	*See GMZ-300*
Wire triangles	*See TRT-300 and TRT-350*
Bottle stands	*See HJL-200-C and FXS-514-A*
Gas cylinder stands	*See GGM-760*
Oven and incubator stands	*See OVH-700-Q and OVH-740-L*
Nessler tube stands	*See COH-800*
Titration stands	*See TLB-300 to TLB-330*
Westergren tube stand	*See CMV-280-L*



STK-910

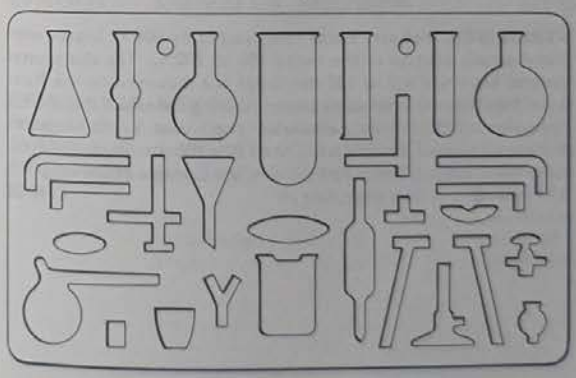


STK-880



STK-940

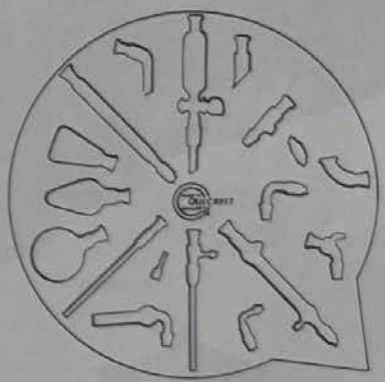
STENCILS



STX-200

STENCILS, chemistry, transparent plastics, 117 × 190mm.

STX-200-Y	Stencils	Pack of 5 **£1·19**



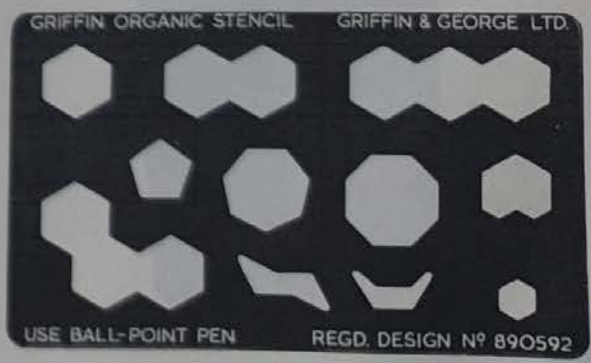
STX-280

STENCIL, *QUICKFIT,* **chemistry,** transparent plastics sheet, 150mm diameter with 18 precision-cut figures, enabling neat drawings of QUICKFIT joint apparatus to be made quickly.

STX-280-V	Stencil	**£0·61**

STENCIL, *GRIFFIN,* **organic chemical** structural formulae. Transparent plastics sheet, approximately 130 × 75mm, with 11 figures, cut to suit standard typewriter spacing and representing: the benzene nucleus (in both single and double typewriter spacing); the condensed ring systems naphthalene, anthracene and phenanthrene; five-, seven- and eight-membered ring systems; a heterocyclic six-membered ring system (a hexagon with two half-length sides); and the chair and boat forms of cyclohexane. Guide lines are ruled on the underside of the stencil.

STX-360-E	Stencil	**£1·15**

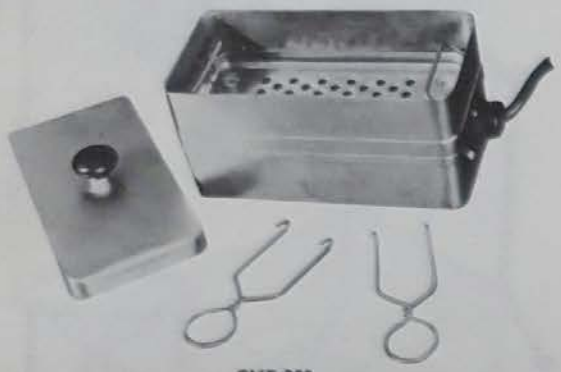


STX-360

Gallenkamp

STERILISERS

BOILING WATER, STEAM AND HOT AIR STERILISERS



SVF-300

STERILISER, boiling water, electrically heated by 300 W heating element having automatic safety cutout designed to operate if the bath boils dry. With removable perforated tray, tray lifters and cover. Bath dimensions 190 × 85 × 50 mm deep; overall dimensions 200 × 90 × 100 mm. For 230–250 V a.c. single phase supplies.

SVF-300-U Steriliser, boiling water **£53·83**

STERILISER, boiling water, electrically heated by 1200 W heating element having an automatic cutout designed to operate if the bath boils dry. The bath is chromium plated and the outer case is steel finished with grained PVC. With hinged lid, tray, lever-operated tray lifting mechanism and insulated handles. Bath dimensions 350 × 160 × 125 mm deep; overall dimensions 460 × 170 × 220 mm. For 230–250 V a.c. single phase supplies.

SVF-340-P Steriliser, boiling water **£175·50**



SVF-340

STERILISER, steam, Koch pattern, electrically heated by 1500 W double loop tubular immersion heater with connector designed to operate if the bath boils dry. The internal surfaces and two removable perforated shelves are of tinned copper and the external surfaces and cover are of copper and hardboard with a stoved enamel finish. Mounted on four feet, with filling trough and a cover fitted with lifting handles and 25 mm diameter thermometer tubulure. Internal dimensions 300 × 300 × 400 mm deep; overall dimensions 330 × 420 × 710 mm high. For 220–240 V a.c. single phase supplies.

SVF-400-M Steriliser, steam **£129·13**

STERILISER, hot air, electrically heated by 900 W heater with thermostatic control in the range 100 to 200°C. The thermostat control knob and a 0 to 120 min timer are mounted on the front panel together with indicator lamps showing mains and thermostat operation. With three removable trays and a thermometer tubulure. Internal dimensions 330 × 170 × 200 mm; overall dimensions 420 × 280 × 370 mm. For 220–240 V a.c. single phase supplies.

SVF-460-Q Steriliser, hot air **£145·20**



SVF-400



SVF-460

STERILISING ACCESSORIES

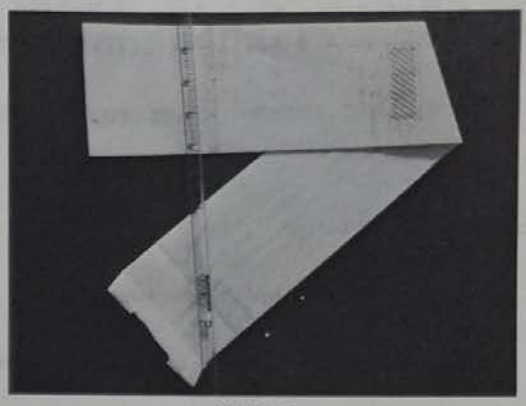
FOR STEAM STERILISING AT TEMPERATURES UP TO 120°C

INDICATING TAPE, self-adhesive, robust paper, width 25mm, with indicating stripes which change colour on autoclaving.

SVF-610-M	Indicating tape	Roll of 55m **£1·24**

STERILISING BAGS, paper, 480 × 75 × 25mm, for sterilising pipettes, etc. in autoclaves and steam sterilisers. With indicating stripes which change colour on autoclaving and top which can be sealed by heat or folding.

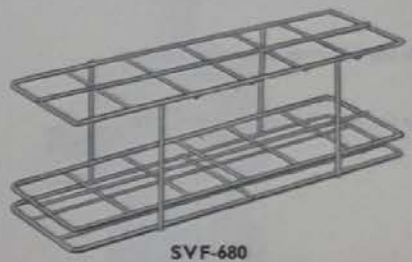
SVF-650-H	Sterilising bags	Pack of 500 **£8·52**



SVF-650

STERILISING RACK, nylon coated metal wire, 220 × 70 × 80mm, to accommodate 12 McCartney bottles BTS-350-050U or universal containers BTS-400.

SVF-680-J	Sterilising rack	**£1·38**



SVF-680

FOR STEAM AND HOT AIR STERILISING AT TEMPERATURES ABOVE 120°C

STERILISING BOX, Petri dish, stainless steel, with lifting rack. Length × diameter 260 × 120mm for 100mm diameter dishes.

SVF-730-N	Sterilising box, 260 × 120mm	**£11·93**

STERILISING BOXES, pipette, stainless steel, with close fitting lid. The dimensions given are length × diameter.

SVF-760-030G	Sterilising box, 380 × 65mm	**£5·76**
SVF-760-050A	Sterilising box, 450 × 65mm	**£7·26**

Dishes — *See PIH-620*
'Sterile' labels — *See LAB-780-L*
Trays — *See TRC-200*



SVF-730



SVF-760

Gallenkamp OVENS

FOR HOT AIR STERILISING

Hotbox Oven/Steriliser, 200°C — *See OVB-300 et seq.*
Economy Oven, 200°C — *See OVB-600 et seq.*
Modular Ovens, 250°C — *See OVE-250 et seq.*
BS Ovens, 250°C and 300°C — *See OVH-200 et seq.*
Steriliser Oven, 250°C — *See OVH-400 et seq.*

See also GALLENKAMP Autoclaves AUX-500 et seq.



Gallenkamp

Gallenkamp HANDILAB STIRRER

THE VERSATILE STIRRER WITH PUSH-FIT ACCESSORIES

ACCESSORIES INCLUDE:

- Stirrer paddles of polythene or stainless steel
- Orbital mixer for speedy mixing of test tube contents
- Magnetic head for remote stirring in closed vessels
- Chuck for 6-35mm diameter fittings
- Pulley for belt driven stirrers, etc.

HOLLOW SHAFT MOTOR FACILITATES:

- Rapid push-in fitting of accessories
- Easy adjustment of stirrer height or immersion depth
- Raising of stirrer for removal of beaker or container
- Fitting accessories from either end of the shaft
- Clockwise or counterclockwise rotation



SWP-300 with accessories

The Handilab stirrer is suitable for stirring a variety of low viscosity liquids such as water, aqueous solutions and light oils in vessels of up to about 60 litres capacity.
It is based on a quiet running, fan cooled, brushless motor and can therefore be operated continuously for long periods with the minimum of attention.
The accessory regulator SWP-350 provides a convenient means of varying the motor speed.

STIRRER, *GALLENKAMP* **HANDILAB,** as specified, comprising fan cooled brushless induction motor approximately 5 W ($\frac{1}{150}$ hp) with hollow shaft. Maximum speed approximately 1200 rev/min.

Motor dimensions	150 x 75 mm diameter
Mounting rod dimensions	200 x 13 mm diameter
Mass	2 kg

With 3-core mains cable and instructions but **without** accessories. For single phase supplies.

SWP-300-010V	Stirrer, 220–240 V 50 Hz	£26·44
SWP-300-030P	Stirrer, 110–120 V 60 Hz	£38·81

STIRRER KIT, *GALLENKAMP* **HANDILAB,** comprising hollow shaft stirrer SWP-300, stainless steel rotor SWP-360-504A, polythene rotor SWP-360-516Q, magnetic stirring rotor SWP-360-528J, set of magnetic followers SWX-280-L, pulley SWP-360-556E, chuck SWP-360-548D and glass rotor. For single phase supplies.

SWP-320-010H	Stirrer kit, 220–240 V 50 Hz	£45·23
SWP-320-030B	Stirrer kit, 110–120 V 60 Hz	£57·38

ACCESSORIES

Regulator, solid state, to enable stirrer speed to be varied. With mains cable. For a.c. single phase supplies.

SWP-350-583J	Regulator, 220–240 V	£23·66
SWP-350-513G	Regulator, 110–120 V	£23·63

Lubricant for motor bearings — See LUB-230-E

Gallenkamp HANDILAB STIRRER ACCESSORIES



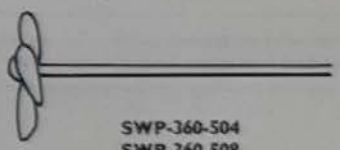
SWP-300 with magnetic rotor SWP-360-528 and follower, stirring the contents of a flask



SWP-360-542 in operation

ROTOR, stainless steel, with 380mm shaft and four-bladed 45mm impeller.
SWP-360-504A Rotor, 380 × 45mm **£1-41**

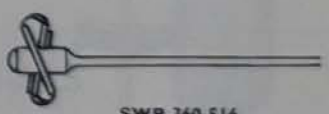
ROTOR, stainless steel, with 380mm shaft and four-bladed 57mm impeller.
SWP-360-508P Rotor, 380 × 57mm **£1-43**



SWP-360-504
SWP-360-508

ROTOR, polythene, with 380mm steel reinforced shaft and four-bladed 45mm impeller.
SWP-360-516Q Rotor, polythene **£0-77**

ROTOR, magnetic, with 180mm stainless steel shaft and magnet enclosed in 60mm diameter mounting.
SWP-360-528J Rotor, magnetic **£4-10**

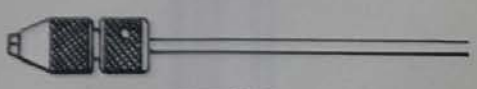


SWP-360-516

ORBITAL MIXER, for producing a vortex mixing action in the contents of test tubes and small containers. The mixer comprises a rubber cup mounted eccentrically on a ball race on a stainless steel rod which fits the hollow shaft of the stirrer. In use, the test tube is held in the hand and the bottom of the tube is pressed into the rubber cup. The two then orbit smoothly in contact until the tube is withdrawn. It is not necessary to stop the motor to withdraw the tube.
SWP-360-542P Orbital mixer **£3-04**

CHUCK, 6·35mm, with 200mm stainless steel shaft, to convert hollow shaft motor to take conventional fixed length rotors.
SWP-360-548D Chuck **£2-27**

For rotors to fit chuck
See SWP-750-502C and SWP-750-506R



SWP-360-548

PULLEY, two-step, 25 and 37·5mm diameter with 200mm stainless steel shaft.
SWP-360-556E Pulley **£3-33**

Rotor, pulley driven, with 24/29 standard joint
See SWP-750-582B



SWP-360-556

Gallenkamp VARIABLE SPEED STIRRERS

TWO MODELS WITH SPEED CONTROLS AND WITH CHUCKS
TO ACCEPT 6·35mm DIAMETER ACCESSORIES



SWP-600
with accessories on stand

NOTE: These stirrers are not suitable for use where very accurate and drift free speed control is essential.

GEARED DRIVE MODEL

- **80 to 600 and 400 to 4000 rev/min on maximum load**
- **Motor approximately 30 W (1/25 hp)**
- **13mm stainless steel support tube encloses the supply cable**

This stirrer is suitable for use where a wide variety of products have to be stirred. The low speed shaft provides the conditions for stirring viscous liquids. The high speed shaft produces intense stirring in water or aqueous solutions.

STIRRER, *GALLENKAMP,* **variable speed, geared.** With solid state speed regulator mounted in separate control box connected to the motor by a length of cable. A chuck which accepts 6·35mm diameter stirrers or other accessories may be fitted either to the shaft at one end of the motor, for speeds up to 4000 rev/min or to the gearbox output shaft for speeds up to 600 rev/min on maximum load.

Motor dimensions	180 × 110 mm diameter
Control unit dimensions	110 × 90 × 50 mm
Mass	3·5 kg

With instructions but **without** accessories. For 220–240 V a.c. single phase supplies.

SWP-600-A Stirrer **£66·94**

SPARE PARTS

SWP-620-030A	Brushes, for motor	Pair **£0·68**
SWP-620-050R	Chuck	**£1·41**

DIRECT DRIVE MODEL

- **Up to 2500 rev/min**
- **Motor approximately 10 W (1/75 hp)**
- **Suitable for a.c. or d.c. supplies**
- **13mm stainless steel support tube encloses the supply cable**

A stirrer useful for applications where the wide speed range provided by the switched control is important. Suitable for stirring water and other low viscosity liquids.

STIRRER, *GALLENKAMP,* **variable speed,** with built-in rotary rheostat controlling the speed in 10 fixed steps up to 2500 rev/min. Fitted with a chuck to accept stirring rotors having 6·35mm diameter shafts.

Motor dimensions	180 × 100 mm diameter
Mass	1·4 kg

Without accessories. For a.c. or d.c. supplies.

SWP-700-P Stirrer, 220–240 V **£50·06**

STIRRER KIT, *GALLENKAMP,* **variable speed,** comprising stirrer SWP-700-P, stainless steel rotor SWP-750-502C, glass rotor SWP-750-526L, polythene rotor SWP-750-534M and pulley. For 220–240 V a.c. or d.c. supplies.

SWP-720-B Stirrer kit **£56·81**

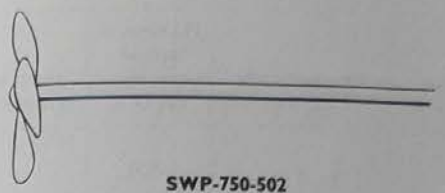
SPARE PARTS

SWP-750-030R	Brushes, for motor	Pair **£0·90**
SWP-750-050L	Chuck	**£1·69**

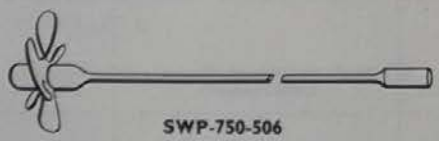


SWP-700
with accessory on stand

Gallenkamp STIRRERS



SWP-750-502



SWP-750-506
SWP-750-512

ACCESSORIES with shafts to fit 6·35mm chucks

Rotor, stainless steel, with 200mm shaft and four-bladed 45mm impeller.

SWP-750-502C Rotor, 200 × 45mm **£1·28**

Rotor, stainless steel, with 250mm flexible shaft and four-bladed 45mm self-aligning impeller.

SWP-750-506R Rotor, 250 × 45mm **£2·31**

Rotor, stainless steel, with 460mm flexible shaft and four-bladed 57mm self-aligning impeller.

SWP-750-512W Rotor, 460 × 57mm **£2·33**

Rotor, glass, with 200mm shaft and two-bladed 30mm impeller.

SWP-750-526L Rotor, glass **£1·95**

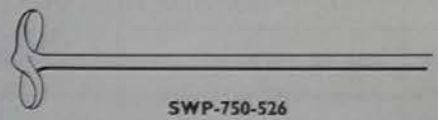
Rotor, polythene, with 200mm steel reinforced shaft and four-bladed 45mm impeller.

SWP-750-534M Rotor, polythene **£0·77**

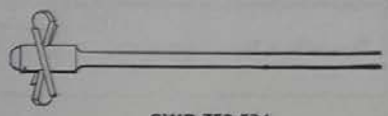
Pulley, two-step, 25 and 37·5mm diameter with 75mm stainless steel shaft.

SWP-750-544J Pulley **£2·95**

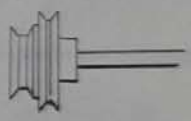
Driving belts *See SWR-840-502E*



SWP-750-526



SWP-750-534

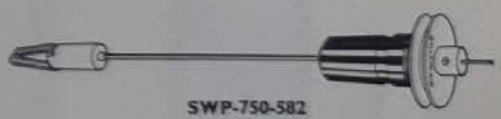


SWP-750-544

PULLEY DRIVEN ROTOR

ROTOR, *GALLENKAMP*, pulley driven, for vacuum applications. Comprises 24/29 plastics cone, pulley running on ball bearings, packed gland and flexible stainless steel shaft 330mm long fitted with link rotor. Working depth of shaft is adjustable and links extend to 65mm diameter.

SWP-750-582B Rotor **£21·38**



SWP-750-582

MIXER/EMULSIFIERS

Alternative laboratory and heavy duty models with interchangeable heads to provide intense mixing and shearing actions

See MPR-700-G and MPR-730-Y



Vortex shaker mixer which provides vigorous stirring of liquids in test tubes and other small vessels

See SGP-300-Q

Gallenkamp MAGNETIC STIRRERS

SUMMARY

List No.	Description	Case or Mounting	Speed control	Temperature control	Maximum speed rev/min approx.	Maximum temperature
SWT-220	Fixed Speed Stirrer		–	–	500	–
SWT-310	Variable Speed Stirrer		Electronic	–	1300	–
SWT-360	Auto-Reverse Stirrer		Electronic	–	1300	–
SWT-500	Stirrer-Hotplate		Electronic	Energy regulator	1300	450°C
SWT-550	Stirrer-Hotplate		Electronic	Thermostat	1300	275°C
SWT-740	Three-Place Stirrer-Hotplate		Electronic	Energy regulator	1300	450°C

Gallenkamp ECONOMY MAGNETIC STIRRER

Designed for use in schools, colleges and laboratories where speed control is not required



SWT-220 with beaker

- **Spark-free brushless motor**
- **Fixed speed of approximately 500 rev/min**
- **130 mm diameter and 95 mm high**

MAGNETIC STIRRER, *GALLENKAMP* **ECONOMY**, comprising brushless motor and magnet, mounted in a white polyurethane sprayed aluminium case. Stirrer speed approximately 500 rev/min. Supplied with 25 mm magnetic follower encased in polypropylene and a mains connecting cable. Overall dimensions 130 mm diameter x 95 mm high. Mass 1 kg. With instructions. For single phase supplies.

SWT-220-010V Magnetic stirrer, 220–240 V 50 Hz **£14·63**
SWT-220-030P Magnetic stirrer, 110–120 V 60 Hz **£15·19**

ELECTRICITY SUPPLIES

Voltage and frequency
Electrical apparatus manufactured by GALLENKAMP is offered and labelled for one, or for a choice of two or more voltage ranges and, where necessary, frequencies of mains electricity supplies.

GALLENKAMP do not accept any responsibility for the operation of any such apparatus should it be connected to electricity supplies which are nominally outside or vary outside the stated voltage and frequency values for which it is designed, nor for any consequential loss, damage or injury howsoever caused.

Gallenkamp MAGNETIC STIRRERS AND STIRRER/HOTPLATES

WITH SOLID STATE SPEED CONTROLLER

Compact variable speed magnetic stirrers for use with aqueous solutions and liquids of similar viscosity

Applications include:

- Titrations
- Precipitations
- Preparation of solutions
- Electrochemical testing
- Stirring liquids in closed containers
- Stirring liquids in evacuated systems

Stirrer design features:

- Solid state continuously variable speed control
- Speed control up to 1300 rev/min
- Drive magnet mounted on silent brushless motor
- Negligible self-heating of case over long periods of stirring
- Control knob has 'click' OFF position
- PTFE coated followers included – others available

Hotplate design features:

- Choice of energy regulator or thermostat control
- Controls have indexed OFF position
- Aluminium hotplate 125 mm diameter
- Tubular sheathed heater cast into hotplate
- Negligible bench heating at maximum temperature

Each model is housed in a case with white polyurethane sprayed aluminium top and stoved hammer-grey steel base fitted with rubber feet. The design incorporates inconspicuous air vents instead of traditional louvres and enables the apparatus to be dismantled easily for adjustment and servicing. A 13 mm diameter threaded support rod may be mounted within the case top; there is no projecting boss on the outside. Hotplate models have a drip-guard to minimise entry of spillage into the case.

NOTES

1. Magnetic stirrer/hotplates incorporate powerful circular alloy magnets designed to withstand high temperature working conditions.
2. PTFE, as used on the followers supplied, has a maximum working temperature of 300°C.
3. The polyurethane finish on the aluminium tops has a high physical and chemical durability and is ideally suited to this particular laboratory application.



SWT-310 with rod

OVERALL DIMENSIONS AND MASSES

Without support rods

	Magnetic stirrer	Magnetic stirrer/hotplate
Overall dimensions, height × width × depth, mm	90 × 210 × 190	130 × 210 × 190
Mass, kg	3	4

MAGNETIC STIRRER, GALLENKAMP, 1300 rev/min maximum, as specified, with mains indicator lamp and mains cable. With one each 20 and 40 mm PTFE coated followers and instructions but **without** support rod. For single phase supplies.

SWT-310-010U Magnetic stirrer, 220–240 V 50 Hz £33·75
SWT-310-030X Magnetic stirrer, 110–120 V 60 Hz £34·31

Gallenkamp

Gallenkamp MAGNETIC STIRRERS AND STIRRER/HOTPLATES



SWT-360

MAGNETIC STIRRER, *GALLENKAMP*, auto-reversing. As SWT-310 but incorporating a solid state switching circuit which reverses direction of the drive every few seconds to increase turbulence in the liquid being stirred. Uni-directional rotation or auto-reversing mode selected by means of a switch. With mains indicator lamp and mains cable. With one each 20 and 40mm PTFE coated followers and instructions but **without** support rod. For single phase supplies.

SWT-360-010Y Magnetic stirrer, 220–240V 50Hz **£47·25**
SWT-360-030C Magnetic stirrer, 110–120V 60Hz **£48·38**



SWT-500 with rod

MAGNETIC STIRRER/HOTPLATE, *GALLENKAMP*, 1300rev/min and 450°C maxima, as specified, with energy regulator controlled 400W hotplate, mains and load indicator lamps and mains cable. With one each 20 and 40mm PTFE coated followers and instructions but **without** support rod. For single phase supplies.

SWT-500-010L Magnetic stirrer/hotplate, 220–240V 50Hz **£50·06**
SWT-500-030F Magnetic stirrer/hotplate, 110–120V 60Hz **£51·19**

NOTE: PTFE has a maximum working temperature of 300°C.



SWT-550

MAGNETIC STIRRER/HOTPLATE, *GALLENKAMP*, 1300rev/min and 275°C maxima, as specified, with thermostat controlled 400W hotplate, mains and load indicator lamps and mains cable. With one each 20 and 40mm PTFE coated followers and instructions but **without** support rod. For single phase supplies.

SWT-550-010W Magnetic stirrer/hotplate, 220–240V 50Hz **£51·75**
SWT-550-030Q Magnetic stirrer/hotplate, 110–120V 60Hz **£53·44**

SPARE PARTS for SWT-500 and SWT-550

Hotplate, with cast-in 400W tubular sheathed heater.
SWT-630-010F Hotplate, 220–240V **£8·44**
SWT-630-030W Hotplate, 110–120V **£8·44**

ACCESSORIES

Support rods *See STH-800*
Magnetic followers *See SWX-280-L*
Magnetic follower retrievers *See SWX-490-L*

Gallenkamp THREE-TEST MAGNETIC STIRRER/HOTPLATE

WITH SOLID STATE SPEED CONTROLLER

Suitable for use with aqueous solutions and liquids of similar viscosity

- **Individual stirrer and heater controls with OFF positions for each hotplate**
- **Speed control up to 1300 rev/min depending on load**
- **Tubular sheathed heaters cast into hotplates**
- **All controls housed in enamelled metal case**
- **Bosses accept 13mm diameter support rods**

Applications include titrations, precipitations, preparation of solutions, electrochemical testing, stirring liquids in closed containers, stirring liquids in evacuated systems, etc.

Overall dimensions, **without** support rod, 520 × 270 × 140mm high, mass 9kg.

MAGNETIC STIRRER/HOTPLATE, *GALLENKAMP* three-test, as specified, 1300rev/min and 450°C maxima. With energy regulator controlled aluminium hotplates, each 125mm diameter, mains and load indicator lamps and mains cable. With three each 20 and 40mm PTFE coated followers and instructions but **without** support rods. For single phase supplies.

SWT-740-010N Magnetic stirrer/hotplate, 220–240V 50Hz **£155·25**

SWT-740-030H Magnetic stirrer/hotplate, 110–120V 60Hz **£156·38**

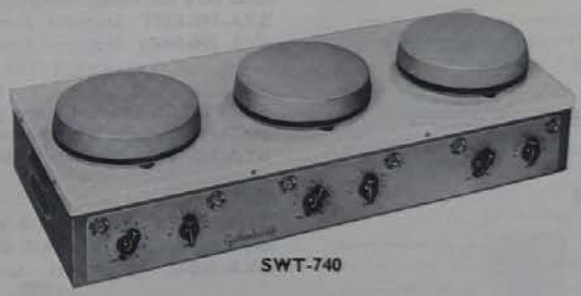
SPARE PARTS

Hotplates	*See SWT-630*

ACCESSORIES

Support rods	*See STA-800*
Magnetic followers	*See SWX-280-L*
Magnetic follower retriever	*See SWX-490-L*

See page 657 for notes on magnetic stirrer/hotplates.



SWT-740

MAGNETIC STIRRER FOLLOWERS

MAGNETIC FOLLOWERS, encased in glass.

SWX-230-030X	Magnetic follower, 6mm long	Pack of 5 **£0·61**
SWX-230-050Y	Magnetic follower, 13mm long	Pack of 5 **£0·97**
SWX-230-070C	Magnetic follower, 19mm long	Pack of 5 **£1·09**
SWX-230-090T	Magnetic follower, 25mm long	Pack of 5 **£1·22**
SWX-230-110Q	Magnetic follower, 38mm long	Pack of 5 **£1·33**
SWX-230-130K	Magnetic follower, 50mm long	Pack of 5 **£1·45**

MAGNETIC FOLLOWERS, encased in polypropylene.

SWX-260-050K	Magnetic follower, 12mm long	Pack of 5 **£0·97**
SWX-260-090V	Magnetic follower, 25mm long	Pack of 5 **£1·22**
SWX-260-130M	Magnetic follower, 45mm long	Pack of 3 **£1·01**
SWX-260-150G	Magnetic follower, 60mm long	Pack of 3 **£1·31**

MAGNETIC FOLLOWER SET comprising one each of all sizes of SWX-230 and SWX-260.

SWX-280-L Magnetic follower set **£2·73**

MAGNETIC FOLLOWERS, encased in polypropylene, with centre rim.

SWX-310-130Q	Magnetic follower, 40mm long	Pack of 3 **£0·95**
SWX-310-150K	Magnetic follower, 60mm long	Pack of 3 **£1·31**

MAGNETIC FOLLOWERS, encased in PTFE.

SWX-350-050J	Magnetic follower, 12mm long	Pack of 5 **£1·69**
SWX-350-070D	Magnetic follower, 20mm long	Pack of 3 **£1·24**
SWX-350-130L	Magnetic follower, 40mm long	Pack of 3 **£1·45**
SWX-350-150F	Magnetic follower, 60mm long	Pack of 1 **£0·92**

RETRIEVER, comprising magnet in glass tube, 300mm long × 8mm diameter.

SWX-490-L Retriever **£0·61**

RETRIEVER, comprising magnet in PTFE tube, 350mm long × 10mm diameter.

SWX-510-N Retriever **£2·18**

HINTS FOR THE USE OF MAGNETIC STIRRERS AND FOLLOWERS

1. Different lengths of followers give widely different stirring characteristics. Try out several sizes.
2. Ensure that the follower coating does not react with the liquid to be stirred.
3. If the stirrer motor fails to rotate, increase the speed setting and raise or rotate the container.
4. If the follower spins out of control, reduce the stirring speed.
5. Where very critical stirring is required, spacers of paper, glass, etc. placed under the container often yield useful results.

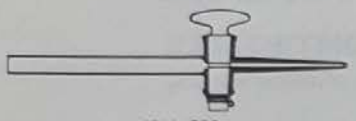
STOPCLOCKS
STOPWATCHES *See Timers*

Gallenkamp

STOPCOCKS

Glass stopcocks fitted with retaining springs.

All dimensions quoted are nominal



SYA-200

STOPCOCKS, BURETTE, soda-lime glass, straight bore, with 9mm o.d. tube for sealing to burettes and capillary jet. SYA-200-030N has individually fitted key; SYA-200-070B has interchangeable key.

SYA-200-030N	Stopcock	**£2·06**
SYA-200-070B	Stopcock, interchangeable key	**£2·42**

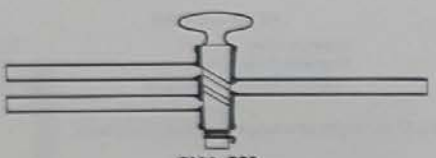


SYA-240
SYA-260

STOPCOCKS, borosilicate glass, single straight bore with wide bore side tubes and individually fitted key.

Bore, mm	2	4	6	8
Side tube o.d., mm	7	9	10	12

SYA-240-030Y	Stopcock, 2mm bore	**£1·69**
SYA-240-050C	Stopcock, 4mm bore	**£2·40**
SYA-240-070T	Stopcock, 6mm bore	**£3·00**
SYA-240-090N	Stopcock, 8mm bore	**£4·57**



SYA-290

STOPCOCK, borosilicate glass, single straight bore with 7mm o.d. side tubes and interchangeable key.

SYA-260-D	Stopcock, 2mm bore	**£2·00**

STOPCOCKS, borosilicate glass, double oblique bore with wide bore side tubes 8mm o.d. and individually fitted key.

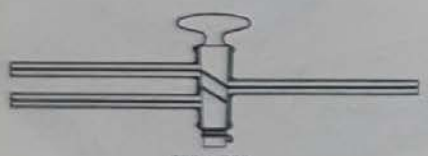
SYA-290-030T	Stopcock, 2mm bore	**£3·60**
SYA-290-050N	Stopcock, 3mm bore	**£3·60**



SYA-320

STOPCOCK, borosilicate glass, single straight bore with capillary side tubes 8mm o.d. and interchangeable key.

SYA-320-A	Stopcock, capillary, 1·5mm bore	**£2·36**



SYA-350

STOPCOCK, borosilicate glass, double oblique bore with capillary side tubes 7mm o.d. and individually fitted key.

SYA-350-C	Stopcock, capillary	**£3·87**

STOPCOCK, borosilicate glass, T-bore with wide bore side tubes and third side tube perpendicular to the other two all 7mm o.d. Individually fitted key.

SYA-390-U	Stopcock, 2mm bore	**£1·64**



SYA-410

STOPCOCK, borosilicate glass, T-bore as SYA-390-U but with capillary side tubes 7mm o.d. Individually fitted key.

SYA-410-W	Stopcock, 2·5mm bore	**£3·07**



SYA-480

STOPCOCK KEY REMOVER

For glass stopcocks

STOPCOCK KEY REMOVER, for removing jammed stopcock keys from laboratory glassware. Comprises a strong steel frame with a steel screw and an aluminium block which is recessed to take the handle of the stopcock key. The block is tapered to accept stopcock barrels of different diameters. The key is removed by careful exertion of pressure using the screw.

SYA-480-T	Stopcock key remover	**£15·75**

PLASTICS STOPCOCKS

STOPCOCK, polypropylene, with straight 3mm single bore key and side tubes tapered from 4 to 6mm o.d. Overall length 55mm.

SYA-530-A Stopcock, 3mm bore **£0·25**


SYA-530

STOPCOCK, polypropylene and high density polythene. Inlet and outlet tubes approximately 8mm diameter.

SYA-550-J Stopcock, 5mm bore **£0·84**

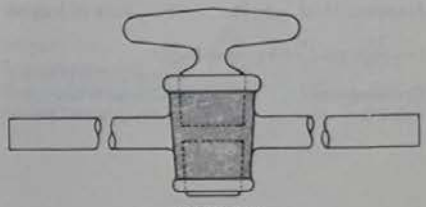

SYA-550

VACUUM STOPCOCKS

STOPCOCKS, vacuum, *QUICKFIT,* borosilicate glass, single straight bore with two side tubes.

Bore of key, mm	1	3	4	6	8	10
Bore of side tube, mm	1·5	5	6	7	10	12

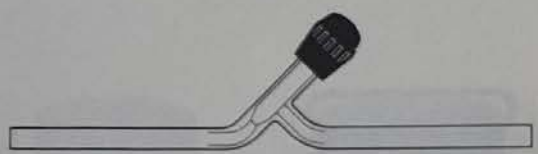
SYA-600-030E	Stopcock, TH1C/1, 1mm bore	**£2·83**
SYA-600-050V	Stopcock, TH1/3, 3mm bore	**£2·92**
SYA-600-070P	Stopcock, TH1/4, 4 mm bore	**£2·99**
SYA-600-090J	Stopcock, TH1/6, 6mm bore	**£4·01**
SYA-600-110G	Stopcock, TH1/8, 8mm bore	**£5·21**
SYA-600-130A	Stopcock, TH1/10, 10mm bore	**£6·38**


SYA-600

STOPCOCKS, vacuum, *QUICKFIT* **ROTAFLO,** borosilicate glass with internal screw action PTFE plug key. Single bore with two side tubes.

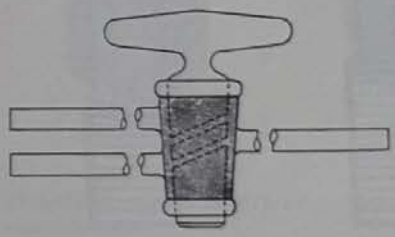
Bore of key, mm	3	6	10
Bore of side tube, mm	5	7	10

SYA-630-050A	Stopcock, TF2/13, 3mm bore	**£4·58**
SYA-630-090L	Stopcock, TF2/18, 6mm bore	**£5·27**
SYA-630-130C	Stopcock, TF2/24, 10mm bore	**£6·24**


SYA-630

STOPCOCK, vacuum, *QUICKFIT* **TH3/3,** borosilicate glass, double oblique bore with three side tubes 5mm bore. Bore of key 3mm.

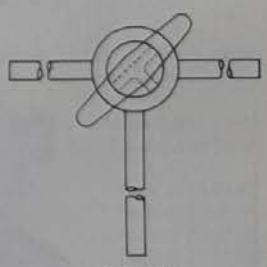
SYA-660-R Stopcock, TH3/3, 3mm bore **£4·69**


SYA-660

STOPCOCKS, vacuum, *QUICKFIT,* borosilicate glass, T-bore, with three side tubes.

Bore of key, mm	3	6
Bore of side tube, mm	5	8

SYA-690-050E	Stopcock, TH4/3, 3mm bore	**£4·77**
SYA-690-090P	Stopcock, TH4/6, 6mm bore	**£6·38**


SYA-690

SOLENOID VALVE

VALVE, solenoid, electrically operated, for ON-OFF control of flow of liquids at pressures up to 35kN/m² (0·35kgf/cm²). Normally closed type suitable for temperatures up to 37°C. The robust valve body and all functional parts are of PVC and PTFE making it suitable for handling a wide range of acids, alkalis, inorganic and organic chemicals and biological fluids. With polypropylene inlet and outlet nozzles for 12·7mm bore flexible tubing. Surge current 1·75A; running current 0·23A. Overall dimensions, excluding nozzles, 60mm diameter × 110mm high. For 220–240V 50Hz single phase supplies.

SYA-800-U Valve, solenoid **£17·16**



SYA-800

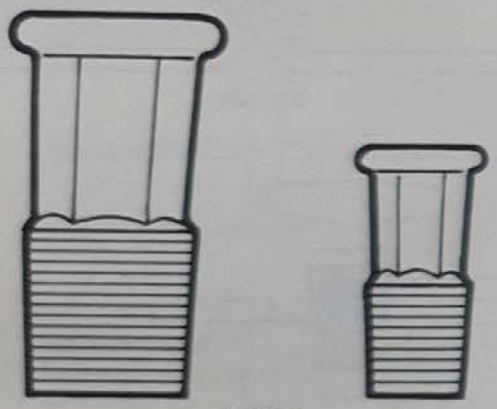
STOPPERS

GLASS STOPPERS

STOPPERS, borosilicate glass, with joint to BS 572 and hexagonal head.

SYH-200-030M	Stopper, 10/13 joint	Pack of 5 **£2·90**
SYH-200-050G	Stopper, 12/14 joint	Pack of 5 **£3·03**
SYH-200-070A	Stopper, 14/15 joint	Pack of 5 **£3·03**
SYH-200-090R	Stopper, 16/16 joint	Pack of 5 **£3·26**
SYH-200-110X	Stopper, 19/17 joint	Pack of 5 **£3·26**
SYH-200-150C	Stopper, 24/20 joint	Pack of 5 **£3·39**
SYH-200-190N	Stopper, 29/22 joint	Pack of 5 **£3·63**

Stoppers, glass, with joint to BS 572 — *See also QUICKFIT section*
Cork stoppers — *See CSD-460 to CSD-480-R*
Iodine flask stoppers — *See QUICKFIT section*



SYH-200

PLASTICS STOPPERS

STOPPERS, foam plastics, base diameter 44mm, height 24mm.
SYH-250-J Stoppers — Pack of 50 **£0·92**

STOPPERS, *GALLENKAMP,* **polypropylene,** coloured, with joint to BS 572 and hexagonal head having grey disc insert. Can be autoclaved at 121°C.

SYH-310-030U	Stoppers, red, 10/13	Pack of 5 **£0·47**
SYH-310-050X	Stoppers, red, 12/14	Pack of 5 **£0·56**
SYH-310-070Y	Stoppers, red, 14/15	Pack of 5 **£0·65**
SYH-310-090C	Stoppers, red, 16/16	Pack of 5 **£0·90**
SYH-310-110W	Stoppers, red, 19/17	Pack of 5 **£1·08**
SYH-310-130Q	Stoppers, red, 19/22	Pack of 5 **£0·39**
SYH-310-150K	Stoppers, red, 24/20	Pack of 5 **£1·15**
SYH-310-170E	Stoppers, red, 24/29	Pack of 5 **£0·47**
SYH-310-190V	Stoppers, red, 29/32	Pack of 5 **£0·56**
SYH-310-230M	Stoppers, blue, 19/22	Pack of 5 **£0·45**
SYH-310-270A	Stoppers, blue, 24/29	Pack of 5 **£0·51**
SYH-310-290R	Stoppers, blue, 29/32	Pack of 5 **£0·56**
SYH-310-330Y	Stoppers, yellow, 19/22	Pack of 5 **£0·45**
SYH-310-370T	Stoppers, yellow, 24/29	Pack of 5 **£0·51**
SYH-310-390N	Stoppers, yellow, 29/32	Pack of 5 **£0·56**



SYH-310



Gallenkamp LABELLED REAGENT BOTTLES

Fitted with hexagonal head polypropylene stopper

- **Enamelled labels**
- **Wide range of titles**
- **Capacities 250ml and 500ml**

  See BTJ-500-030 et seq.
- **Dropping bottles**

  See BTR-750-030E et seq.

RUBBER STOPPERS

Each stopper has a number moulded-in, corresponding to the bottom diameter in millimetres.

Stopper No.	3	4	5	6	7	8
Bottom dia., mm	3	4	5	6	7	8
Top dia., mm	4·5	5·8	7	8	9	10·5
Height, mm	12	14	16	16	16	20
Stopper No.	9	10	11	13	15	17
Bottom dia., mm	9	10	11	13	15	17
Top dia., mm	11·5	12·5	14	16	18	20·3
Height, mm	20	20	24	24	24	26
Stopper No.	19	21	23	25	27	29
Bottom dia., mm	19	21	23	25	27	29
Top dia., mm	22·5	24·5	26·5	28·5	31	33
Height, mm	28	28	28	28	32	32

Stopper No.	31	33	35	37	39
Bottom dia., mm	31	33	35	37	39
Top dia., mm	36	38·5	40·5	42·5	44·5
Height, mm	35	38·5	38·5	38·5	38·5
Stopper No.	41	43	45	49	53
Bottom dia., mm	41	43	45	49	53
Top dia., mm	47	49	51	55	59·5
Height, mm	42	42	42	42	45·5
Stopper No.	57	62	67	71	75
Bottom dia., mm	57	62	67	71	75
Top dia., mm	64	69	74	78	85
Height, mm	49	49	49	49	54
Stopper No.	79	86	92	99	105
Bottom dia., mm	79	86	92	99	105
Top dia., mm	89	96	102	109	116·5
Height, mm	54	54	54	54	63·5

STOPPERS, rubber, BS 2775, solid.

SYH-450-030H	Stoppers, solid, No. 3	Pack of 20 **£0·42**
SYH-450-040E	Stoppers, solid, No. 4	Pack of 20 **£0·42**
SYH-450-050B	Stoppers, solid, No. 5	Pack of 20 **£0·42**
SYH-450-060V	Stoppers, solid, No. 6	Pack of 20 **£0·42**
SYH-450-070S	Stoppers, solid, No. 7	Pack of 20 **£0·45**
SYH-450-080P	Stoppers, solid, No. 8	Pack of 20 **£0·45**
SYH-450-090M	Stoppers, solid, No. 9	Pack of 20 **£0·48**
SYH-450-100M	Stoppers, solid, No. 10	Pack of 20 **£0·54**
SYH-450-110J	Stoppers, solid, No. 11	Pack of 20 **£0·54**
SYH-450-120G	Stoppers, solid, No. 13	Pack of 20 **£0·57**
SYH-450-130D	Stoppers, solid, No. 15	Pack of 20 **£0·68**
SYH-450-140A	Stoppers, solid, No. 17	Pack of 20 **£0·78**
SYH-450-150U	Stoppers, solid, No. 19	Pack of 10 **£0·48**
SYH-450-160R	Stoppers, solid, No. 21	Pack of 10 **£0·61**
SYH-450-170X	Stoppers, solid, No. 23	Pack of 10 **£0·71**
SYH-450-180L	Stoppers, solid, No. 25	Pack of 10 **£0·84**
SYH-450-190Y	Stoppers, solid, No. 27	Pack of 10 **£1·06**
SYH-450-200Y	Stoppers, solid, No. 29	Pack of 10 **£1·25**
SYH-450-210F	Stoppers, solid, No. 31	Pack of 10 **£1·83**
SYH-450-220C	Stoppers, solid, No. 33	Pack of 10 **£2·03**
SYH-450-230W	Stoppers, solid, No. 35	Pack of 10 **£2·27**
SYH-450-240T	Stoppers, solid, No. 37	Pack of 10 **£2·48**
SYH-450-250Q	Stoppers, solid, No. 39	Pack of 10 **£2·63**
SYH-450-260N	Stoppers, solid, No. 41	Pack of 5 **£1·42**
SYH-450-270K	Stoppers, solid, No. 43	Pack of 5 **£1·54**
SYH-450-280H	Stoppers, solid, No. 45	Pack of 5 **£1·58**
SYH-450-290E	Stoppers, solid, No. 49	Pack of 5 **£2·09**
SYH-450-300E	Stoppers, solid, No. 53	Pack of 5 **£2·57**
SYH-450-310B	Stoppers, solid, No. 57	Pack of 3 **£1·94**
SYH-450-320V	Stoppers, solid, No. 62	Pack of 3 **£2·50**
SYH-450-330S	Stopper, solid, No. 67	Pack of 1 **£1·00**
SYH-450-340P	Stopper, solid, No. 71	Pack of 1 **£1·16**
SYH-450-350M	Stopper, solid, No. 75	Pack of 1 **£1·67**
SYH-450-360J	Stopper, solid, No. 79	Pack of 1 **£1·77**
SYH-450-370G	Stopper, solid, No. 86	Pack of 1 **£2·03**
SYH-450-380D	Stopper, solid, No. 92	Pack of 1 **£2·34**
SYH-450-390-A	Stopper, solid, No. 99	Pack of 1 **£2·60**
SYH-450-400A	Stopper, solid, No. 105	Pack of 1 **£2·86**



SYH-450



SYH-530

STOPPERS, rubber, BS 2775, solid, in pack containing assorted sizes as follows:

5 each sizes 7, 8, 9, 10, 11, 13, 15, 17, 19, 21, 23
2 each sizes 25, 27, 29, 31, 33, 35

SYH-480-S	Stoppers, solid, assorted	Pack **£4·16**

STOPPERS, rubber, BS 2775, with one central hole 3mm diameter in Nos. 5 and 6, 4mm diameter in Nos. 7 and 8 and 5mm diameter in remainder.

SYH-530-050H	Stoppers, 1-hole, No. 5	Pack of 20 **£0·42**
SYH-530-060E	Stoppers, 1-hole, No. 6	Pack of 20 **£0·42**
SYH-530-070B	Stoppers, 1-hole, No. 7	Pack of 20 **£0·45**
SYH-530-080V	Stoppers, 1-hole, No. 8	Pack of 20 **£0·45**
SYH-530-090S	Stoppers, 1-hole, No. 9	Pack of 20 **£0·48**
SYH-530-100S	Stoppers, 1-hole, No. 10	Pack of 20 **£0·54**
SYH-530-110P	Stoppers, 1-hole, No. 11	Pack of 20 **£0·54**
SYH-530-120M	Stoppers, 1-hole, No. 13	Pack of 20 **£0·57**
SYH-530-130J	Stoppers, 1-hole, No. 15	Pack of 20 **£0·68**
SYH-530-140G	Stoppers, 1-hole, No. 17	Pack of 20 **£0·78**
SYH-530-150D	Stoppers, 1-hole, No. 19	Pack of 10 **£0·48**
SYH-530-160A	Stoppers, 1-hole, No. 21	Pack of 10 **£0·61**
SYH-530-170U	Stoppers, 1-hole, No. 23	Pack of 10 **£0·71**
SYH-530-180R	Stoppers, 1-hole, No. 25	Pack of 10 **£0·84**
SYH-530-190X	Stoppers, 1-hole, No. 27	Pack of 10 **£1·06**
SYH-530-200X	Stoppers, 1-hole, No. 29	Pack of 10 **£1·25**
SYH-530-210L	Stoppers, 1-hole, No. 31	Pack of 10 **£1·83**
SYH-530-220Y	Stoppers, 1-hole, No. 33	Pack of 10 **£2·03**
SYH-530-230F	Stoppers, 1-hole, No. 35	Pack of 10 **£2·27**
SYH-530-240C	Stoppers, 1-hole, No. 37	Pack of 10 **£2·48**

Gallenkamp

STOPPERS, rubber, BS 2775, with two 5mm diameter holes.

SYH-580-130U	Stoppers, 2-hole, No. 15	Pack of 10 **£0·36**
SYH-580-140R	Stoppers, 2-hole, No. 17	Pack of 10 **£0·38**
SYH-580-150X	Stoppers, 2-hole, No. 19	Pack of 10 **£0·48**
SYH-580-160L	Stoppers, 2-hole, No. 21	Pack of 10 **£0·61**
SYH-580-170Y	Stoppers, 2-hole, No. 23	Pack of 10 **£0·71**
SYH-580-180F	Stoppers, 2-hole, No. 25	Pack of 10 **£0·84**
SYH-580-190C	Stoppers, 2-hole, No. 27	Pack of 10 **£1·06**
SYH-580-200C	Stoppers, 2-hole, No. 29	Pack of 10 **£1·25**
SYH-580-210W	Stoppers, 2-hole, No. 31	Pack of 10 **£1·83**
SYH-580-220T	Stoppers, 2-hole, No. 33	Pack of 10 **£2·03**
SYH-580-230Q	Stoppers, 2-hole, No. 35	Pack of 10 **£2·27**
SYH-580-240N	Stoppers, 2-hole, No. 37	Pack of 10 **£2·48**



SYH-580

STOPPERS, silicone rubber, BS 2775, solid, non-toxic, translucent and will withstand sterilisation.

SYH-700-030S	Stoppers, solid, No. 3	Pack of 20 **£1·51**
SYH-700-040P	Stoppers, solid, No. 4	Pack of 20 **£1·51**
SYH-700-050M	Stoppers, solid, No. 5	Pack of 20 **£1·51**
SYH-700-060J	Stoppers, solid, No. 6	Pack of 20 **£1·67**
SYH-700-070G	Stoppers, solid, No. 7	Pack of 10 **£1·02**
SYH-700-080D	Stoppers, solid, No. 8	Pack of 10 **£1·58**
SYH-700-090A	Stoppers, solid, No. 9	Pack of 10 **£1·82**
SYH-700-100A	Stoppers, solid, No. 10	Pack of 10 **£2·22**
SYH-700-110U	Stoppers, solid, No. 11	Pack of 5 **£2·08**
SYH-700-120R	Stoppers, solid, No. 13	Pack of 5 **£2·08**
SYH-700-130X	Stoppers, solid, No. 15	Pack of 5 **£2·60**
SYH-700-140L	Stoppers, solid, No. 17	Pack of 3 **£2·50**
SYH-700-150Y	Stoppers, solid, No. 19	Pack of 3 **£2·89**
SYH-700-160F	Stoppers, solid, No. 21	Pack of 2 **£2·12**
SYH-700-170C	Stoppers, solid, No. 23	Pack of 2 **£2·46**
SYH-700-180W	Stopper, solid, No. 25	Pack of 1 **£1·41**
SYH-700-190T	Stopper, solid, No. 27	Pack of 1 **£1·92**
SYH-700-200T	Stopper, solid, No. 29	Pack of 1 **£2·12**
SYH-700-210Q	Stopper, solid, No. 31	Pack of 1 **£2·91**
SYH-700-220N	Stopper, solid, No. 33	Pack of 1 **£3·24**



SYJ-300

SUBA-SEAL STOPPERS

Each stopper has the size number moulded-in.

STOPPERS, *SUBA-SEAL,* rubber, with turnover flange and serrations, for narrow mouth containers.

Size No.	9	13	17	21
Base dia., mm	6·5	8	9·5	11
Size No.	25	29	33	37
Base dia., mm	12·5	14	16	17·5
Size No.	41	45	49	
Base dia., mm	19	20·5	22	

SYJ-300-090N	Stoppers, SUBA-SEAL, No. 9	Pack of 20 **£1·35**
SYJ-300-120G	Stoppers, SUBA-SEAL, No. 13	Pack of 20 **£1·35**
SYJ-300-140A	Stoppers, SUBA-SEAL, No. 17	Pack of 20 **£1·54**
SYJ-300-160R	Stoppers, SUBA-SEAL, No. 21	Pack of 20 **£1·67**
SYJ-300-180L	Stoppers, SUBA-SEAL, No. 25	Pack of 10 **£0·90**
SYJ-300-200Y	Stoppers, SUBA-SEAL, No. 29	Pack of 10 **£1·02**
SYJ-300-220C	Stoppers, SUBA-SEAL, No. 33	Pack of 10 **£1·18**
SYJ-300-240T	Stoppers, SUBA-SEAL, No. 37	Pack of 10 **£1·47**
SYJ-300-260N	Stoppers, SUBA-SEAL, No. 41	Pack of 5 **£0·87**
SYJ-300-280H	Stoppers, SUBA-SEAL, No. 45	Pack of 5 **£1·13**
SYJ-300-290E	Stoppers, SUBA-SEAL, No. 49	Pack of 5 **£1·47**



SYJ-350

STOPPERS, *SUBA-SEAL,* non-toxic, translucent silicone rubber with recessed top. With serrations and with a lip to assist removal. The top can be pierced by a hypodermic needle. May be autoclaved.

Size No.	15	20	30	36
Base dia., mm	8·7	10·7	15	17

SYJ-350-130X	Stoppers, SUBA-SEAL, No. 15	Pack of 5 **£0·83**
SYJ-350-150Y	Stoppers, SUBA-SEAL, No. 20	Pack of 5 **£0·93**
SYJ-350-200T	Stoppers, SUBA-SEAL, No. 30	Pack of 5 **£1·35**
SYJ-350-240H	Stoppers, SUBA-SEAL, No. 36	Pack of 5 **£1·44**

Griffin XENON STROBOSCOPE

- **Fully transistorised**
- **1 to 250 flashes/s**

A portable instrument employing a high intensity xenon flash tube which gives a brilliant white light particularly suitable for photographic purposes. The use of Ilford HP4 film or, in POLAROID-LAND cameras, POLAROID Type 47 film, 3000-ASA is recommended. A wide range of flashing rates is covered, and the accuracy of calibration is unaffected by mains voltage fluctuations within normal limits. A pair of sockets is fitted which can be used to synchronise the flash with a particular event: shorting the sockets produces a single flash. The completely transistorised circuit, employing components of high stability, ensures accurate and consistent performance.



SYS-400

Technical data

Flashing rate	Range 1: 1 to 10 flashes/s at 0·8J Range 2: 10 to 100 flashes/s at 0·2J Range 3: 100 to 250 flashes/s at 0·1J
Mean flash power	5 W approximately
Accuracy	±2% f.s.d. on each range
Flash duration	12 μs, approximately
Triggering	Internal oscillator External shorting contacts
Overall dimensions	210 × 170 × 175 mm
Mass	3·7 kg

STROBOSCOPE, Xenon, *GRIFFIN*, as specified, in a strong metal case fitted with a carrying handle and rubber feet. An inclined rear panel carries the flash rate control, range selector, sockets and switch for external synchronisation, mains ON-OFF switch and 1 A, 20 × 5 mm fuse. With instructions. For single phase supplies.

SYS-400-010H	Stroboscope, 220–240 V 50 Hz	**£74·80**
SYS-400-030B	Stroboscope, 110–120 V 60 Hz	**£79·20**

SPARE PARTS

SYS-420-010Q	Xenon discharge tube	**£14·41**
	Fuse	See *ECF-630-290S*

SURFACE TENSION

SURFACE AND INTERFACIAL TENSION TORSION BALANCE, dual-purpose torsion balance for the measurements of surface and interfacial tensions and for direct weighing up to 1 g maximum.

Balance mechanism with eddy-current damping in cylindrical housing 140 mm diameter, scale length 305 mm with hook to carry plate or ring, and fitted with steel pivots mounted in spring-loaded jewelled bearings. Dial calibrated 0–0·12 N/m × 0·0005 N/m and 0–1 g × 0·002 g ±0·4%; with zero adjuster and rapid-action lock and release device for clamping beam for repetitive weighing independent of the index pointer position.

Mounted on tripod stand with levelling feet and spirit level, with metal support bearing an adjustable arm having a coarse adjustment on main column, and supporting a rod with fine height adjustment which holds the test liquid container platform. Complete with two extended hooks, one platinum ring, one glass test plate, one concave and two flat glass dishes.

XCK-440-X Surface tension balance **£195·25**

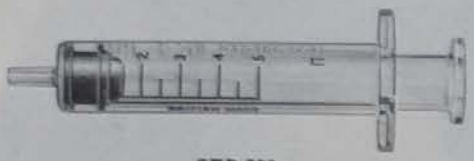


XCK-440

SYRINGES

SYRINGES, plastics, disposable, for gases or liquids, Luer fitting. Radiation sterilised, individually packed in sealed envelope. With polystyrene barrel and plunger and surgical rubber piston, coated with silicone lubricant. The 1 ml size is the tuberculin type, the others are to BS 1263. **Without** needle.

SZR-200-030Q	Syringes, 1 × 0·01 ml	Pack of 25 **£2·21**
SZR-200-050K	Syringes, 2 × 0·2 ml	Pack of 25 **£1·18**
SZR-200-070E	Syringes, 5 × 0·5 ml	Pack of 20 **£1·64**
SZR-200-090V	Syringes, 10 × 1 ml	Pack of 20 **£2·13**
SZR-200-110S	Syringes, 20 × 2 ml	Pack of 10 **£1·49**



SZR-200



SZR-260



SZR-500 with needle



SZR-570

SYRINGES, glass, for liquids, Luer fitting. Heat resistant glass with indelibly marked graduations. Pistons and barrels from any one size are interchangeable. **Without** needle. (F)

SZR-260-030U	Syringe, 1 × 0·1 ml	**£0·59**
SZR-260-050X	Syringe, 2 × 0·2 ml	**£0·59**
SZR-260-070Y	Syringe, 5 × 0·2 ml	**£0·68**
SZR-260-090C	Syringe, 10 × 0·2 ml	**£0·84**
SZR-260-110W	Syringe, 20 × 1 ml	**£1·11**

ACCESSORIES for SZR-200 and SZR-260

Needles, disposable, stainless steel with polystyrene Luer fitting, radiation sterilised, individually packed with sheath in sealed envelope.

Size	Hypo 20	17	15	12	1	Serum II
Gauge	25	25	23	23	21	19
Length, mm	16	24	25	28	38	51

SZR-280-502X	Needles, Hypo 20	Pack of 25 **£0·80**
SZR-280-512L	Needles, size 17	Pack of 25 **£0·80**
SZR-280-522Y	Needles, size 15	Pack of 25 **£0·80**
SZR-280-532F	Needles, size 12	Pack of 25 **£0·80**
SZR-280-542C	Needles, size 1	Pack of 25 **£0·80**
SZR-280-552W	Needles, Serum II	Pack of 25 **£1·16**

MICRO SYRINGES

SYRINGES, *HAMILTON,* for gases or liquids, Luer fitting. Borosilicate glass barrel with graduations. SZR-500-050J has tungsten plunger and SZR-500-130L has PTFE coated plunger, each with PTFE tip. **Without** needle. (F)

SZR-500-050J	Syringe, 50 × 1 µl	**£23·34**
SZR-500-130L	Syringe, 500 × 10 µl	**£23·51**

ACCESSORY

Needles, tapered, stainless steel with nickel plated brass Luer fitting. Tip has 0·15mm bore and 17° point to minimise damage to septa. (F)

SZR-510-502Q	Needles	Pack of 3 **£5·51**

SYRINGE, *HAMILTON,* for liquids, with extension handle. Borosilicate glass barrel, 10 × 0·1 µl, with graduations and stainless steel plunger. A metal extension handle enables the syringe to be balanced comfortably in the hand and also provides a sturdy guide for the plunger. **Without** needle. (F)

SZR-570-030M	Syringe, 10 × 0·1 µl	**£34·03**

ACCESSORY

Needles, tapered, stainless steel. Tip has 0·115mm bore and 22° point. (F)

SZR-580-502N	Needles	Pack of 3 **£7·88**

SYRINGE PIPETTES



One-mark capacities 1 to 25 ml *See PMC-370-020P et seq.*

Graduated, capacities 1 to 25 ml *See PMF-410-040N et seq.*

Dispensing, capacities 5 to 250 µl *See PMP-690-030F et seq.*

Agla micrometer, capacity 0·5 ml *See PMP-800-P*

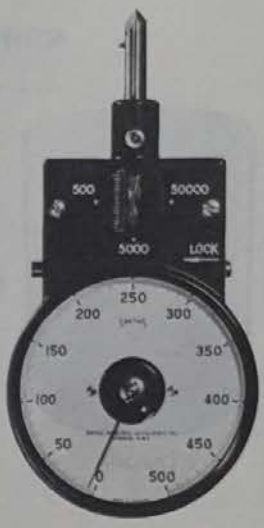
TACHOMETERS



TAF-200

REVOLUTION COUNTER, four-figure, for speeds up to 6000 rev/min. Left and right hand drive, geared 1:1, with reset device, in metal case 90 × 40 × 25 mm. With one each metal and rubber tips, in leatherette covered case. (F)

TAF-200-R Revolution counter **£11·42**



TAF-260

TACHOMETER, for measuring the speed of rotation in either direction. Scale graduated 0 to 500 rev/min with × 10 and × 100 range switch for readings up to 50000 rev/min and device to lock pointer position. With male and female hard rubber centres, disc attachment for surface speed measurements in ft/min and 75 mm extension piece in protective case.

TAF-260-V Tachometer **£44·55**



TAF-350

TACHOMETER, digital, battery operated, solid state circuitry. Measuring range 0 to 19999 rev/min; accuracy ± 1 rev/min. The instrument, which is designed to be hand held, requires a low torque to drive the shaft and is particularly suitable for low speed measurements.

With conical hard rubber contactor, memory recall facility and warning light which indicates when the batteries need replacing. Overall dimensions 200 × 60 × 51 mm high; shaft length 33 mm. Mass 400 g. Complete in carrying case with set of four batteries.

TAF-350-U Tachometer **£95·43**

SPARE PARTS

TAF-360-010K Batteries Set of 4 **£0·31**

TACHOMETER, optical, battery operated, with solid state integrated circuitry.

May be used in virtually all applications covered by mechanical tachometers and, in addition, for applications where a mechanical tachometer would slow down the rotating object or where the ends of the object are inaccessible.

The instrument emits a narrow pencil of light which is directed towards a small strip of adhesive reflecting tape affixed to the rotating object. Usually, it is held at 45° to the axis of rotation at a distance of 150 mm to 1 m. Pulses of reflected light are received by the instrument and converted by an analogue circuit into a meter reading.

With three switched ranges 250 to 2500, 500 to 5000 and 1000 to 10000 rev/min. Speeds below 250 rev/min can be measured by using two or more strips of tape and dividing the meter reading by the number of strips. The meter scale is 90 mm long and provides good reading accuracy; overall precision is 1·5% f.s.d. Overall dimensions 150 × 80 × 75 mm, mass approximately 0·5 kg.

With batteries, spare lamp and pack of adhesive reflecting tape.

TAF-450M Tachometer, optical **£88·33**

SPARE PARTS

TAF-460-010C	Battery	**£1·91**
TAF-460-030T	Lamp	**£0·96**
TAF-460-050N	Reflecting tape	Pack **£0·96**



TAF-450

Gallenkamp

TANKS

All capacities and dimensions quoted are nominal



TAJ-200



TAJ-260

CIRCULAR TANKS

TANKS, *PYREX* **glass, circular,** with ground edge. Suitable for use with GALLENKAMP Thermo Stirrers BJH-300 and BJH-400 as thermostatically controlled baths.

Capacity, litres	12	30
Diameter, mm	250	300
Height, mm	300	450
Wall thickness, mm	3 to 6	5 to 8

TAJ-200-030X	Tank, PYREX, 12 litres	**£18·90**
TAJ-200-070C	Tank, PYREX, 30 litres	**£30·43**

TANK, polycarbonate, transparent, circular. Can be used at temperatures up to 135°C. Capacity 9 litres, diameter 220mm, height 250mm. With polycarbonate cover. (F)

TAJ-260-030S	Tank, polycarbonate, 9 litres	**£26·61**



TAJ-400

RECTANGULAR TANKS

TANKS, glass, rectangular. Suitable for use as aquaria. (F)

Capacity, litres	1·75	3	5·5	9
Length, mm	175	200	250	300
Width, mm	125	150	175	200
Height, mm	125	150	175	200
Capacity, litres	14	25	35	48
Length, mm	350	400	450	600
Width, mm	225	275	300	300
Height, mm	225	275	300	300

TAJ-400-030V	Tank, glass, 1·75 litres	**£4·61**
TAJ-400-050P	Tank, glass, 3 litres	**£5·46**
TAJ-400-070J	Tank, glass, 5·5 litres	**£6·86**
TAJ-400-090D	Tank, glass, 9 litres	**£9·45**
TAJ-400-110A	Tank, glass, 14 litres	**£12·77**
TAJ-400-150L	Tank, glass, 25 litres	**£21·38**
TAJ-400-190W	Tank, glass, 35 litres	**£29·81**
TAJ-400-210T	Tank, glass, 48 litres	**£38·59**



TAJ-490

TANKS, glass fibre, with lid.

Length, mm	460	730
Width, mm	330	570
Height, mm	350	510

TAJ-490-050V	Tank, 460 × 330 × 350mm	**£11·14**
TAJ-490-090J	Tank, 730 × 570 × 510mm	**£23·12**

TEMPERATURE CONTROL

CONTACT THERMOMETERS

For the thermostatic control of baths, ovens, etc.

CONTACT THERMOMETER, Jackson, mercury filled and sealed. A Beckmann differential type thermometer capable of controlling to ±0·01°C over the range 0 to 100°C. Coarse control of temperature operating point is achieved by transferring mercury between the internal reservoir and the bulb. Fine control is by means of an adjusting head which is rotated to control the position of a contact wire in the thermometer capillary. The head incorporates a 2-pin plug for electrical connection and a mating socket is provided. Moulded graduations on the head facilitate final adjustment of temperature and the set point responds in either direction to rotation of the head through a fraction of a division. The thermometer has a 50 division reference scale, for any given volume of mercury in the bulb, which represents an operating range of approximately 10°C. Overall length including adjusting head 350mm.

TEH-200W	Contact thermometer, Jackson	**£23·01**

CONTACT THERMOMETERS, direct reading, adjustable, mercury filled and sealed. Capable of controlling to within ±0·1°C. With two opal glass scales, the upper one for setting and the lower one indicating the temperature. An adjustable head contains a magnetic coupling device to adjust the thermometer setting to the required temperature against the internal scale. Overall length including adjustable head 400mm, immersion depth 150mm. (F)

TEH-240-030Y	Contact thermometer, 0 to 50 × 1°C	**£23·74**
TEH-240-050C	Contact thermometer, 0 to 100 × 1°C	**£23·74**
TEH-240-070T	Contact thermometer, 0 to 200 × 2°C	**£23·74**
TEH-240-090N	Contact thermometer, 0 to 350 × 5°C	**£25·20**

ACCESSORY

TEH-260-504V	Protective case, metal, ¾in. BSP. (F)	**£9·34**



TEH-200



TEH-240

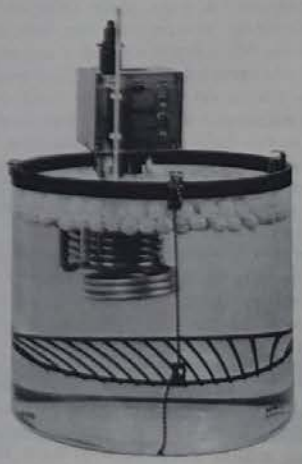
NOTE: These contact thermometers must be used in conjunction with a sensitive relay. For loads up to 20A a.c. electronic relay EFP-700-C is recommended.

Gallenkamp THERMO STIRRERS

For converting suitable containers into temperature controlled water baths

Both models incorporate heaters, thermostats and efficient stirrers which can be converted into pumps for the external circulation of water at controlled temperatures.

- **Temperature range from ambient plus 5°C to 100°C**
- **Quiet and reliable operation**
- **Suitable for a wide range of bath sizes**



See BJH-300 and BJH-400

Gallenkamp

Gallenkamp COMPENSTAT HYDRAULIC THERMOSTATS

- Prepacked kits – easily installed
- Direct temperature scale
- Temperature fluctuations down to ±0·25°C
- Good long term stability
- Ambient temperature compensation



TEH-410

The COMPENSTAT hydraulic thermostat is suitable for fitting to a wide range of laboratory equipment. It gives accurate and reliable temperature control when installed in accordance with simple instructions and is readily built into equipment because the sensing bulb is connected by a flexible capillary tube to the control head. The bulb position can therefore be chosen for maximum efficiency, while the head can be independently positioned to suit the overall design of the equipment.

Comprises basically a sensing bulb, a capillary connecting tube and a control head. The system is unaffected by barometric pressure variations. A scale plate calibrated in °C facilitates temperature setting. In operation the bulb is heated until the expansion of the filling liquid extends a bellows which actuates a microswitch and turns off the heaters. Compensation for ambient temperature effects on the control head is provided. Rapid temperature response is obtained by a heat feedback system which consists of a heater fixed to the capillary tube. The heat feedback enables the COMPENSTAT to anticipate the approach of the desired temperature and thus prevent overshoot. During steady operation it provides a form of proportional control and reduces fluctuations to a minimum.

These COMPENSTAT kits are for user installation in ovens, incubators, liquid baths, etc, not of GALLENKAMP manufacture.

Each kit includes a small transformer to ensure the correct current through the capillary heater for a wide variety of main heater loadings.

The microswitch, which has single pole changeover contacts, is rated at 15A a.c. non-inductive. For higher loads and for all d.c. applications a relay must be used (See *EFF-700-C*).

Bulb dimensions 150mm long × 6·4mm diameter, capillary 1100mm long, overall dimensions of head 35mm high × 90mm wide × 70mm deep.

COMPENSTAT KIT, *GALLENKAMP*, as specified, range 0 to 100°C, with instructions. For use in incubators, ovens, etc. For 220–240V 50–60Hz single phase supplies.

TEH-380-E COMPENSTAT kit **£29·25**

COMPENSTAT KIT, *GALLENKAMP*, as specified, range 40 to 250°C, with instructions. For 220–240V 50–60Hz single phase supplies.

TEH-390-U COMPENSTAT kit **£29·25**

COMPENSTAT KIT, *GALLENKAMP*, as specified, range 0 to 100°C, with instructions. For use in water or oil baths. With $\frac{3}{8}$ in. BSF union on capillary to make a liquid tight seal. Capillary length from head to union 340mm, from union to bulb 100mm. For 220–240V 50–60Hz single phase supplies.

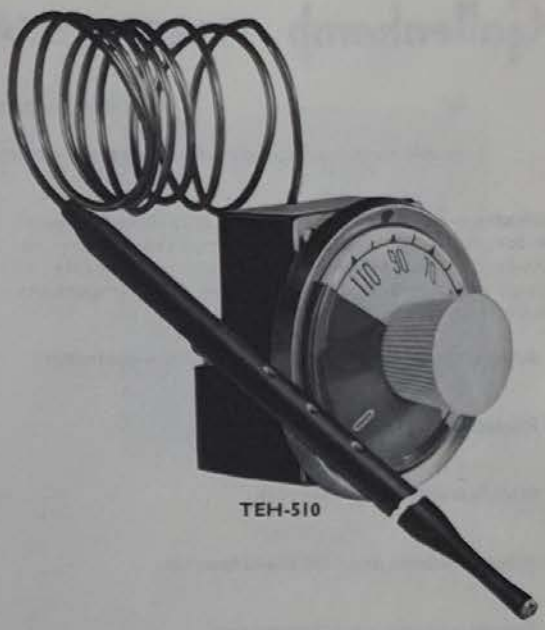
TEH-410-W COMPENSTAT kit **£29·25**

NOTE: Replacement COMPENSTATS for GALLENKAMP apparatus are available factory assembled and must be ordered specifically for the individual apparatus.

HYDRAULIC THERMOSTAT

THERMOSTAT, hydraulic, range 20 to 110°C. For building into equipment where a fluctuation of nominally 5°C is adequate. Suitable for use as a safety thermostat. Incorporates a single pole switch for ON/OFF switching of up to 20A at 250V non-inductive loads. Not recommended for currents below 0·5A. With locating lugs and suitable for fixing by a screwed nosepiece to panels up to 6·5mm thick. Capillary length approximately 1m. Supplied with knob, escutcheon and instructions for assembly.

TEH-510-X Thermostat **£8·04**



TEH-510

BIMETAL THERMOSTATS

Operate by means of a helix of bimetal fixed at one end to a stem and at the other end to an operating rod. A change of temperature causes the helix to twist and this motion is transmitted to the switch within the head. With arbitrary scale. The stem requires a protective pocket if inserted through the side of a bath below liquid level. A relay is essential for Type TS3 and for best results a relay should be used with Type TS2 also.

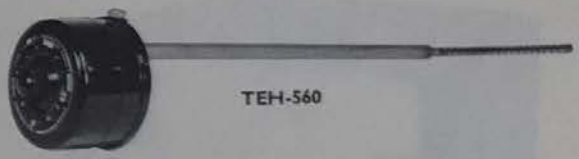
The switch differentials quoted are the changes of temperature which will cause the thermostats to open or close, and not the performance of the apparatus to which they are fitted.

Although set for optimum performance when supplied, the contact pressure, and hence the differential can be increased or decreased.

Type	TS2	TS2	TS3
Maximum temperature, °C	300	300	150
Range of adjustment, °C	120	120	40
Differential, °C	0·5	0·5	0·2
Stem length, mm	150	300	250

TEH-560-030Q Bimetal thermostat, TS2, 150mm **£16·99**
TEH-560-050K Bimetal thermostat, TS2, 300mm **£18·84**
TEH-560-090V Bimetal thermostat, TS3, 250mm **£18·03**

Relays *See EFP-700-C to EFS-220-V*


TEH-560

AQUARIUM THERMOSTATS, combined with heater and mounted in protective tube

See APN-750-030Y et seq.

TEMPERATURE CONTROLLER

TEMPERATURE CONTROLLER, electronic, range 0 to 100°C. The controller is housed in a steel case 100mm high × 210mm wide × 105mm deep, with carrying handle and four feet. Temperature is measured by means of a close tolerance thermistor probe in a stainless steel sheath 225mm long × 6mm diameter. The probe is connected by 2m of cable to a miniature terminal block inside the case. Temperature is displayed on a 75mm scale length meter and a calibration check is built-in. A press button and knob allow for a single control temperature to be set on the meter and a relay of 20A capacity switches over when the measured temperature passes the set point. The relay contacts are brought out to a 13A terminal block within the controller case and 'normally open' or 'normally closed' switching functions can be selected. For 220–240V 50Hz single phase supplies. Complete with 1·5m of mains cable.

TEH-630-P Temperature controller **£104·63**

Thermo stirrers for controlling water baths *See BJH-300 to BJH-400*


TEH-630

Gallenkamp

Gallenkamp THERMOSTATIC WATER CIRCULATOR

Range near ambient to 80°C

A self-contained apparatus for pumping temperature controlled water through external apparatus

Applications include the maintaining of constant temperature for viscosity, spectrophotometry, polarimetry, refractometry and other investigations and circulation through water jackets, condensers, constant temperature coils and open tanks.

- **Solid state COMPENSTAT temperature controller**
- **Direct reading temperature scale**
- **Stainless steel reservoir tank**
- **Integral heater provides rapid heat-up**
- **Robust, reliable circulating pump**
- **Compact, light-weight overall design**



TEH-750

Construction

The water is heated by sheathed heater inside a stainless steel tank contained in the circulator. Its temperature is accurately controlled by means of a solid state COMPENSTAT with direct reading scale; a safety cutout is incorporated which operates at about 85°C.

Nozzles in the side of the tank act as inlet and outlet and also as filling, draining and overflow ports. The tank is fitted with a cooling coil through which tap water or other coolant may be run for operation near ambient temperature. This facility enables thermostatted water to be circulated at a few degrees below ambient provided cold mains water is available.

The water is pumped by an efficient, reliable, centrifugal pump which is directly coupled to a brushless motor. The pump is not damaged if the flow of water is stopped while the motor is running.

The apparatus is fitted with a combined mains switch and indicator lamp, a load lamp to show the operation of the thermostat and a safety cutout indicator lamp.

Operation

The solid state COMPENSTAT maintains the water in the circulator at the correct temperature. The apparatus to be heated, however, may stabilise at a lower temperature due to heat losses in the circulation system. The COMPENSTAT must then be adjusted until the external apparatus reaches the desired temperature.

Should the circulator overheat the safety cutout operates at about 85°C and must be manually reset.

The circulator can be used in conjunction with sealed external apparatus such as a water jacket or open systems, e.g. an aquarium.

Technical data

Temperature range	Near ambient to 80°C
Temperature fluctuation	Less than ±0·05°C
Heating rate	10°C/min at no load
Internal tank capacity	2·5 litres
Heater rating	750 W
Pumping rate	5 litres/min at zero head
Maximum head	2·5 m
Nozzles, diameter	10 mm (inlet 14 mm)
Overall dimensions, height × width × depth	200 × 270 × 320 mm
Mass	8 kg

THERMOSTATIC WATER CIRCULATOR, *GALLENKAMP*, 80°C as specified. Comprising 2·5 litre stainless steel reservoir tank, 750 W heater, centrifugal pump, cooling coil, direct reading COMPENSTAT solid state thermostat, safety cutout and instructions. For single phase supplies.

TEH-750-010N Thermostatic water circulator, 220–240 V 50 Hz **£177·75**

TEH-750-030H Thermostatic water circulator, 110–120 V 60 Hz **£183·38**

ACCESSORIES

Tubing clips	See CNK-640
Tubing, N10 and N12·5	See TWR-290
Tubing connectors	See ADF-600

Gallenkamp **THERMO STIRRER**

with pump to circulate bath fluid to external apparatus

- **Maximum temperature 100°C**

See BJH-300 with accessories

REFRIGERATED THERMOSTATIC WATER CIRCULATORS

For use in ambient temperatures up to 30°C. Comprises reservoir, direct reading temperature indicator-controller, refrigeration unit, heater and pump. For 220–240 V 50 Hz single phase supplies.

Temperature range	−5 to 60°C	−15 to 60°c
Heat extraction rate (approximate) of circulating water at 20°C with air temperature of 22°C, W	400	1300
Reservoir capacity, litres	1·1	1·7
Heater rating, kW	1	1·5
Refrigeration unit, W	150	375
Pumping rate at zero head, litres/min	6·5	11
Maximum head, m	2	4·5
Power rating, maximum, kW	2	3
Overall dimensions, height × width × depth, mm	380 × 340 × 535	600 × 380 × 440
Mass, kg	46	60

TEH-830-010T Thermostatic water circulator, −5 to 60°C **£341·00**

TEH-830-110P Thermostatic water circulator, −15 to 60°C **£544·50**



TEH-830-110
TEH-830-010
is similiar

Gallenkamp REFRIGERATED THERMOSTATIC BATHS

35 LITRE CAPACITY

- **Temperature range −20 to +50°C**
- **Contact thermometer control**
- **Stainless steel interior**
- **Internal depth 23cm**
- **Fitted shelf adjustable for height**
- **Available with pump for circulating cooled liquid to external apparatus**

See BLC-280 et seq.



TEST TUBES

All dimensions quoted are nominal length × diameter

SODA-LIME GLASS TEST TUBES

TEST TUBES, soda-lime glass, normal wall (BS 3218 light wall thickness), with rim.

TES-200-030S	Test tubes, 50 × 6mm	Pack of 144 **£1·58**
TES-200-050M	Test tubes, 50 × 10mm	Pack of 144 **£1·63**
TES-200-070G	Test tubes, 75 × 10mm	Pack of 144 **£1·74**
TES-200-090A	Test tubes, 75 × 12mm	Pack of 144 **£1·97**
TES-200-110U	Test tubes, 100 × 12mm	Pack of 72 **£1·08**
TES-200-130X	Test tubes, 125 × 12mm	Pack of 72 **£1·24**
TES-200-150Y	Test tubes, 125 × 16mm	Pack of 72 **£1·46**
TES-200-170C	Test tubes, 125 × 19mm	Pack of 72 **£1·74**
TES-200-190T	Test tubes, 150 × 16mm	Pack of 72 **£1·69**
TES-200-210Q	Test tubes, 150 × 19mm	Pack of 72 **£2·03**
TES-200-230K	Test tubes, 150 × 25mm	Pack of 72 **£3·15**

TEST TUBES, soda-lime glass, heavy wall, rimless, bacteriological grade. The 75 × 12mm tube is suitable for the Kahn test.

TES-240-070B	Test tubes, 75 × 10mm	Pack of 144 **£2·08**
TES-240-090S	Test tubes, 75 × 12mm	Pack of 144 **£2·25**
TES-240-110P	Test tubes, 100 × 12mm	Pack of 72 **£1·41**
TES-240-130J	Test tubes, 125 × 12mm	Pack of 72 **£1·63**
TES-240-150D	Test tubes, 125 × 16mm	Pack of 72 **£1·86**
TES-240-190X	Test tubes, 150 × 16mm	Pack of 72 **£2·08**
TES-240-210L	Test tubes, 150 × 19mm	Pack of 72 **£2·48**
TES-240-230F	Test tubes, 150 × 25mm	Pack of 72 **£3·71**
TES-240-250W	Test tubes, 175 × 30mm	Pack of 72 **£8·10**

TEST TUBES, soda-lime glass, with rim, graduated, capacity 20 × 0·2ml, figured every 2ml.

TES-280-R	Test tubes, 20ml, graduated	Pack of 12 **£4·95**



TES-200
TES-600
TES-630
TES-680



TES-240
TES-650
TES-700
TEW-300
TEW-380



TES-280

BOROSILICATE GLASS TEST TUBES

TEST TUBES, thermal shock resisting glass, normal wall (BS 3218 light wall thickness), with rim.

TES-600-030J	Test tubes, 75 × 10mm	Pack of 144 **£2·42**
TES-600-050D	Test tubes, 100 × 12mm	Pack of 72 **£1·69**
TES-600-070U	Test tubes, 100 × 16mm	Pack of 72 **£2·06**
TES-600-090X	Test tubes, 125 × 16mm	Pack of 72 **£2·25**
TES-600-110L	Test tubes, 150 × 16mm	Pack of 72 **£2·75**
TES-600-130F	Test tubes, 150 × 19mm	Pack of 72 **£3·51**
TES-600-150W	Test tubes, 150 × 25mm	Pack of 72 **£4·30**

TEST TUBES, *PYREX* **glass,** light wall, with rim.

TES-630-030L	Test tubes, 75 × 10mm	Pack of 144 **£4·09**
TES-630-050F	Test tubes, 75 × 12mm	Pack of 144 **£4·31**
TES-630-070W	Test tubes, 100 × 12mm	Pack of 144 **£5·29**
TES-630-090Q	Test tubes, 100 × 16mm	Pack of 144 **£7·88**
TES-630-110N	Test tubes, 125 × 16mm	Pack of 144 **£7·07**
TES-630-130H	Test tubes, 150 × 12mm	Pack of 144 **£5·98**
TES-630-150B	Test tubes, 150 × 16mm	Pack of 144 **£8·05**
TES-630-170S	Test tubes, 150 × 19mm	Pack of 144 **£9·20**
TES-630-190M	Test tubes, 150 × 24mm	Pack of 144 **£12·08**
TES-630-210J	Test tubes, 180 × 18mm	Pack of 144 **£9·09**
TES-630-230D	Test tubes, 200 × 24mm	Pack of 72 **£9·44**
TES-630-250U	Test tubes, 200 × 32mm	Pack of 72 **£18·98**
TES-630-270X	Test tubes, 200 × 38mm	Pack of 36 **£13·40**

TEST TUBES, *PYREX* **glass,** light wall, rimless.

TES-650-030U	Test tubes, 75 × 10mm	Pack of 144 **£4·09**
TES-650-050X	Test tubes, 75 × 12mm	Pack of 144 **£4·31**
TES-650-070Y	Test tubes, 100 × 12mm	Pack of 144 **£5·29**
TES-650-090C	Test tubes, 100 × 16mm	Pack of 144 **£7·88**
TES-650-110W	Test tubes, 125 × 16mm	Pack of 144 **£7·07**
TES-650-130Q	Test tubes, 150 × 12mm	Pack of 144 **£5·98**
TES-650-150K	Test tubes, 150 × 16mm	Pack of 144 **£8·05**
TES-650-170E	Test tubes, 150 × 19mm	Pack of 144 **£9·20**
TES-650-190V	Test tubes, 150 × 24mm	Pack of 144 **£12·08**
TES-650-210S	Test tubes, 180 × 18mm	Pack of 144 **£9·09**
TES-650-230M	Test tubes, 200 × 24mm	Pack of 72 **£9·44**
TES-650-250G	Test tubes, 200 × 32mm	Pack of 72 **£18·98**
TES-650-270A	Test tubes, 200 × 38mm	Pack of 36 **£13·40**

TEST TUBES, *PYREX* **glass,** medium wall, with rim.

TES-680-030W	Test tubes, 75 × 10mm	Pack of 144 **£5·98**
TES-680-050Q	Test tubes, 75 × 12mm	Pack of 144 **£6·79**
TES-680-070K	Test tubes, 100 × 12mm	Pack of 144 **£6·61**
TES-680-090E	Test tubes, 125 × 16mm	Pack of 144 **£11·90**
TES-680-110B	Test tubes, 150 × 16mm	Pack of 144 **£11·73**
TES-680-130S	Test tubes, 150 × 19mm	Pack of 144 **£13·63**
TES-680-150M	Test tubes, 150 × 24mm	Pack of 144 **£18·29**
TES-680-170G	Test tubes, 200 × 32mm	Pack of 72 **£26·34**
TES-680-190A	Test tubes, 200 × 38mm	Pack of 36 **£14·49**

TEST TUBES, *PYREX* **glass,** medium wall, rimless.

TES-700-030B	Test tubes, 75 × 10mm	Pack of 144 **£5·98**
TES-700-050S	Test tubes, 75 × 12mm	Pack of 144 **£6·79**
TES-700-070M	Test tubes, 100 × 12mm	Pack of 144 **£6·61**
TES-700-090G	Test tubes, 125 × 16mm	Pack of 144 **£11·90**
TES-700-110D	Test tubes, 150 × 16mm	Pack of 144 **£11·73**
TES-700-130U	Test tubes, 150 × 19mm	Pack of 144 **£13·63**
TES-700-150X	Test tubes, 150 × 24mm	Pack of 144 **£18·29**
TES-700-170Y	Test tubes, 200 × 32mm	Pack of 72 **£26·34**
TES-700-190C	Test tubes, 200 × 38mm	Pack of 36 **£14·49**

TEST TUBES, borosilicate glass, with ground joint neck but without stopper.

Length × dia., mm Neck size	100 × 12 10/13	125 × 16 14/15	150 × 23 19/17
TES-730-070X	Test tube, 100 × 12 mm		**£0·68**
TES-730-090Y	Test tube, 125 × 16 mm		**£0·74**
TES-730-150Q	Test tube, 150 × 23 mm		**£0·90**

Stoppers — *See SYH-200 and SYH-310*
Test tubes, stoppered — *See also QUICKFIT section*


TES-730 with SYH-200

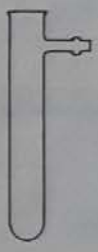
TEST TUBE, borosilicate glass, graduated, capacity 10 × 0·1 ml.

TES-760-X Test tube, 10 × 0·1 ml **£0·84**


TES-760

TEST TUBE, borosilicate glass, with side arm.

TES-790-090M	Test tube, 125 × 15 mm	Pack of 6 **£1·77**
TES-790-130D	Test tube, 150 × 20 mm	Pack of 6 **£2·17**
TES-790-150U	Test tube, 150 × 26 mm	Pack of 6 **£2·36**


TES-790

TEST TUBE, borosilicate glass, 150 × 20 mm, with side arm and 19/26 joint neck.

TES-820-L Test tube, 150 × 20 mm **£1·33**


TES-820

TEST TUBE, borosilicate glass, graduated, capacity 10 × 1 ml, with side arm and 14/15 joint neck.

TES-850-N Test tube, 10 × 1 ml **£1·80**


TES-850

Test tubes for special purposes are listed elsewhere in the catalogue as indicated.

Colorimetry

Test tubes, uniform diameter — *See COL-590-550A*

Dairy Products

Test tubes, methylene blue index — *See DBH-620-R*
Test tubes, solubility index — *See DBH-570-N*

Petroleum and Allied Products

Test tubes, drop point, IP 31 — *See PEH-320-150*
Test tubes, drop point, ASTM D566-IP 132 — *See PEH-360-U*

NEUTRAL RESISTANCE GLASS TEST TUBES

TEST TUBES, neutral resistance glass, medium wall, nominal thickness 0·75 mm, rimless, bacteriological grade. Linear expansivity 5·1 × 10^{-6}/°C.

TEW-300-030Q	Test tubes, 75 × 10 mm	Pack of 144 **£2·37**
TEW-300-050K	Test tubes, 100 × 12 mm	Pack of 72 **£1·58**
TEW-300-070E	Test tubes, 100 × 16 mm	Pack of 72 **£1·97**
TEW-300-090V	Test tubes, 125 × 16 mm	Pack of 72 **£2·15**
TEW-300-110S	Test tubes, 150 × 16 mm	Pack of 72 **£2·61**
TEW-300-130M	Test tubes, 150 × 19 mm	Pack of 72 **£3·38**
TEW-300-150G	Test tubes, 150 × 25 mm	Pack of 72 **£4·05**

TEST TUBES, DREYER, **BS 625,** neutral resistance glass, 60 × 7 mm, with rim.

TEW-340-U Test tubes, 60 × 7 mm Pack of 144 **£9·05**


TEW-340

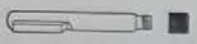
TEST TUBES, Durham fermentation, BS 625, neutral resistance glass, rimless.

TEW-380-030G	Test tubes, 30 × 6 mm	Pack of 288 **£14·41**
TEW-380-050A	Test tubes, 35 × 8 mm	Pack of 288 **£14·41**
TEW-380-070R	Test tubes, 50 × 7·5 mm	Pack of 144 **£2·44**

Gallenkamp



TEW-450



TEW-510



TEW-530-530 with TEW-510



TEW-650



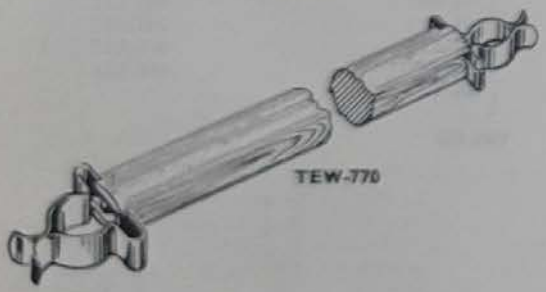
TEW-680



TEW-710



TEW-740



TEW-770

CULTURE TUBES

TUBES, tissue culture, expendable, clear polystyrene, water wettable and non-toxic, 100 × 16mm, fitted with airtight screw cap. (F)

TEW-450-F Tubes, 100 × 16mm — Pack of 50 **£2·70**

TUBES, tissue culture, Leighton, neutral glass, 125 × 16mm, rimless, with flat rectangular enlargement 40 × 12mm in wall at the closed end. In use, the indentation retains the medium. Permits simultaneous preparation of a matrix culture and a 'flying coverslip' culture in the same tube. The matrix culture can be examined without optical distortion by the wall of the tube. J. Leighton, 'The Growth Patterns of some Transplantable Animal Tumours in Sponge Matrix Tissue Culture', 1954, *J. Nat. Cancer Inst.* **15**, 273.

TEW-480-H Tubes, 125 × 16mm — Pack of 48 **£37·71**

TUBES, tissue culture, Leighton, as TEW-480-H but with plastics screw cap with screw liner packed separately. Tube and cap can be autoclaved at 121°C.

TEW-510-C Tubes, 125 × 16mm — Pack of 48 **£43·54**

SPARE PARTS

TEW-530-010Y Caps, with liner. — Pack of 50 **£1·04**

ACCESSORIES for TEW-480-H and TEW-510-C

TEW-530-510L Coverslips, No. 1½, 35 × 9·5mm. — Pack of 100 **£1·09**

Rack, anodised aluminium, to accommodate 48 Leighton tubes horizontally in 4 layers. Self locking feature ensures correct tube location. Supplied in kit form for easy assembly by user.

TEW-530-530F Rack — **£22·16**

TEST TUBE HOLDERS

TEST TUBE HOLDERS, wood with steel spring. Accommodates tubes up to 19mm diameter.

TEW-650-M Test tube holders — Pack of 10 **£2·13**

TEST TUBE HOLDERS, brass with wood handle. Accommodates tubes up to 32mm diameter.

TEW-680-X Test tube holders — Pack of 3 **£2·14**

TEST TUBE HOLDERS, plated spring steel. Accommodates tubes up to 30mm diameter.

TEW-710-J Test tube holders — Pack of 10 **£3·44**

TEST TUBE HOLDER, as TEW-710-J but fitted with alloy rod 62mm long × 13mm diameter for hand use or bosshead mounting.

TEW-740-L Test tube holder — **£1·28**

TEST TUBE HOLDERS, Nuffield pattern, comprising wood rod 150mm long × 13mm diameter with spring clip set in slot at each end. Accommodates tubes of 10, 12 and 16mm diameters.

TEW-770-N Test tube holders — Pack of 6 **£2·52**

Test tube brushes — *See BUR-550 to BUR-640*
Test tube stands — *See STK-440 to STK-680*
Test tube tongs — *See TNS-650*

TEST PAPERS

Chemical — *See PBK-210*
Litmus — *See PBK-260*
pH — *See PBK-320*
pH reels — *See PBK-370*

THERMOGRAPHS

7-day clockwork movement. Ranges −10 to 40°C and 0 to 50°C

See THV-820

THERMAL ANALYSIS

METTLER TA2000 MODULAR THERMAL ANALYSIS SYSTEM

A compact versatile system suitable for quantitative differential thermal analysis and other measurements involving the thermal behaviour of materials

Applications include studies of:

- **Melting behaviour**
- **Recrystallisation**
- **Tempering and stress release**
- **Chemical reaction enthalpy**
- **Reaction-kinetic data**
- **Decomposition temperature**
- **Specific heat**
- **Glass transition**
- **Desorption**



Technical data

TA10 DTA cell

Temperature range	−20 to 500°C
Calorimetric sensitivity	60 μV approx. (at 100°C) / mcal/s
Calorimetric reproducibility	±0·5%
DTA measuring sensor	Five-fold thermopile Au/Ni
Standard crucible	Al, sealable, 40 μl
High pressure crucible	Up to 100 atmospheres
Purge gas flow	Maximum 20 ml/min
Pressure range	760 to 10^{-3} torr
Dimensions	220 mm diameter × 280 mm high

TA20 DTA amplifier

Measuring ranges	10/20/50/100/200/500/1000 μV With the instrument set on the 1 mV position, maximum input voltage (for linear deflection) is 3 mV. In the other measuring ranges, the maximum input voltage is always five times that of the corresponding measuring range (i.e., measuring range of 500 μV: 5 × 500 μV = 2·5 mV)
Outputs: for recorder	100 mV/measuring range
for DVM	1 V/measuring range
Load capacity of the outputs	1 V output: load resistance ⩾ 50 k Ω 100 mV outputs: load resistance ⩾ 5 k Ω (all outputs are short circuit proof)
Zero point displacement	±1 measuring range
Calibrated backing voltages, automatically connected	±3 measuring ranges
Noise (0·01 to 1 Hz)	= 0·1 μVpp, typical (related to input)

TA30 programme selector

Heating and cooling rates	0·1 to 29·9°C/min
Digitally selectable steps of	0·1°C/min
High speed	100°C/min
Temperature programmes	Up (down) – isotherm; up (down) – out; cycles: up – down – up . . .
Temperature markings	Can be switched off; 1 marking/1°C or 1 marking/10°C

MEASURING PRINCIPLES

The METTLER TA2000 System determines the heat flow to a sample by measuring the difference between the heat flows to the sample crucible and a reference crucible.

Most measurements are made under heating or cooling conditions. This makes it possible to determine thermal effects which occur in a given temperature range. However, reactions can also be investigated under constant (isothermal) temperature conditions.

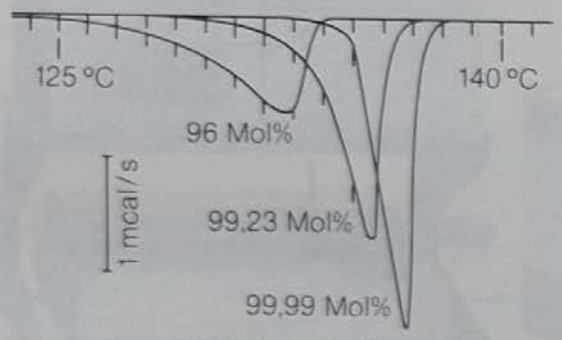
The heat flow (mcal/s) to the sample is converted into an electrical signal by means of a differential temperature thermopile. This signal is transmitted to a recorder and can be evaluated manually or automatically. Automatic data processing may be performed via the METTLER data transfer system.

METTLER TA2000 THERMAL ANALYSIS SYSTEM MODULES

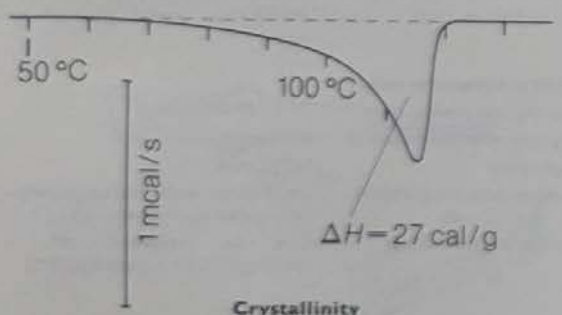
DTA CELL *METTLER* TA10

Comprises a fan cooled silver furnace mounted in an outer case which is fitted with a sealing lid and connections for vacuum and gas purging. The lid can be locked. A platinum resistance sensor measures furnace temperature and exact positioning of the crucible is ensured by centring holes on the measuring sensor and by corresponding guide pins on the crucible.

The DTA measuring sensor comprises a glass disc with vapour-deposited five-fold thermopiles acting as differential temperature sensors. The temperature difference between the sample and the reference crucible which is proportional to the heat flow to the sample, is converted into a voltage proportional to the heat flow, or temperature difference, and transmitted to the TA20 amplifier.



Purity determination
Phenacetin of varying purity, each approx. 5·5mg
Scan rate 1°C/min



Crystallinity
Polyethylene 3·628mg
Scan rate 5°C/min

DTA AMPLIFIER *METTLER* TA20

A low noise, high sensitivity amplifier which amplifies the weak signal coming from the differential temperature sensor of the TA10 DTA Cell. The voltages available at the rear of the instrument can be used to operate a recorder and for automatic data processing via the METTLER data transfer system.

PROGRAMME SELECTOR *METTLER* TA30

Comprises a pulse generator to provide selection of cooling and heating speed, with digital indication, programme selection controls, heater ON-OFF switches and indicator lamps. A remote programming plug is provided to allow all functions of the amplifier to be controlled externally.

POWER AMPLIFIER *METTLER* TA31

Contains the output stage for furnace heating and provides power distribution to the DTA Amplifier Programme Selector and Recorder.

TEMPERATURE CONTROLLER *METTLER* TA32

Provides programme control and digital indication of furnace temperatures.

ACCESSORIES

Crucibles. The standard aluminium crucibles can be sealed vapourtight. In this way, no sublimation or evaporation can alter the measuring signal. An optional high-pressure crucible may be used for chemical reactions in solutions with an inherent vapour pressure of up to 100 atmospheres. Both types of crucible are equipped with a centring pin for exact positioning on the measuring sensor.

Crucible sealing press. A manually operated press for sealing the standard aluminium crucibles.

THERMAL ANALYSIS SYSTEM, modular, *METTLER* **TA2000,** as specified, comprising DTA cell, DTA amplifier, programme selector, power amplifier, temperature controller, aluminium crucibles and crucible sealing press. Requires but **does not include,** a recorder or digital voltmeter. For 90–135V or 190–260V, 50–60Hz single phase supplies. (F)

THB-350-G Thermal analysis system Price from **£15000·00**

Data Transfer System *See BDT-200-X*

ACCESSORIES

Crucible set, comprising 100 aluminium crucibles, capacity 40µl, with cover and one pair of curved tweezers. METTLER 27338. (F)

THB-370-510P	Crucible set	**£66·55**
THB-370-520M	Crucible sealing press. METTLER 27330. (F)	**£419·87**
THB-370-530J	Indium sample in vial. METTLER 88437. (F)	**£20·21**
THB-370-540G	Cooling attachment. METTLER 27342. (F)	**£72·60**
THB-370-550D	Crucible set. METTLER 27343. (F)	**£707·85**

THERMOMETERS

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THERMOMETERS listed in other sections

See page headings Dairy Incubators Ovens Quickfit Soil Science

TEMPERATURE CONVERSION TABLE

(Sauveur's Arrangement)

The middle column is the known temperature in °C or °F. The equivalent temperature on the other scale is to right or left of this figure depending on the conversion desired. For example: 100°C is 212°F and 100°F is 37·8°C.

−170 to −1			0 to 34			35 to 69			70 to 89			90 to 1000			1100 to 3000		
C		F	C		F	C		F	C		F	C		F	C		F
−112	**−170**	−274	−17·8	**0**	32	1·7	**35**	95·0	21·1	**70**	158	32·2	**90**	194	593	**1100**	2012
−107	**−160**	−256	−17·2	**1**	33·8	2·2	**36**	96·8	21·7	**71**	159·8	32·8	**91**	195·8	649	**1200**	2192
−101·2	**−150**	−238	−16·7	**2**	35·6	2·8	**37**	98·6	22·2	**72**	161·6	33·3	**92**	197·6	704	**1300**	2372
−96	**−140**	−220	−16·1	**3**	37·4	3·3	**38**	100·4	22·8	**73**	163·4	33·9	**93**	199·4	760	**1400**	2552
−90	**−130**	−202	−15·6	**4**	39·2	3·9	**39**	102·2	23·3	**74**	165·2	34·4	**94**	201·2	816	**1500**	2732
−84	**−120**	−184	−15·0	**5**	41·0	4·4	**40**	104·0	23·9	**75**	167·0	35·0	**95**	203·0	871	**1600**	2912
−79	**−110**	−166	−14·4	**6**	42·8	5·0	**41**	105·8	24·4	**76**	168·8	35·6	**96**	204·8	927	**1700**	3092
−73·4	**−100**	−148	−13·9	**7**	44·6	5·6	**42**	107·6	25·0	**77**	170·6	36·1	**97**	206·6	982	**1800**	3272
−68	**−90**	−130	−13·3	**8**	46·4	6·1	**43**	109·4	25·6	**78**	172·4	36·7	**98**	208·4	1038	**1900**	3452
−62	**−80**	−112	−12·8	**9**	48·2	6·7	**44**	111·2	26·1	**79**	174·2	37·2	**99**	210·2	1093	**2000**	3632
−57	**−70**	−94	−12·2	**10**	50·0	7·2	**45**	113·0	26·7	**80**	176·0	37·8	**100**	212	1149	**2100**	3812
−51	**−60**	−76	−11·7	**11**	51·8	7·8	**46**	114·8	27·2	**81**	177·8	93·3	**200**	392	1204	**2200**	3992
−45·6	**−50**	−58	−11·1	**12**	53·6	8·3	**47**	116·6	27·8	**82**	179·6	149	**300**	572	1260	**2300**	4172
−40·0	**−40**	−40	−10·6	**13**	55·4	8·9	**48**	118·4	28·3	**83**	181·4	204	**400**	752	1316	**2400**	4352
−34·4	**−30**	−22	−10·0	**14**	57·2	9·4	**49**	120·2	28·9	**84**	183·2	260	**500**	932	1371	**2500**	4532
−28·9	**−20**	−4	−9·4	**15**	59·0	10·0	**50**	122·0	29·4	**85**	185	316	**600**	1112	1427	**2600**	4712
−28·3	**−19**	−2·2	−8·9	**16**	60·8	10·6	**51**	123·8	30·0	**86**	186·8	371	**700**	1292	1482	**2700**	4892
−27·8	**−18**	−0·4	−8·3	**17**	62·6	11·1	**52**	125·6	30·6	**87**	188·6	427	**800**	1472	1538	**2800**	5072
−27·2	**−17**	1·4	−7·8	**18**	64·4	11·7	**53**	127·4	31·1	**88**	190·4	482	**900**	1652	1593	**2900**	5252
−26·7	**−16**	3·2	−7·2	**19**	66·2	12·2	**54**	129·2	31·7	**89**	192·2	538	**1000**	1832	1649	**3000**	5432
−26·1	**−15**	5·0	−6·7	**20**	68·0	12·8	**55**	131·0									
−25·6	**−14**	6·8	−6·1	**21**	69·8	13·3	**56**	132·8									
−25·0	**−13**	8·6	−5·6	**22**	71·6	13·9	**57**	134·6									
−24·4	**−12**	10·4	−5·0	**23**	73·4	14·4	**58**	136·4									
−23·9	**−11**	12·2	−4·4	**24**	75·2	15·0	**59**	138·2									
−23·3	**−10**	14·0	−3·9	**25**	77·0	15·6	**60**	140·0									
−22·8	**−9**	15·8	−3·3	**26**	78·8	16·1	**61**	141·8									
−22·2	**−8**	17·6	−2·8	**27**	80·6	16·7	**62**	143·6									
−21·7	**−7**	19·4	−2·2	**28**	82·4	17·2	**63**	145·4									
−21·1	**−6**	21·2	−1·7	**29**	84·2	17·8	**64**	147·2									
−20·6	**−5**	23·0	−1·1	**30**	86·0	18·3	**65**	149·0									
−20·0	**−4**	24·8	−0·6	**31**	87·8	18·9	**66**	150·8									
−19·4	**−3**	26·6	0	**32**	89·6	19·4	**67**	152·6									
−18·9	**−2**	28·4	0·6	**33**	91·4	20·0	**68**	154·4									
−18·3	**−1**	30·2	1·1	**34**	93·2	20·6	**69**	156·2									

INTERPOLATION FACTORS

C		F	C		F	C		F
0·56	**1**	1·8	4·44	**8**	14·4	33·3	**60**	108
1·11	**2**	3·6	5·00	**9**	16·2	38·9	**70**	126
1·67	**3**	5·4	5·56	**10**	18·0	44·4	**80**	144
2·22	**4**	7·2	11·1	**20**	36·0	50·0	**90**	162
2·78	**5**	9·0	16·7	**30**	54·0	55·6	**100**	180
3·33	**6**	10·8	22·2	**40**	72·0			
3·89	**7**	12·6	27·8	**50**	90·0			

Gallenkamp

THERMOMETERS



GENERAL INFORMATION

Mercury-in-glass thermometers are still the most convenient devices for measuring temperature quickly and with reasonable accuracy. Alcohol, pentane and toluene are used to fill low temperature thermometers but such thermometers do not have the same accuracy as mercury thermometers.

ENGRAVED STEM THERMOMETERS

These comprise selected glass tubes, of very fine and uniform bores, sealed to bulbs, the scales being engraved directly on the stems.

ENCLOSED OPAL GLASS SCALE THERMOMETERS

These thermometers comprise capillary tubes of small outside diameters, sealed to bulbs and the stems so produced are anchored to scales made of opal glass. The capillaries and scales are both enclosed in outer protective glass tubes.

IMMERSION DEPTH

Most standard thermometers are calibrated to give a correct reading of temperature when the liquid in the thermometer is completely immersed in the medium being tested. In theory, that part of the stem above the fluid level in the thermometer should be immersed, but in practice it is necessary to have the thermometer fluid level slightly above the sample level in order to read the thermometer. Partial immersion thermometers are calibrated to read correctly when immersed up to a definite point indicated on the stem. In theory, the temperature of vapour surrounding the emergent portion should be the same as during standardisation and calibration, but this condition is difficult to obtain. Thus, total immersion thermometers are considered more accurate although if insufficiently immersed these thermometers will read low for temperatures above the surroundings and vice-versa. **All standard thermometers are calibrated for total immersion unless otherwise stated.**

TEST CERTIFICATES

The testing of liquid-in-glass thermometers is shared by the British Standards Institution and the National Physical Laboratory and the BST and NPL certificates issued respectively by these authorities are of equal standing. Both authorities accept thermometers which are manufactured to conform with the appropriate British Standard or other recognised specifications for testing and retesting. Such thermometers are provided with certificates which give corrections at five or more points according to the type and accuracy of the thermometer. A test certificate is a verification of the accuracy of a thermometer and not a guarantee of correct functioning. Thermometers should be re-tested at intervals not exceeding five years, or more frequently if determination of the zero or other suitable fixed point indicates that a re-test is required.

Users may submit thermometers direct to the BSI or NPL. Further details of the procedure are given in Test Leaflet TL12 issued by the British Standards Institution, Maylands Avenue, Hemel Hempstead, Hertfordshire, England.

STORAGE OF THERMOMETERS

Those thermometers having ranges entirely below ambient temperature should, if possible, be stored vertically with the bulbs downwards. Spirit thermometers should always be stored away from direct sunlight. Thermometers after usage should be allowed to reach air temperature before storage.

CARE OF LIQUID-IN-GLASS THERMOMETERS

Liquid-in-glass thermometers are liable to develop faults during transit or when otherwise subjected to undue vibration. The following is a summary of the defects which are likely to occur and the best remedial procedures which can be carried out by the user.

Gas trapped in bulb. First tap any bubbles of gas into the top of the bulb then cool the bulb in a suitably cold medium, until the mercury contracts sufficiently for the trapped gas to be forced above the mercury. It may be necessary to heat and cool the thermometer two or three times to do this. Should a thermometer need cooling to very low temperatures for this purpose (see RFR-650-G Freezer Aerosol), it should not be shaken or vibrated while the mercury is frozen solid.

Gas trapped in contraction chamber. The mercury can be cooled as described above until the gas is above the mercury.

Divided column. The parts may be rejoined by cooling as described above.

Detached mercury at the top of contraction chamber. It is necessary to cool the bulb until mercury comes down into the contraction chamber. The side of the stem should be gently tapped until the detached mercury forms a globule on the wall of the contraction chamber. By gently heating the bulb this mercury can be rejoined to the main column.

Detached mercury in expansion chamber. Tap the top of the stem until the detached mercury collects on the top of the capillary. Heat the thermometer bulb, taking great care if the thermometer is a high temperature one. As the expanding mercury forces gas into the expansion chamber continue to tap the stem in order to keep the detached mercury on top of the capillary.

Mercury in U-tube of Beckmann thermometer. For safety in transit, the U-shaped capillary, at the top of Beckmann thermometers, is frequently almost filled with mercury. To rejoin this mercury to the main column so that zero can be set at the required point, the top of stem just below the metal cap is gently warmed until the mercury in the U-capillary expands thereby driving some into the bore. All the mercury should then siphon into the bulb and fill the bore. The trapped gas can then be cleared by the cooling method already described.

Safety grip for inserting thermometers into cork or rubber stoppers *See GTB-400-L*

GENERAL PURPOSE THERMOMETERS

All dimensions quoted are nominal

THERMOMETERS, °C scale, mercury-in-glass, gas filled, with permanent graduations in amber stain. Overall length 300mm, diameter 6 to 7mm, 75mm immersion.

THL-210-030C	Thermometer, −10 to 50×0·5°C	**£1·13**
THL-210-050T	Thermometer, −10 to 110×1°C	**£0·92**
THL-210-070N	Thermometer, −10 to 200×1°C	**£1·24**
THL-210-090H	Thermometer, −10 to 250×1°C	**£1·26**
THL-210-110E	Thermometer, −10 to 360×2°C	**£1·35**
THL-210-130V	Thermometer, −10 to 400×2°C	**£1·42**



THL-210
THL-240

THERMOMETERS, °F scale, otherwise as THL-210.

THL-240-030E	Thermometer, 0 to 110×1°F	**£1·13**
THL-240-050V	Thermometer, 0 to 240×1°F	**£1·01**
THL-240-070P	Thermometer, 0 to 400×2°F	**£1·24**
THL-240-090J	Thermometer, 0 to 600×5°F	**£1·42**

THERMOMETERS, °C scale, engraved stem, mercury-in-glass, gas filled. Overall length 375mm, diameter 7mm. Graduations commence about 100mm above the mercury bulb.

THL-290-050J	Thermometer, −10 to 110×0·5°C	**£2·23**
THL-290-070D	Thermometer, −10 to 150×1°C	**£2·27**
THL-290-090U	Thermometer, −10 to 250×2°C	**£2·32**
THL-290-110R	Thermometer, −10 to 360×5°C	**£2·67**



THL-290

THERMOMETERS, stirring, °C scale, mercury-in-glass, with reinforced bulb and permanent graduations in amber stain. Overall length 150mm, diameter 6mm, 76mm immersion.

THL-340-030T	Thermometer, −10 to 50×1°C	**£0·88**
THL-340-050N	Thermometer, −10 to 110×1°C	**£0·82**
THL-340-070H	Thermometer, −10 to 250×5°C	**£0·97**
THL-340-090B	Thermometer, −10 to 360×5°C	**£1·07**

THERMOMETERS, stirring, °C scale, as THL-340 but 300mm overall length.

THL-360-030F	Thermometer, −10 to 50×0·5°C	**£1·17**
THL-360-050W	Thermometer, −10 to 110×1°C	**£0·97**
THL-360-070Q	Thermometer, −10 to 250×1°C	**£1·28**
THL-360-090K	Thermometer, −10 to 360×2°C	**£1·42**



THL-340
THL-360

THERMOMETERS WHICH INDICATE INCORRECT TEMPERATURES

Incorrect indication of temperature is nearly always due to a break in the mercury thread and in most cases the thread can easily be rejoined by the user. Thermometers should be examined before use and if necessary corrected using the procedures detailed on page 680.



THL-410



THL-440



THL-490

THERMOMETERS, low temperature, °C scale, engraved stem, total immersion. Overall length 300mm, diameter 7mm. THL-410-030J is mercury filled; THL-410-050D and 070U are red spirit filled.

THL-410-030J	Thermometer, −40 to +40×0·5°C	**£3·51**
THL-410-050D	Thermometer, −80 to +30×1°C	**£2·06**
THL-410-070U	Thermometer, −120 to +30×1°C	**£2·90**

THERMOMETER, high temperature, °C scale, engraved stem, mercury-in-glass. Scale 0 to 550×2°C. Overall length 400mm, diameter 7mm, 70mm immersion.

THL-440-U	Thermometer, 0 to 550×2°C	**£5·18**

THERMOMETERS, red reflector, engraved stem, lens front mercury-in-glass, with red glass strip in stem. The mercury forms a mirror in which is seen a bright red image of the strip. These thermometers can be read more easily and the reading can be seen from a greater distance than with the ordinary mercury pattern and at the same time are free from the disadvantages of spirit filled thermometers. Overall length 300mm, diameter 6mm, 75mm immersion.

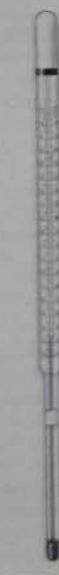
THL-490-030W	Thermometer, −10 to 110×1°C	**£1·74**
THL-490-050Q	Thermometer, 0 to 250×1°C	**£2·04**
THL-490-070K	Thermometer, 0 to 360×2°C	**£2·18**
THL-490-230X	Thermometer, 0 to 240×2°F	**£1·74**

THERMOMETERS, enclosed opal °C scale, mercury-in-glass. Overall length 300mm, diameter 10mm, 75mm immersion. (F)

THL-550-030T	Thermometer, −10 to 110×1°C	**£4·50**
THL-550-050N	Thermometer, 0 to 250×2°C	**£6·64**
THL-550-070H	Thermometer, 0 to 360×2°C	**£7·37**



THL-550



THL-580

THERMOMETERS, enclosed opal °C scale, mercury-in-glass. Overall length 600mm, stem length 300mm, stem diameter 11mm, scale tube diameter 19mm. (F)

THL-580-030V	Thermometer, 0 to 110×1°C	**£9·68**
THL-580-050P	Thermometer, 0 to 200×2°C	**£9·90**
THL-580-070J	Thermometer, 0 to 360×2°C	**£11·93**



THL-630

THERMOMETERS, °C scale, mercury-in-glass, engraved stem, gas filled with expansion chamber. Diameter 6mm, 60mm immersion. Overall length 350mm except THL-630-110E and 150P which are 450mm.

THL-630-030C	Thermometer, −20 to 30×0·1°C	**£4·50**
THL-630-050T	Thermometer, −5 to 50×0·2°C	**£3·76**
THL-630-070N	Thermometer, −5 to 50×0·1°C	**£4·39**
THL-630-090H	Thermometer, −5 to 105×0·2°C	**£4·22**
THL-630-110E	Thermometer, −5 to 105×0·1°C	**£5·46**
THL-630-130V	Thermometer, 50 to 105×0·1°C	**£5·29**
THL-630-150P	Thermometer, 50 to 150×0·1°C	**£7·43**
THL-630-170J	Thermometer, 100 to 150×0·1°C	**£6·02**

THERMOMETERS WHICH INDICATE INCORRECT TEMPERATURES

Incorrect indication of temperature is nearly always due to a break in the mercury thread and in most cases the thread can easily be rejoined by the user. Thermometers should be examined before use and if necessary corrected using the procedures detailed on page 680.

GENERAL PURPOSE THERMOMETERS TO BS 1704

Engraved stem, mercury-in-glass thermometers

The first thermometer of the total immersion series is spirit filled

THERMOMETERS, BS 1704, °C scale, total immersion, diameter 6mm.

	Schedule mark	Range and Subdivisions °C	Overall length mm	
THM-280-030M	B.GP.35C/TOT	−120 to 35 × 1	350	£2·90
THM-280-050G	GP.50C/TOT	−35 to 50 × 0·5	300	£2·27
THM-280-070A	GP.105C/1·0/TOT	−5 to 105 × 1	300	£1·55
THM-280-090R	GP.105C/0·5/TOT	−5 to 105 × 0·5	300	£1·69
THM-280-110X	GP.150C/TOT	−5 to 150 × 1	300	£1·72
THM-280-130Y	GP.250C/TOT	−5 to 250 × 1	300	£1·94
THM-280-150C	GP.360C/TOT	−5 to 360 × 1	350	£2·90
THM-280-170T	GP.400C/TOT	−10 to 400 × 2	300	£4·12
THM-280-190N	GP.510C/TOT	−10 to 510 × 2	380	£7·55

THERMOMETERS, BS 1704, °C scale, partial (100mm) immersion, diameter 6mm.

	Schedule mark	Range and Subdivisions °C	Overall length mm	
THM-300-050Y	GP.50C/100	−35 to 50 × 0·5	300	£2·27
THM-300-070C	GP.105C/1·0/100	−5 to 105 × 1	300	£1·58
THM-300-090T	GP.105C/0·5/100	−5 to 105 × 0·5	300	£1·70
THM-300-110Q	GP.150C/100	−5 to 150 × 1	300	£1·72
THM-300-130K	GP.250C/100	−5 to 250 × 1	300	£1·94
THM-300-150E	GP.360C/100	−5 to 360 × 1	350	£2·90
THM-300-170V	GP.400C/100	−10 to 400 × 2	300	£4·12
THM-300-190P	GP.510C/100	−10 to 510 × 2	380	£7·55

THERMOMETERS, BS 1704, °F scale, total immersion, diameter 6mm.

	Schedule mark	Range and Subdivisions °F	Overall length mm	
THM-320-030A	B.GP.96F/TOT	−180 to 96 × 2	350	£2·90
THM-320-050R	GP.120F/TOT	−35 to 120 × 1	300	£2·27
THM-320-070L	GP.220F/TOT	30 to 220 × 1	300	£1·72
THM-320-090F	GP.300F/TOT	30 to 300 × 1	300	£1·72
THM-320-110C	GP.500F/TOT	28 to 500 × 2	300	£1·94
THM-320-130T	GP.650F/TOT	26 to 650 × 2	350	£2·32
THM-320-150N	GP.750F/TOT	20 to 750 × 5	300	£4·12
THM-320-170H	GP.950F/TOT	20 to 950 × 5	380	£7·55

THERMOMETERS, BS 1704, °F scale, partial (100mm) immersion, diameter 6mm.

	Schedule mark	Range and Subdivisions °F	Overall length mm	
THM-340-050D	GP.120F/100	−35 to 120 × 1	300	£2·27
THM-340-070U	GP.220F/100	30 to 220 × 1	300	£1·72
THM-340-090X	GP.300F/100	30 to 300 × 1	300	£1·72
THM-340-110L	GP.500F/100	28 to 500 × 2	300	£1·94
THM-340-130F	GP.650F/100	26 to 650 × 2	350	£2·32
THM-340-150W	GP.750F/100	20 to 750 × 5	300	£4·12
THM-340-170Q	GP.950F/100	20 to 950 × 5	380	£7·55

STANDARD THERMOMETERS TO BS 593

Engraved stem, mercury-in-glass thermometers

All dimensions quoted are nominal

THERMOMETERS, BS 593 Series A, °C scale, with zero check scale −0·5 to 0·5°C where applicable. Overall length 400mm, diameter 7mm. Total immersion.

	Schedule mark	Range and Subdivisions °C	
THM-420-050J	A.20C/TOT	−20 to 20 × 0·1	£3·71
THM-420-070D	A.40C/TOT	0 to 40 × 0·1	£3·60
THM-420-090U	A.70C/TOT	40 to 70 × 0·1	£4·73
THM-420-110R	A.100C/TOT	70 to 100 × 0·1	£6·08
THM-420-130L	A.130C/TOT	100 to 130 × 0·1	£6·50
THM-420-150F	A.160C/TOT	130 to 160 × 0·1	£6·87

THERMOMETERS, BS 593 Series A, °C scale, as THM-420 but partial (100mm) immersion.

	Schedule mark	Range and Subdivisions °C	
THM-440-030B	A.10C/100	−30 to 10 × 0·1	£4·52
THM-440-050S	A.20C/100	−20 to 20 × 0·1	£4·29
THM-440-070M	A.40C/100	0 to 40 × 0·1	£3·63
THM-440-090G	A.70C/100	40 to 70 × 0·1	£5·45
THM-440-110D	A.100C/100	70 to 100 × 0·1	£5·45
THM-440-130U	A.130C/100	100 to 130 × 0·1	£6·50
THM-440-150X	A.160C/100	130 to 160 × 0·1	£6·87

THERMOMETERS, BS 593 Series B, °C scale, with zero check scale −1 to 1°C where applicable. Overall length 400mm, diameter 7mm. Total immersion.

	Schedule mark	Range and Subdivisions °C	
THM-460-030K	B.60C/TOT	−20 to 60 × 0·2	£3·15
THM-460-050E	B.110C/TOT	50 to 110 × 0·2	£5·57
THM-460-070V	B.160C/TOT	100 to 160 × 0·2	£5·91
THM-460-090P	B.210C/TOT	150 to 210 × 0·2	£6·10
THM-460-110M	B.260C/TOT	200 to 260 × 0·2	£6·46

THERMOMETERS, BS 593 Series B, °C scale, as THM-460 but partial (100mm) immersion.

	Schedule mark	Range and Subdivisions °C	
THM-480-030T	B.60C/100	−20 to 60 × 0·2	£3·15
THM-480-050N	B.110C/100	50 to 110 × 0·2	£5·43
THM-480-070H	B.160C/100	100 to 160 × 0·2	£5·91
THM-480-090B	B.210C/100	150 to 210 × 0·2	£6·10
THM-480-110V	B.260C/100	200 to 260 × 0·2	£6·46

THERMOMETERS, BS 593 Series F, °C scale. Overall length 400mm, diameter 7mm. Identical with the corresponding IP and ASTM thermometers as indicated. Partial (100mm) immersion.

	Schedule mark	ASTM No	IP No	Range and Subdivisions °C	
THM-570-030S	F.50C/100	37C	77C	−2 to 52 × 0·2	£5·40
THM-570-050M	F.75C/100	38C	78C	24 to 78 × 0·2	£5·32
THM-570-070G	F.100C/100	39C	79C	48 to 102 × 0·2	£5·81
THM-570-090A	F.125C/100	40C	80C	72 to 126 × 0·2	£5·81
THM-570-110U	F.150C/100	41C	81C	98 to 152 × 0·2	£5·93
THM-570-130X	F.225C/100	42C	82C	95 to 255 × 0·5	£6·29

SHORT-RANGE, SHORT-STEM THERMOMETERS to BS 1365

Mercury-in-glass thermometers which meet the requirements for thermometers of the Anschutz and similar types. In series covering the ranges of −10 to 360°C with scale span of about 60°C.

THERMOMETERS, BS 1365, Series A2, °C scale. Overall length 230mm, diameter 6mm. Partial (80mm) immersion.

THM-640-030Y Thermometer, SA.55C/80, −10 to 55 × 0·2°C **£2·78**

THM-640-050C Thermometer, SA.105C/80, 45 to 105 × 0·2°C **£2·90**

THM-640-070T Thermometer, SA.155C/80, 95 to 155 × 0·2°C **£3·07**

THM-640-090N Thermometer, SA.205C/80, 145 to 205 × 0·2°C **£3·24**

THM-640-110K Thermometer, SA.255C/80, 195 to 225 × 0·2°C **£3·49**

THM-640-130E Thermometer, SA.305C/80, 245 to 305 × 0·2C **£3·97**

THM-640-150V Thermometer, SA.360C/80, 295 to 360 × 0·2°C **£4·52**



THM-820

ADJUSTABLE IMMERSION THERMOMETERS AND ADAPTERS

THERMOMETERS, engraved stem, adjustable immersion depth, °C scale, for use in thermometer adapter THM-820. Calibrated for an average immersion of 120mm and may be used at between 75 and 180mm immersion depth. Overall length 400mm, with lowest graduation 220mm from bulb, diameter 6mm. Particularly useful for use with standard joint apparatus where the adapter can be placed in a stillhead or flask side neck.

THM-780-030S Thermometer, −5 to 105 × 1°C **£2·73**

THM-780-050M Thermometer, 95 to 205 × 1°C **£3·49**

THM-780-070G Thermometer, 195 to 305 × 1°C **£4·42**



THM-890

THERMOMETER ADAPTERS, for fitting thermometers or gas entry tubes into standard joint glassware, allowing adjustment of immersion depth. The thermometer is held at the desired immersion depth using a short length of flexible tubing 6·5mm i.d.

THM-820-030G Thermometer adapter, 14/23 joint **£1·91**

THM-820-050A Thermometer adapter, 19/26 joint **£2·03**

THERMOMETER READERS

THERMOMETER READER, metal, with adjustable focusing eyepiece and spring loaded clip to accommodate thermometers up to 13mm diameter.

THM-890-M Thermometer reader **£5·85**

THERMOMETER READER, with plastics lens, held in a rubber moulding and giving × 2 magnification. The magnifier clips on thermometers or burettes up to 13mm diameter by a stainless steel wire spring. Two pointers formed from the rubber moulding assist the accurate reading of the mercury or liquid meniscus.

THM-920-H Thermometer reader **£5·34**



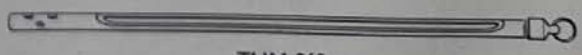
THM-920

THERMOMETER CASES

THERMOMETER CASES, brass, to take thermometers 5 to 7mm diameter. The dimension given is the length of thermometer accommodated.

THM-960-030Q Thermometer case, 300 to 320mm **£1·52**

THM-960-050K Thermometer case, 340 to 360mm **£2·59**



THM-960

Gallenkamp

BECKMANN DIFFERENTIAL THERMOMETERS

Beckmann differential thermometers are used for the accurate measurement of very small changes in temperature, e.g. for boiling point and freezing point determinations.



THP-340



THP-500
THP-520

Thermometers THP-320-C and THP-340-L have a large capacity reservoir and a wide bore capillary. After transit or use, the mercury in the reservoir can be joined with that in the capillary to form an uninterrupted column by tilting the thermometer. Therefore, as no shaking or tapping is required, the lives of these models are greatly increased. The procedure for preparing the thermometers for use requires little skill. The mercury column breaks and rejoins without coercion. Thermometer THP-360-U of necessity requires a narrow bore capillary and therefore cannot be designed to provide the simplified setting procedure mentioned above.

THERMOMETER, Beckmann, with zero at top of scale, for applications requiring the measurement of decreases in temperature such as freezing point determinations, etc. Approximate range −10 to 150°C, scale span 5 or 6 × 0·01°C. Overall length 600mm, scale length 250mm. Immersion 150mm. (F)

THP-320-C Thermometer **£28·69**

THERMOMETER, Beckmann, as THP-320-C but with zero at bottom of scale, for applications requiring the measurement of increases in temperature such as boiling point determinations, etc. Approximate range −10 to 150°C, scale span 5 or 6 × 0·01°C. (F)

THP-340-L Thermometer **£28·69**

THERMOMETER, Beckmann, with zero at bottom of scale, for applications requiring the measurement of increases in temperature such as boiling point determinations, etc. Approximate range −10 to 150°C, scale span 1 × 0·002°C. Overall length 550mm, scale length 250mm. Immersion 150mm. (F)

THP-360-U Thermometer **£42·75**

CALORIMETER THERMOMETERS, BS 791

THERMOMETERS, calorimeter, °C scale, engraved stem, total immersion, overall length 750mm, with maximum error of ±0·1°C at any point and maximum change in error of ±0·01°C for any interval of 0·5°C. Subdivided in 0·01°C. (F)

THP-500-030X Thermometer, Cal. 15 to 21C, 15 to 21°C **£39·38**

THP-500-050Y Thermometer, Cal. 18 to 24C, 18 to 24°C **£39·38**

THP-500-070C Thermometer, Cal. 21 to 27C, 21 to 27°C **£39·38**

THP-500-090T Thermometer, Cal. 24 to 30C, 24 to 30°C **£39·38**

THP-500-110Q Thermometer, Cal. 27 to 33C, 27 to 33°C **£39·38**

THP-500-130K Thermometer, Cal. 30 to 36C, 30 to 36°C **£39·38**

THP-500-150E Thermometer, Cal. 33 to 39C, 33 to 39°C **£39·38**

THERMOMETERS, calorimeter, as THP-500 but with NPL certificate giving the value of corrections at 11 points (each 0·5°C) to an accuracy of ±0·002°C. (F)

THP-520-030A Thermometer, Cal. 15 to 21C, 15 to 21°C **£109·45**

THP-520-050R Thermometer, Cal. 18 to 24C, 18 to 24°C **£109·45**

THP-520-070L Thermometer, Cal. 21 to 27C, 21 to 27°C **£109·45**

THP-520-090F Thermometer, Cal. 24 to 30C, 24 to 30°C **£109·45**

THP-520-110C Thermometer, Cal. 27 to 33C, 27 to 33°C **£109·45**

THP-520-130T Thermometer, Cal. 30 to 36C, 30 to 36°C **£109·45**

THP-520-150N Thermometer, Cal. 33 to 39C, 33 to 39°C **£109·45**

CLINICAL THERMOMETERS

THERMOMETERS, clinical, mercury-in-glass, engraved stem, lens front, stubby bulb, constricted bore pattern. In case with screw cap. Overall length 100mm, diameter 4mm.

THR-230-030U Thermometer, 35 to 42°C **£0·91**
THR-230-050X Thermometer, 95 to 107°F **£0·88**


THR-230

DIPPING THERMOMETERS

THERMOMETERS, dipping, with stainless steel dual scale and polypropylene case having suspension hook and a reservoir at the bottom for liquid sampling. Overall dimensions 300 × 45 × 40mm.

THR-270-030P Thermometer, −30 to 50°C and −20 to 120°F **£1·67**
THR-270-050J Thermometer, −5 to 115°C and 20 to 240°F **£1·67**


THR-270


THR-340

FOOD THERMOMETERS

THERMOMETER, confectioners', sugar boiling, mercury filled, mounted on brass frame approximately 200mm long with bent-up sides and handle and 140mm scale 50 to 450 × 5°F engraved on left, confectioners' terms on right. Overall length 290mm.

THR-340-X Thermometer **£3·80**

THERMOMETER, cookery, mercury filled, magnifying glass tube mounted on stainless steel frame with handle, overall length 250mm, having clip for attachment to side of cookery vessel. Scale, 130mm long, 20 to 240 × 2°C shows the correct cooking temperatures for various foods. With instructions and recipe booklet.

THR-370-Q Thermometer **£3·72**


THR-370

THERMOMETER, meat, for the determination of the internal temperature of roast meat. Bimetallic type with pointed stem 92mm long × 5mm diameter, and 50mm diameter head having dial graduated 60 to 90°C, showing the correct cooking temperatures for various types of meat. (F)

THR-410-E Thermometer **£2·37**


THR-410

THERMOMETER, refrigerator and freezer, red spirit filled, magnifying glass tube mounted horizontally in a triangular-section plastics case, 133 × 43 × 40mm high overall, which may be used free standing or hung on a suitable surface of up to 7mm thick using integral clip. Scale, 78mm long, is calibrated −40 to 40 × 2°C.

THR-440-G Thermometer **£1·41**



THR-440

INCUBATOR THERMOMETER

THERMOMETER, incubator, red reflecting, mercury-in-glass. Scale 10 to 60 × 1°C. Overall length 200mm, diameter 6mm.

THR-510-T Thermometer **£1·74**


THR-510



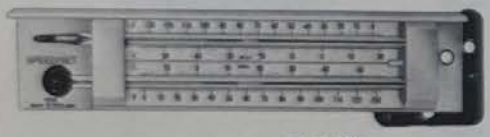
THR-570



THR-600



THR-690



THR-630

MAXIMUM AND MINIMUM THERMOMETERS

THERMOMETERS, maximum, °C scale, engraved stem, mercury-in-glass, constricted bore pattern, overall length 300mm, diameter 7mm, immersion 76mm.

THR-570-030X	Thermometer, −10 to 110 × 1°C	**£3·63**
THR-570-050Y	Thermometer, 0 to 200 × 1°C	**£3·97**

THERMOMETER, maximum and minimum, Six's pattern, BS 2840, wall mounting. Spirit-in-glass thermometer with mercury indicating thread and two cursors mounted on dual scale −20 to 55 × 1°C and 10 to 130 × 2°F. Overall length 270mm. In plastics frame complete with magnet.

THR-600-S	Thermometer	**£3·53**

THERMOMETER, maximum and minimum, wall mounting. Spirit-in-glass thermometer, with mercury indicating thread and two cursors, mounted on a dual scale −10 to 50 × 1°C and 0 to 130 × 2°F. Designed for horizontal mounting and reset by swivelling the frame to the vertical position. Overall length 220mm. In plastics frame and complete with mounting bracket and instructions for fitting.

THR-630-U	Thermometer	**£3·00**

MELTING POINT THERMOMETERS

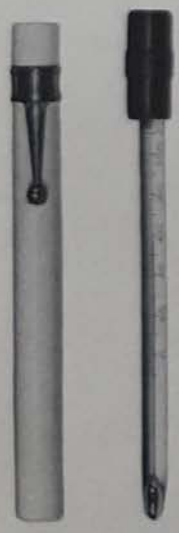
THERMOMETERS, melting point, °C scale, engraved stem, mercury-in-glass, gas filled, with expansion chamber. Overall length 250mm, except 0 to 360° range which is 300mm, diameter 6mm, 30mm immersion.

THR-690-030P	Thermometer, 0 to 150 × 0·5°C	**£3·15**
THR-690-050J	Thermometer, 140 to 190 × 0·5°C	**£3·53**
THR-690-070D	Thermometer, 140 to 300 × 0·5°C	**£4·23**
THR-690-090U	Thermometer, 290 to 400 × 0·5°C	**£5·37**
THR-690-110R	Thermometer, 0 to 360 × 1°C	**£2·90**

POCKET THERMOMETERS

THERMOMETERS, pocket, mercury-in-glass, with stem held in the cap of a plastics case which is fitted with a pocket clip. In use, the cap may be reversed and inserted into the case, which then forms a convenient extension handle. Overall length of case 140mm.

THR-740-030T	Thermometer, −10 to 110 × 2°C	**£1·50**
THR-740-050N	Thermometer, 30 to 220 × 2°F	**£1·50**



THR-740



THR-810



THR-840

WALL THERMOMETERS

THERMOMETER, Factories Act, wall mounting. Solid stem, lens front, red spirit-in-glass, on hardwood mount. Dual scale −5 to 50 × 1°C and 20 to 120 × 2°F with large figures and graduations and marked boldly at 16°C and 60°F. With bulb guard. Overall dimensions 255 × 45mm.

THR-810-S	Thermometer	**£1·22**

THERMOMETER, wall mounting. Solid stem, lens front, red spirit-in-glass, on hardwood mount. Dual scale 0 to 50 × 1°C and 20 to 120 × 2°F. With bulb guard. Overall dimensions 225 × 40mm.

THR-840-U	Thermometer	**£0·63**

Bimetal wall mounting thermometer *See THT-840-A*

WATER JACKET THERMOMETER

THERMOMETER, water jacket, °C scale, mercury-in-glass. Scale 10 to 40 × 0·2°C. Overall length 125mm, diameter 6mm.

THR-930-T	Thermometer	**£1·97**

IP STANDARD THERMOMETERS

Specified in IP Standards for Petroleum and its Products, Part I, published by the Institute of Petroleum.

THT-260-030C Thermometer, IP 1F/ASTM 5F, −36 to 120°F £2·48

THT-260-050T Thermometer, IP 1C/ASTM 5C, −38 to 50°F £2·48

THT-260-130V Thermometer, IP 2F, −112 to 70°F £2·31

THT-260-150P Thermometer, IP 2C, −80 to 20°C £2·31

THT-260-230R Thermometer, IP 3F, 30 to 220°F £2·42

THT-260-250L Thermometer, IP 3C, −1 to 105°C £2·42

THT-260-330N Thermometer, IP 4C, −4 to 360°C £6·10

THT-260-430J Thermometer, IP 5C, −2 to 300°C £7·70

THT-260-530F Thermometer, IP 6C, −2 to 400°C £7·93

THT-264-030B Thermometer, IP 8F, 30 to 110°F £3·03

THT-264-050S Thermometer, IP 8C, 0 to 44°C £3·03

THT-264-130U Thermometer, IP 9F, 100 to 180°F £4·08

THT-264-150X Thermometer, IP 9C, 37·8 to 82°C £4·08

THT-264-230Q Thermometer, IP 10F, 170 to 250°F £4·19

THT-264-250K Thermometer, IP 10C, 76 to 122°C £4·19

THT-270-050M Thermometer, IP 14C/ASTM 114C, −80 to 20°C £2·73

THT-270-130X Thermometer, IP 15F/ASTM 9F, 20 to 230°F £3·77

THT-270-150Y Thermometer, IP 15C/ASTM 9C, −7 to 110°C £3·77

THT-270-230K Thermometer, IP 16F, 200 to 700°F £5·32

THT-270-250E Thermometer, IP 16C, 90 to 370°C £5·32

THT-270-330G Thermometer, IP 17F, 100 to 180°F £4·23

THT-270-350A Thermometer, IP 17C, 38 to 82°C £4·23

THT-274-050L Thermometer, IP 20C, −38 to 42°C £3·63

THT-274-150H Thermometer, IP 21C, 25 to 105°C £3·63

THT-274-330F Thermometer, IP 23F, 94 to 108°F £4·60

THT-274-350W Thermometer, IP 23C, 34 to 42°C £4·60

THT-278-030Q Thermometer, Abel oil cup, 50 to 150°F £3·49

THT-278-050K Thermometer, Abel oil cup, 10 to 65°C £3·49

THT-278-130M Thermometer, Abel water bath, 90 to 190°F £3·56

THT-278-150G Thermometer, Abel water bath, 32 to 88°C £3·56

THT-282-030W Thermometer, IP 28F, 20 to 760°F £5·32

THT-282-050Q Thermometer, IP 28C, −6 to 400°C £5·32

THT-282-130S Thermometer, IP 29F, 66·5 to 71·5°F £11·70

THT-282-150M Thermometer, IP 29C, 18·6 to 21·4°C £10·41

THT-282-330K Thermometer, IP 31F, 97·5 to 102·5°F £11·08

THT-282-350E Thermometer, IP 31C, 36·6 to 39·4°C £10·69

THT-282-430G Thermometer, IP 32F, 208·5 to 213·5°F £13·28

THT-282-450A Thermometer, IP 32C, 98·6 to 101·4°C £13·28

THT-282-530C Thermometer, IP 33F, 29 to 35°F £9·23

THT-286-030V Thermometer, IP 35F, 137 to 143°F £11·70

THT-286-350D Thermometer, IP 38C, 23 to 27°C £4·82

THT-286-430F Thermometer, IP 39F, 30 to 100°F £4·16

THT-286-450W Thermometer, IP 39C, −1 to 38°C £4·16

THT-286-550S Thermometer, IP 40C, 20 to 120°C £4·33

THT-290-050V Thermometer, IP 41C, 100 to 230°C £4·94

THT-294-050U Thermometer, IP 47C, 150 to 175°C £4·55

THT-298-050T Thermometer, IP 60C, −2 to 80°C £3·63

THT-298-150P Thermometer, IP 61C, 30 to 200°C £3·87

THT-298-230R Thermometer, IP 62F/ASTM 2F, 20 to 580°F £4·55

THT-298-250L Thermometer, IP 62C/ASTM 2C, −5 to 300°C £4·55

THT-298-350H Thermometer, IP 63C/ASTM 61C, 32 to 127°C £5·57

THT-298-430J Thermometer, IP 64F, −5 to 215°F £4·48

THT-298-450D Thermometer, IP 64C, −20 to 102°C £4·48

THT-302-030B Thermometer, IP 74F, −35 to 160°F £4·02

THT-302-050S Thermometer, IP 75F, −25 to 180°F £4·05

THT-302-150X Thermometer, IP 76C, 10 to 55°C £4·55

THT-306-050R Thermometer, IP 84C, 148 to 202°C £6·14

THT-310-030G Thermometer, IP 89F/ASTM 113F, 30 to 350°F £4·14

THT-310-050A Thermometer, IP 89C/ASTM 113C, −1 to 175°C £4·14

Thermometers IP 77C to IP 82C See *THM-570*

ASTM THERMOMETERS

ASTM	
2C	See *THT-298-250L*
2F	See *THT-298-230R*
5C	See *THT-260-050T*
5F	See *THT-260-030C*
9C	See *THT-270-150Y*
9F	See *THT-270-130X*
37C	See *THM-570-030S*
38C	See *THM-570-050M*

ASTM	
39C	See *THM-570-070G*
40C	See *THM-570-090A*
41C	See *THM-570-110U*
42C	See *THM-570-130X*
61C	See *THT-298-350H*
113C	See *THT-310-050A*
113F	See *THT-310-030G*
114C	See *THT-270-050M*

Gallenkamp

TEMPERATURE INDICATING STRIPS

TEMPERATURE INDICATING STRIPS, *THERMAX*, self-adhesive, suitable for indicating and monitoring surface temperature. Can provide a permanent record of maximum temperature reached. Each strip comprises eight or more individual indicators printed with a series of temperatures. The indicators turn black when subjected to dry heat at the temperatures printed and the figures remain legible after heating.

THT-500-030U Temperature indicating strips, 37 to 65°C
Pack of 10 **£2·37**

THT-500-070Y Temperature indicating strips, 71 to 110°C
Pack of 10 **£2·37**

THT-500-110W Temperature indicating strips, 116 to 154°C
Pack of 10 **£2·37**

THT-500-150K Temperature indicating strips, 160 to 199°C
Pack of 10 **£2·37**

THT-500-190V Temperature indicating strips, 204 to 260°C
Pack of 10 **£2·37**



THT-500

BIMETALLIC DIAL THERMOMETERS

DIAL THERMOMETERS, bimetallic, with dial 46mm diameter and stainless steel stem 200mm long × 4mm diameter. Minimum immersion depth 60mm. Accuracy approximately 1% of full scale. (F)

THT-650-030A Dial thermometer, −10 to 110 × 1°C **£12·38**
THT-650-050R Dial thermometer, 0 to 220 × 2°C **£13·50**
THT-650-070L Dial thermometer, 0 to 400 × 5°C **£14·06**



THT-650 with clip


THT-700

ACCESSORY

Clip, plated brass to hold thermometer in a water bath or similar vessel having a wall thickness up to 6mm. (F)

THT-670-502R Clip **£2·30**

DIAL THERMOMETER, bimetallic, pocket type, with dial 24mm diameter, scaled 0 to 100°C, and stainless steel stem 120mm long × 4mm diameter. Complete with pocket clip and protective sheath which must be removed before immersing stem of thermometer in liquid. (F)

THT-700-N Dial thermometer **£9·62**



THT-730

DIAL THERMOMETER, bimetallic, for measuring temperature of flat surfaces such as hotplates. Dial 46mm diameter, scaled 0 to 400°C, stem 39mm long with copper end 25mm diameter. (F)

THT-730-P Dial thermometer **£17·38**

DIAL THERMOMETER, bimetallic, bench mounting, with dial 100mm diameter, dual scale −30 to 60°C and −20 to 140°F. Mounted in a black plastics frame for bench mounting. (F)

THT-790-T Dial thermometer **£2·37**

DIAL THERMOMETER, bimetallic, wall mounting, with dial 150mm diameter, dual scale −30 to 60°C and −20 to 140°F. In black plastics frame.

THT-840-A Dial thermometer **£2·15**


THT-790



THT-840

BATHS FOR THERMOMETER CALIBRATION

250°C MAXIMUM

- For use with water or oils
- Temperature fluctuation ± 0·025°C
- Illuminated work space

See VHC-400-010T et seq.



200°C MAXIMUM

- Purpose built calibration bath
- Temperature fluctuation ± 0·2°C for thermostatic model
- Rapid heating

See BLC-550-010L et seq.



120°C MAXIMUM

- For use with water or oils
- Temperature fluctuation ± 0·015°C
- Illuminated work space

See VHC-220-010V et seq.

50°C MAXIMUM

- Refrigerated bath
- Temperature fluctuation ± 0·05°C
- Minimum temperature −20°C

See BLC-240-010 et seq.



ELECTRICAL THERMOMETERS



THV-220



THV-430

POINTER READING THERMOMETERS

THERMOMETERS, electrical, battery operated with 95mm scale and simple operating controls including calibration check and OFF positions. Sockets are provided for connecting up to six temperature probes, selection of which is by pushbuttons on the front panel. In metal case, 210 x 160 x 75mm, with battery but **without** probe. THV-220-030K is subdivided in 5°C; THV-220-050E is subdivided in 5°C from −50 to 0°C and in 2°C from 0 to 50°C.

THV-220-030K	Thermometer, 10 to 150°C	£62·55
THV-220-050E	Thermometer, −50 to 50°C	£62·55

SPARE PART

THV-240-010C	Battery, MALLORY TR146X	£1·80

ACCESSORIES

	Probe, 65 x 4mm, stainless steel, in 80mm handle with 2m of cable.	
THV-240-502E	Probe, 65 x 4mm	£18·90
	Probe, 15 x 6mm, aluminium, with removable copper clip for surface temperature measurements and with 2m of cable.	
THV-240-510F	Probe, 15 x 6mm	£11·93
	Probe, 440 x 10mm, stainless steel, with rounded tip, T-pattern handle and 2m of cable. Suitable for use in soil and other loose material.	
THV-240-518M	Probe, 440 x 10mm	£26·44
THV-240-530W	Carrying case	£6·53

INDICATING PYROMETERS

- **Maximum temperature 1200°C and 1600°C**
- **Portable, bracket and panel mounting models**
- **Alternative pattern thermocouples in chromel-alumel and platinum-rhodium**

See PYL-300-J et seq.

DIGITAL READING THERMOMETER

A platinum resistance, temperature sensing element acts as part of a self-compensating resistance measuring bridge and the output signal of the bridge is fed via a transistorised amplifier to a stepping motor which maintains the bridge in balance and operates the digital counter.

Technical data

Temperature range	−20 to 300°C
Accuracy	From ±0·15 to ±0·5°C depending on temperature range
Reproducibility	±0·05°C
Reading resolution	0·1°C (1 digital step)
Response time	Approximately 100°C/20s
Recorder connection	1mV/°C; linearity +0·15%
Output voltage	320mV maximum
Internal resistance	500Ω maximum
Admissible ambient temperature	−20 to 50°C
Overall dimensions	215 x 170 x 115mm

THERMOMETER, digital reading, *METTLER* **TM15,** as specified. With output for recorder but **without** temperature probe. For 110–240V 50–60Hz single phase supplies. (F)

THV-430-T	Thermometer, digital	£661·87

ACCESSORIES

THV-450-050N	Probe, 150 x 5mm, glass, 2m cable. (F)	£193·60
THV-450-070H	Probe, 150 x 5mm, glass 4m cable. (F)	£193·60
THV-450-130P	Probe, 100 x 7mm, PYREX glass, NS 14.5/15 joint, 2m cable. (F)	£150·04
THV-450-250F	Probe, 150 x 2·5mm, stainless steel, 2m cable. (F)	£193·60
THV-450-270W	Probe, 150 x 2·5mm, stainless steel, 4m cable. (F)	£193·60
THV-450-310N	Probe, 100 x 6mm, stainless steel, 2m cable. (F)	£150·04
THV-450-370S	Probe, 250 x 6mm, stainless steel, 2m cable. (F)	£150·04
THV-450-410J	Probe, 50 x 11mm, surface temperature, 2m cable. (F)	£170·61
THV-450-470X	Switch, to accept up to six probes. (F)	£127·05

TEMPERATURE RECORDERS

A stainless steel sheathed iron-constantan thermocouple probe, 300mm long × 5mm diameter is connected by 2m of cable to a galvanometer movement housed in a compact, robust case. The deflection of the galvanometer is recorded by the pointer being pressed on to a pressure sensitive paper chart roll 60mm wide. The recordings occur at frequent intervals so that the trace appears as a continuous line. The chart drive mechanism is mounted on a swing down front panel for easy removal and replacement of the chart roll.

The chart speed is 125mm/h which enables each roll to run continuously for approximately two months. Temperature can be read directly to an accuracy of ±5°C and changes in temperature to within 1°C. Fitted with automatic cold junction compensation. With thermocouple probe and one chart roll.



THV-600
THV-650 is similar

TEMPERATURE RECORDER, *RUSTRAK*, as specified, range −10 to 110°C for recording incubator or oven temperatures.

THV-600-010V Temperature recorder, 220–260V 50Hz **£218·81**
THV-600-030P Temperature recorder, 105–125V 60Hz **£218·81**

SPARE PART

THV-620-030B Chart roll, scaled −10 to 110°C **£3·75**

TEMPERATURE RECORDER, *RUSTRAK*, as specified, range 50 to 300°C, for recording oven temperatures.

THV-650-010J Temperature recorder, 220–260V 50Hz **£218·81**
THV-650-030D Temperature recorder, 105–125V 60Hz **£218·81**

SPARE PART

THV-670-030M Chart roll, scaled 50 to 300°C **£3·75**

THERMOGRAPHS

THERMOGRAPH, for recording air temperature in the vicinity of the instrument. The temperature is measured by a bimetallic strip and recorded as an ink trace on a scaled chart attached to a drum driven by a 7-day clockwork movement. Housed in white stoved enamel case. Accuracy is ±1% of full scale. With bottle of ink, 100 charts and instructions.

THV-820-030Y Thermograph, −10 to 40°C **£82·50**
THV-820-070T Thermograph, 0 to 50°C **£82·50**



THV-820

SPARE PARTS

THV-840-030R Charts, −10 to 40°C Pack of 200 **£5·91**
THV-840-070F Charts, 0 to 50°C Pack of 200 **£5·91**

ACCESSORIES

Change wheels, to convert to 24-hour recording
See HYT-820-506Y

THICKNESS MEASUREMENT

GASOMETRIC APPARATUS, *TECHNICO*, **BS 443,** for the determination of the thickness of galvanised coatings on wire. Comprises 100ml burette subdivided in 0·5ml with bulb, two stopcocks and a tubulure for connection to a levelling bulb. Main glass part only.

TKB-200-Q Gasometric apparatus **£19·86**



TKB-200

ACCESSORY

Mercury reservoir levelling bulb, capacity 150ml
See MGH-480-010J

THICKNESS GAUGE, *ELCOMETER* **Inspector,** scale range 0 to 500 μm. A hand-operated instrument for direct thickness measurements of non-magnetic coatings on ferro-magnetic bases. Readings are accurate to ±10%.

TKB-300-Y Thickness gauge **£50·63**



TKB-300

Gallenkamp

TIMERS



TKL-210
TKL-230 is similar

CLOCKS

CLOCK, wall mounting, electrically operated. With stoved enamel case, 230mm diameter dial and sweep second hand. For 200–250V a.c. single phase supplies.

TKL-210-B Clock, 200–250V a.c. **£27·56**

CLOCK, wall mounting, as TKL-210-B but battery operated. Requires but **does not include** a 1·5V battery.

TKL-230-K Clock, battery **£25·31**



TKL-400

STOPCLOCKS

STOPCLOCK, with two hands indicating 60min and 60s total respectively on a 100mm diameter dial. With 30h spring driven movement, start and stop lever on one side and a reset lever on the other side. In stove enamelled case with holes for bench fixing and with protected dial.

TKL-400-P Stopclock **£9·27**

STOPCLOCK, with two hands indicating 60min and 60s total respectively on a 100mm diameter dial. With 4h spring driven movement and start, stop and reset pushbuttons. In plastics case with foot for bench mounting and with protected dial. (F)

TKL-430-R Stopclock **£18·11**



TKL-430

STOPCLOCK, with two hands indicating 60min and 60s total respectively on a 140mm diameter dial and with a third index pointer operated by a knurled knob in the centre of the glass window. Minute hand set by control knob. With 30h spring driven lever movement and lever operated start and stop. In plastics case with chromium plated bezel, stainless steel foot for bench or wall mounting and with protected dial.

TKL-470-M Stopclock **£26·78**

STOPCLOCK, with two hands indicating 60min and 60sec total respectively on a 210mm diameter dial. With 20h spring driven movement and start, stop and reset pushbuttons. In metal case with foot for bench mounting and with protected dial. (F)

TKL-510-A Stopclock **£25·76**

THERMOREGULATION

Bimetal thermostats	*See TEH-560 et seq.*
Contact thermometers	*See TEH-200 et seq.*
Electronic controller	*See TEH-630-P*
Hydraulic thermostats	*See TEH-380 et seq.*
Thermo Stirrers	*See BJH-300 et seq.*
Water circulators	*See TEH-750 et seq.*



TKL-470



TKL-510

STOPWATCHES

STOPWATCH, with main dial 0 to 60 × 0·2s and subsidiary dial 0 to 30 × 1 min. Start, stop and reset by consecutive pressures on the winder. (F)
TKM-300-N Stopwatch **£13·07**

STOPWATCH, with main dial 0 to 60 × 0·2s and subsidiary dial 0 to 60 × 1 min. Start and stop by consecutive pressures on the winder and reset by press movement at the side. Jewel movement, in chromium plated case. (F)
TKM-340-Y Stopwatch **£22·30**

STOPWATCH, with main dial 0 to 30 × 0·1s and subsidiary dial 0 to 30 × 0·5min. Start and stop by consecutive pressures on the winder and reset by press movement at the side. Jewel movement, in chromium plated case. (F)
TKM-390-T Stopwatch **£22·30**

STOPWATCH, precision, with three separate dials 0 to 1 × 0·1s, 0 to 60 × 1s and 0 to 60 × 1 min. Start, stop and reset by consecutive pressures on the winder. The 0·1s indicator stops only on the graduations thus facilitating exact readings. Jewel lever movement, in chromium plated case. (F)
TKM-440-A Stopwatch **£39·38**

STOPWATCH, multiple timing, split action, with main dial 0 to 30 × 0·1s and subsidiary dial 0 to 30 × 0·5min. With two co-axial seconds hands that can be operated by pressing the central knob. In addition the split-second hand can be stopped and made to rejoin the other, which continues to run steadily, by pressing a pushbutton. A number of concurrent tests can therefore be timed with one watch. The central knob is used to wind, start and stop the time. A pushbutton enables the second and minute hands to be returned to zero. Mounted in black polypropylene case. (F)
TKM-480-S Stopwatch **£74·50**

STOPWATCH HOLDER, with pushbutton operation for start, stop and reset by a simple mechanism which is adjustable for different sizes of watch and which always gives a positive action. **Without** stopwatch.
TKM-530-W Stopwatch holder **£7·90**


TKM-300


TKM-340


TKM-390


TKM-440


TKM-480


TKM-530 with stopwatch

ELECTRONIC TIMERS

STOPWATCH, portable electronic, multiple timing, with digital readout 0 to 99min 59·99s × 0·01s. With pushbuttons to start, stop and display the timed period, to reset to zero and to provide sequential timing. A selector switch allows the timer to be used in the 'Taylor mode' for timing successive events or processes. Sockets are provided for remote starting and stopping. Overall dimensions with display cover closed 120 × 75 × 45mm, mass 300g. With carrying cord but **without** batteries. Suitable batteries are EVER READY alkaline MN 1500 (four required). (F)
TKM-600-M Stopwatch **£137·50**

TIMER, digital, with six independent quartz crystal controlled timing channels. A four digit display indicates either 0·1 to 999·9s or 0·01 to 99·99s by means of a changeover switch. Each channel is independently operated by pushbutton switches for start, stop and display. The display can be switched to any channel during or after the timing period. Precise intermediate timing can be achieved by operating the display hold button. Each channel can be operated remotely. Overall dimensions 200 × 240 × 95mm high, mass 3·5kg. For single phase supplies.
TKM-650-A Timer, 110–250V 50–60Hz **£302·50**


TKM-600


TKM-650

Gallenkamp

INTERVAL TIMERS



TKP-330

INTERVAL TIMER, for periods of up to 120min, the end of the period being signalled by a buzzer alarm of 4s duration. The dial is approximately 40mm diameter and is subdivided in 5min intervals. With indicator which is turned to the required period thereby winding and starting the clock mechanism. Complete with key ring attachment. (F)

TKP-330-Y Interval timer **£5·32**



TKP-370

INTERVAL TIMER, for periods of up to 60min, the end of the period being signalled by a long bell ring. With indicator which is turned to the required period thereby winding and starting the clock mechanism. In plastics case with 50mm diameter dial.

TKP-370-D Interval timer **£4·74**

INTERVAL TIMER, as TKP-370-D but in metal case with 100mm diameter dial.

TKP-390-M Interval timer **£8·75**



TKP-390

INTERVAL TIMER, for periods of up to 120min, the end of the period being signalled by a 10s bell ring. The period required is set by a control knob which moves the minute and second pointers. The 30h spring driven lever movement is wound by one side lever while the other side lever energises the alarm. In metal case with 90mm diameter dial.

TKP-450-J Interval timer **£9·83**



TKP-450

TIME/TEMPERATURE CYCLING INCUBATORS



- Fan convection models, temperature range approximately 25 to 100°C
- Cooled models, temperature range approximately 0 to 45°C

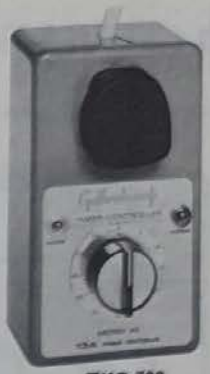
See INC-730-010E and INF-630-XX

PROCESS TIME SWITCHES

MANUAL ON, AUTOMATIC OFF

PROCESS TIMER CONTROLLER, *GALLENKAMP*, spring driven, bench mounting, for switching off electrical apparatus after an elapsed time of up to 60 min. Mounted in a rigid ABS plastics case with integral 13A shuttered socket and fitted 13A plug both to BS 1363, mains and output indicator lamps. Overall dimensions 175 × 100 × 90 mm high. Rating 13A. For 200–250V a.c. single phase supplies.

TKP-700-U Process timer controller **£20-25**



TKP-700



TKP-760

PROCESS TIMER, *VENNER*, spring driven, panel mounting, for switching off electrical apparatus after an elapsed time of up to 60 min and, simultaneously, to give visible or audible warning by connection to a lamp or bell circuit. Incorporates a spring operated movement with a 40 mm diameter dial on which the required period is set by turning the central indicator to an adjustable stop. With 5A single pole change-over switch. For 250V a.c. or 24V d.c. supplies.

TKP-760-B Process timer **£26-78**



TKR-210 without plug

DAILY CYCLE

TIME SWITCH, daily cycle, wall or bench mounting, with 24h dial divided every 15 min, timing levers to provide choice of one or two ON-OFF periods every 24h, integral 13A shuttered socket and fitted 13A plug both to BS 1363, indicator lamp and manual override. Minimum switching period 60 min ON-60 min OFF. Rating 13A. For 200–240V 50Hz frequency controlled single phase supplies.

TKR-210-K Time switch **£12-05**



TKR-250

TIME SWITCH, daily cycle, wall mounting, with 24h dial divided every 15 min, two timing levers, manual override, day selector and cable connection. Minimum switching period 30 min ON-15 min OFF. Rating 30A. For 200–240V 50Hz frequency controlled single phase supplies.

TKR-250-F Time switch **£20-10**



TKR-310

TIME SWITCH, daily cycle, multiple switching, wall mounting, with 24h dial having 96 tabs at 15 min intervals. When raised, the tabs provide a 15 min ON period, adjacent raised tabs providing continuous ON periods. The timer is thus very versatile for many laboratory purposes and can provide regular or irregular switching in any multiple of 15 min throughout the 24h. Minimum switching period 15 min ON-15 min OFF. With cable connection. Rating 10A. For 200–240V 50Hz frequency controlled single phase supplies. (F)

TKR-310-C Time switch **£35-49**

TISSUE GRINDERS

All capacities and dimensions quoted are nominal

TISSUE GRINDERS, (Homogenisers), comprising glass cup with protecting tube and glass plunger. Cup and plunger are ground internally and externally respectively, with a very small clearance between the ground surfaces when fitted together.

Overall length, mm	180	225
Ground zone length, mm	40	50
Ground zone dia., mm	7	11

TKW-300-03QT Tissue grinder, length 180mm **£3-15**
TKW-300-05QN Tissue grinder, length 225mm **£4-84**

Homogeniser, QUICKFIT See QHX-100-L



TKW-300



TKW-370

TISSUE GRINDER, capacity 50ml, comprising a tubular body closed at one end by a perforated plate and a piston. The piston, propelled by a screw, forces the tissue through the perforations into the path of a revolving knife.

TKW-370-C Tissue grinder **£35-70**

Gallenkamp

Gallenkamp TITRATION POTENTIOMETER

Manufactured under licence from Kodak Ltd



TLB-200

- **Suitable for potentiometric, differential or dead-stop titrations**
- **Transistor circuit suitable for most common electrodes except glass pH electrodes**

Battery operated and suitable for use with most electrodes except glass pH electrodes. The dial is calibrated 0 to 1 V x 10 mV and out of balance voltages of 2 mV are detectable. A switch selects the titration function required and controls are fitted for calibration, sensitivity and balance. A socket is provided for connecting a high sensitivity external meter. Overall dimensions 190 x 100 x 120 mm high, mass 1 kg.

TITRATION POTENTIOMETER, *GALLENKAMP*, transistorised, as specified, range 0 to 1 V, with built-in null meter and three batteries, MALLORY type MN 1500.

TLB-200-F	Titration potentiometer	**£43·31**

ACCESSORIES

	Reference electrode, calomel, stem diameter 15 mm, stem length 150 mm.	
TLB-220-030F	Reference electrode	**£8·80**
	Platinum foil electrode, stem diameter 6 mm, stem length 120 mm.	
TLB-220-050W	Platinum foil electrode	**£11·55**
	Silver foil electrode, stem diameter 6 mm, stem length 120 mm.	
TLB-220-070Q	Silver foil electrode	**£12·10**
	Battery, voltage reference	See *BML-830*
	Titration stand assemblies	See *TLB-300*
	Magnetic followers	See *SWX-280-L*

pH METERS



- **Student, general purpose and research models**
- **Meter and digital readouts**
- **Expanded scale facilities**
- **Wide range of electrodes**

See *PHJ-250-F* et seq.

Gallenkamp TITRATION STAND ASSEMBLIES

For electrometric titrations at ambient or elevated temperatures

- **Efficient variable magnetic stirring**
- **Convenient and quick to use**
- **Accepts standard electrodes, burettes and thermometers**



TLB-300 with burette and beaker

One assembly is based on an unheated magnetic stirrer, the other on a magnetic stirrer with hotplate. The stirring speeds of both are variable and each assembly is fitted with a burette holder for burettes of capacities 5 to 25ml. An electrode holder with quick release bosshead enables the electrodes to be lifted clear of the titration vessel between tests.

TITRATION STAND ASSEMBLY, *GALLENKAMP*, **unheated**, as specified, for ambient temperature titrations. Comprising:

Support rod, stainless steel, 750 x 13mm
Bosshead
Bosshead, quick release
Burette holder, 10mm clips
Electrode/thermometer holder
Magnetic stirrer

For single phase supplies.

TLB-300-010R Titration stand assembly, 200–240V 50Hz **£45·00**
TLB-300-030L Titration stand assembly, 100–120V 60Hz **£45·56**

TITRATION STAND ASSEMBLY, *GALLENKAMP*, **heated**, as specified, for ambient and higher temperature titrations. Comprising:

Support rod, stainless steel, 750 x 13mm
Bosshead
Bosshead, quick release
Burette holder, 10mm clips
Electrode/thermometer holder
Magnetic stirrer/hotplate.

For single phase supplies.

TLB-330-010T Titration stand assembly, 200–240V 50Hz **£61·31**
TLB-330-030N Titration stand assembly, 100–120V 60Hz **£62·44**

ACCESSORIES for TLB-300 and TLB-330

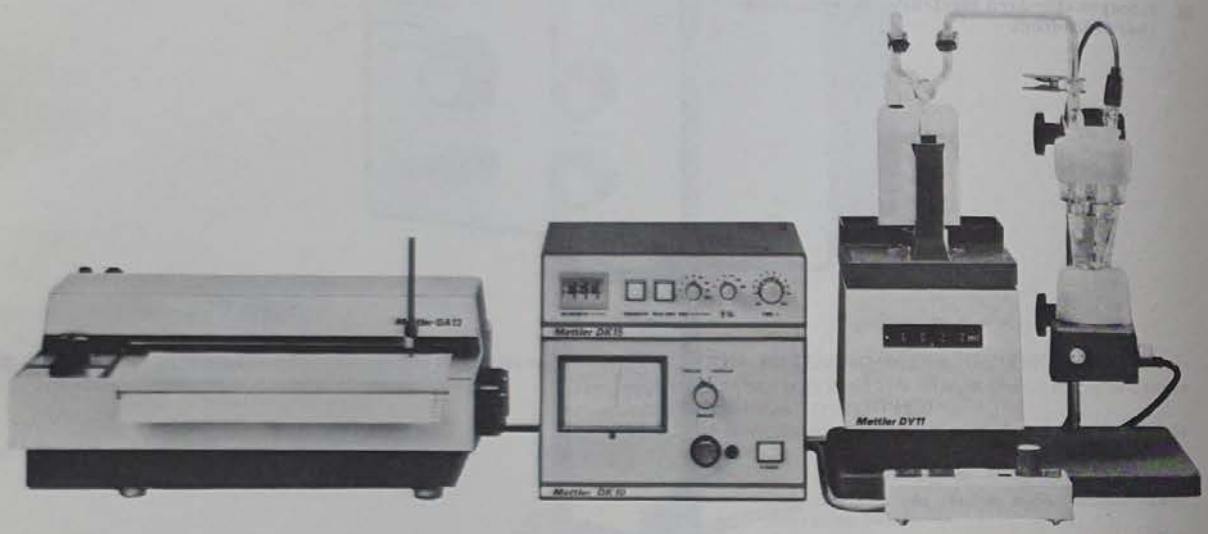
Burette holder with 6mm clips for 1 and 2ml burettes and 13mm clips for 50ml burettes See STE-690

Magnetic followers See SWX-230 to SWX-260

For suitable pH meters and electrodes see under page heading pH. Other accessories will be found under page heading Beakers and Burettes. See also SWT-550 Magnetic stirrer/hotplate with thermostatic control.

METTLER MODULAR TITRATION SYSTEM

A compact, versatile system comprising a number of compatable modules which may be used singly or in combinations for a wide variety of manual and automatic titrations with a choice of readout, print-out and connection to computers and data processers



APPLICATIONS

- Simple manually controlled titrations with a digital burette
- Manually controlled potentiometric titrations with meter readout of electrode potential
- Manually or automatically controlled potentiometric titrations with recording of titration curves or their first derivatives
- Automatic titrations to preset potentiometric end points and to preset values of pX eg. pH, pCa, etc., with manual or auto temperature compensation
- Automatic recording of pX titration curves or their first derivatives with manual or auto temperature compensation and of dV/dt reaction kinetics curves under pX-stat conditions e.g. saponification of esters at elevated pH
- Manual or automatic 'dead-stop' titrations e.g. Karl Fischer water determinations

METTLER TITRATION SYSTEM MODULES

All inter-connections between modules are made by a system of plugs and sockets with location keys

BURETTE DRIVE MODULES

Standard model (*METTLER* DV10)

Comprises a drive mechanism for use with a range of interchangeable burette heads having various volumes. It may be controlled manually or automatically and gives a pulse output for electrical synchronisation between volume delivered and the chart recorder volume axis. Includes digital display reading to 0·1% of burette volume with automatic decimal setting.

Analogue model (*METTLER* DV11)

Similar to the standard model but additionally giving voltage analogue output proportional to volume delivered for pX stat recording.

BURETTE MODULES (*METTLER* DV201, 202, 205, 210 and 220)

Five interchangeable glass burettes, volumes 1, 2, 5, 10 and 20ml respectively. Each comprises an assembly complete with 500ml polythene reservoir, mounted on a pallet for rapid attachment to a drive module which operates the burette piston. Delivery accuracy is about ±0·3%.

COMMAND MODULE (*METTLER* DV103)

This module incorporates a delivery rate control and three operating buttons. One button initiates automatic refilling and zeroing of the burette, the second starts automatic titration (or causes delivery of 1% of burette volume each time it is depressed), and the third stops an automatic titration (or causes continuous delivery until it is released).

ELECTRODE POTENTIAL AMPLIFIER (*METTLER* DK10)

This is the basic module for automation of the digital burette system. It converts an input electrode potential of high resistance sensors such as glass electrodes with impedances up to 10^{10} ohms into the identical potential at low output impedance. This enables the potential to be displayed on a chart recorder or digital voltmeter, or to operate the automatic titration modules. It has meter readout and a range switch for ±2000mV and ±500mV full scale deflection. Output signals are electrode potential, first derivative of electrode potential (dE/dt) and 0·1 × first derivative. Accuracy is ±0·2% ±1mV.

RATE AND END POINT CONTROL MODULE (*METTLER* DK11)

When used in conjunction with the electrode potential amplifier, this module stops an automatic titration when a preset end point has been reached. In addition to the presetting dials it incorporates a deviation meter. It provides:

- automatic slope fitting in which rate of titrant addition is automatically minimum when rate of change of potential of the electrode system is maximum.
- delayed stop to ensure that end points are reached and that titrations are not prematurely terminated.
- selection of mV or pX end points (the latter requires the E–pX converter to be incorporated in the system).
- adjustment for the + or − sense and the steepness of the titration curve.

E–pX CONVERTER (*METTLER* DK12)

An electrode potential–to–pH or –p Ion converter which provides pX output signals. Three controls are built-in for setting up electrode parameters viz. isopotential values, iso–pX values and dE/dpX slope values, as well as provision for manual or automatic temperature compensation.

DIGITAL DISPLAY MODULE (*METTLER* DK13)

Provides a four-digit display of electrode potential or pX together with BCD output. Measuring range ±1·999V and 0·00 to 19·99 pX with accuracy ±0·1% ±1 digit.

EQUILIBRIUM TITRATION MODULE (*METTLER* DK15)

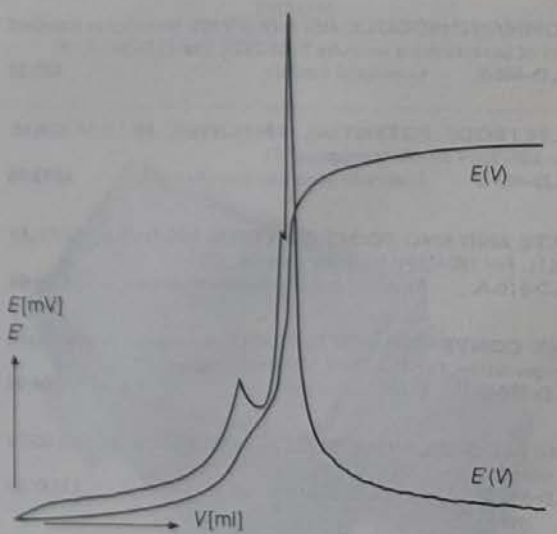
This module controls the sequence of dispensing equal increments of titrant into a sample in order to provide enough time to achieve equilibrium for the chemical reaction and for the measuring process of the electrode.

POLARISATION CURRENT ADAPTER (*METTLER* DK101)

A small battery powered module (battery life >2000h) for use with the electrode potential amplifier to provide electrode polarisation for Karl Fischer, dead-stop and other voltametric end point titrations. Current range 0·2 to 10μA.

POTENTIOMETRIC RECORDERS

A series of stepping motor driven linear recorders for continuous single point recording on perforated 250mm strip chart. The pre-amplifiers and measuring range circuits are in a compartment shielded from line transients and a.c. pick-up. Accuracy is ±0·25% f.s.d.



Typical titration curve and first derivative

METTLER TITRATION SYSTEM OUTFITS

TITRATION OUTFIT, *METTLER*, for automatic titrations to preset potential end points. Comprises standard model burette drive module, burette module 10ml, electrode potential amplifier and rate and end point control module. **Without** titration stand or electrodes. For 180–250V 50–60Hz supplies. (F)

TLD-200-Y Titration outfit **£2615·91**

TITRATION OUTFIT, *METTLER*, for automatic titrations to preset pX or potential end points. Comprises standard model burette drive module, burette module 10ml, electrode potential amplifier, rate and end point control module and E–pX converter. **Without** titration stand or electrodes. For 180–250V 50–60Hz supplies. (F)

TLD-230-K Titration outfit **£3600·85**

TITRATION OUTFIT, *METTLER*, for automatic plotting of potentiometric curves and automatic titrations to preset potential end points. Comprises standard model burette drive module, burette module 10ml, electrode potential amplifier, rate and end point control module and potentiometric recorder. **Without** titration stand or electrodes. For 180–250V 50–60Hz supplies. (F)

TLD-260-M Titration outfit **£4340·16**

TITRATION OUTFIT, *METTLER*, for automatic plotting of pX or potentiometric curves and automatic titrations to preset pX or potential end points. Comprises standard model burette drive module, burette module 10ml, electrode potential amplifier, rate and end point control module, E–pX converter and potentiometric recorder. **Without** titration stand or electrodes. For 180–250V 50–60Hz supplies. (F)

TLD-290-X Titration outfit **£5325·10**

NOTE: For alternative burette drive modules, burettes and recorders, and accessory digital display unit and titration stand, see entries TLD-350-L to TLD-760-S.

MODULES

BURETTE DRIVE MODULE, *METTLER* **DV10,** standard model with pulse output. Includes command module TLD-440-K. For 180–250V 50–60Hz supplies. (F)

TLD-350-L Burette drive module **£839·74**

BURETTE DRIVE MODULE, *METTLER* **DV11,** analogue model. Includes command module TLD-440-K. For 180–250V 50–60Hz supplies. (F)

TLD-360-E Burette drive module **£989·78**

BURETTE MODULES, *METTLER*, complete with burette and piston, three-way stopcock, reservoir, filter and delivery jet. (F)

TLD-390-050X	Burette module, DV201, 1ml	**£157·30**
TLD-390-070Y	Burette module, DV202, 2ml	**£157·30**
TLD-390-090C	Burette module, DV205, 5ml	**£132·00**
TLD-390-130Q	Burette module, DV210, 10ml	**£122·10**
TLD-390-170E	Burette module, DV220, 20ml	**£132·00**

COMMAND MODULE, *METTLER* **DV103.** Included as standard part of burette drive modules TLD-350-L and TLD-360-E. (F)

TLD-440-K Command module **£82·28**

ELECTRODE POTENTIAL AMPLIFIER, *METTLER* **DK10.** For 180–250V 50–60Hz supplies. (F)

TLD-490-V Electrode potential amplifier **£892·98**

RATE AND END POINT CONTROL MODULE, *METTLER* **DK11.** For 180–250V 50–60Hz supplies. (F)

TLD-510-A Rate and end point control module **£761·09**

E-pX CONVERTER, *METTLER* **DK12,** for manual temperature compensation. For 180–250V 50–60Hz supplies. (F)

TLD-550-S E–pX converter **£984·94**

DIGITAL DISPLAY MODULE, *METTLER* **DK13.** For 180–250V 50–60Hz supplies. (F)

TLD-570-E Digital display module **£1547·59**

EQUILIBRIUM TITRATION MODULE, *METTLER* **DK15.** For 180–250V 50–60Hz supplies. (F)

TLD-600-W Equilibrium titration module **£1574·21**

POLARISATION CURRENT ADAPTER, *METTLER* **DK101.**

TLD-630-B Polarisation current adapter **£102·85**

For details of METTLER DK14, DK18, DK19 and DK31 accessories see Addenda

CHART RECORDER, POTENTIOMETRIC, Model W+W 1100, for 250mm strip chart. With input range selection from 1 to 100mV and 12 chart speeds.

See RDS-520-B

CHART RECORDER, POTENTIOMETRIC, *METTLER* **GA12,** single point for recording on perforated 250mm strip chart. Incorporates trigger input for control of stepping motor by external pulses. With 20 internal chart speeds and 18 measuring ranges from 1mV to 500V. Includes one chart roll, set of three fibre pens, pen adapter, power supply and input cables. For 180–240V 50–60Hz supplies. (F)

TLD-690-F Potentiometric recorder **£1724·25**

CHART RECORDER, POTENTIOMETRIC, *METTLER* **GA13,** as TLD-690-F but with ±2V backing voltage independent of measuring ranges to allow maximum use of chart width. With coarse and fine span adjustment controls. For 180–240V 50–60Hz supplies. (F)

TLD-710-H Potentiometric recorder **£2133·23**

SPARE PARTS for above recorders

Chart rolls *See RDS-540-070M*

Fibre pens *See RDS-540-030B*

TITRATION STAND ASSEMBLY, *METTLER* **903-MG,** comprising variable speed magnetic stirrer with followers, 50ml capacity titration vessel with water jacket, cap and stoppers, burette tip with ball and socket joint and standard taper sleeve. Includes baseplate, 300mm long mounting rod and clamps. **Without** electrodes. For 220–240V 50Hz single phase supplies. (F)

TLD-760-S Titration stand assembly **£314·60**

Additional accessories include vessels for micro and Karl Fischer titrations, thermometer and gas inlet and drying tubes – Details on application.

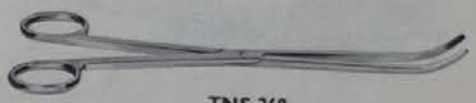
TONGS

TONGS, crucible, stainless steel, straight with flattened hinge.
TNS-200-010R Tongs, crucible, length 150mm **£1·09**
TNS-200-030L Tongs, crucible, length 200mm **£1·41**


TNS-200

TONGS, crucibles, stainless steel, straight with forged scissors type hinge. Length 200mm. (F)
TNS-260-B Tongs, crucible, 200mm **£2·49**

TONGS, crucible, stainless steel as TNS-260-B but fitted with platinum shoes. Length 200mm.
TNS-280-K Tongs, crucible, 200mm **£60·75**


TNS-260
TNS-280

TONGS, crucible, brass, with bow and flattened hinge. Length 200mm.
TNS-350-A Tongs, crucible, 200mm **£0·75**

TONGS, crucible, blackened steel, with bow and flattened hinge, student pattern. Length 200mm.
TNS-380-C Tongs, crucible, 200mm **£0·56**


TNS-350
TNS-380
TNS-410

TONGS, crucible, stainless steel, with bow and flattened hinge. Length 200mm.
TNS-410-U Tongs, crucible, 200mm **£0·97**

TONGS, crucible, stainless steel, with bow and forged scissors type hinge. Length 200mm. (F)
TNS-440-W Tongs, crucible, 200mm **£2·49**

TONGS, crucible, stainless steel as TNS-440-W but fitted with platinum shoes. Length 200mm.
TNS-460-Y Tongs, crucible, 200mm **£60·75**


TNS-440
TNS-460

TONGS, beaker, *GALLENKAMP*, **Fisher pattern,** stainless steel. Will firmly grip beakers from 100 to 1500ml. The 25mm wide jaws are lined with replaceable asbestos covers which reduce the risk of breakage. Overall length 330mm.
TNS-530-V Tongs, beaker **£5·74**

SPARE PARTS
TNS-540-010L Asbestos covers Pack of 6 pairs **£4·92**

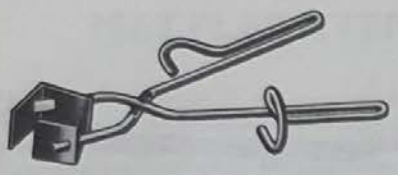

TNS-530

Gallenkamp
GLOVE BOX

- For applications where user and sample must be mutually isolated
- Incorporates automatic air-lock loading hatch



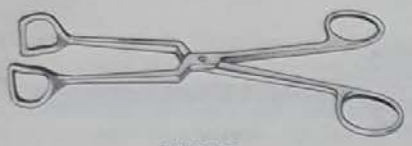
See GXH-350-S



TNS-590

TONGS, flask, *GALLENKAMP*, **Fisher pattern,** stainless steel. Will firmly grip flasks of any shape from 100 to 2000ml. One of the rectangular V-shaped jaws is smaller than the other providing a firm grip. The tong handles extend beyond the finger holds, thus the weight of the flask is supported by the palm of the hand. Overall length 230mm.

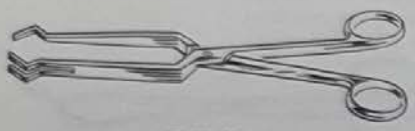
TNS-590-C Tongs, flask **£4·73**



TNS-620

TONGS, general purpose, *GALLENKAMP*, stainless steel, having a wide variety of applications and will hold thin pieces of paper, tubes over 12mm diameter or small beakers up to 150ml. Overall length 200mm with 25mm serrated jaws. (F)

TNS-620-U Tongs, general purpose **£3·30**



TNS-650

TONGS, general purpose, *GALLENKAMP*, stainless steel, with scissor hinge and finger claws giving a firm but sensitive three point grip, suitable for test tubes, electrodes, thermometers, small flasks and beakers, slides, etc. Overall length 210mm. (F)

TNS-650-W Tongs, general purpose **£2·70**

TONGS, furnace, blackened steel, straight with flattened hinge.

TNS-730-030T Tongs, length 300mm **£1·37**

TNS-730-070H Tongs, length 375mm **£1·58**



TNS-730

TONGS, furnace, mild steel, with bow and flattened hinge.

TNS-750-030F Tongs, length 300mm **£1·37**

TNS-750-070Q Tongs, length 375mm **£1·85**



TNS-750

TONGS, furnace, *GALLENKAMP*, **Ward pattern,** stainless steel, for handling a wide variety of crucibles, etc., especially in tube furnaces. Operated by thumb action with one hand and fitted with a circular shield to protect the hand against radiation from the furnace.

Overall length, mm	590	740
Length to shield, mm	410	560

TNS-790-030A Tongs, length 590mm **£12·71**

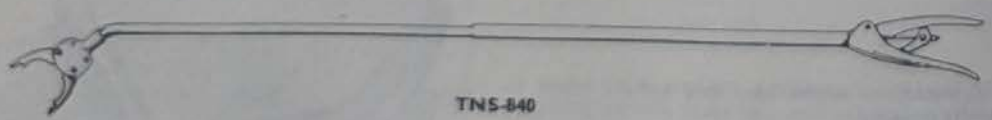
TNS-790-070L Tongs, length 740mm **£15·86**



TNS-790

TONGS, remote handling, with cork-lined jaws, maximum opening 63mm, length of arm 750mm.

TNS-840-N Tongs, remote handling **£8·47**



TNS-840

TOOLS

SCRATCH BRUSH, brass wire, 300mm long × 19mm wide.
TOH-210-U Scratch brush **£1·80**


TOH-210

G-CLAMPS, 50mm, plated steel with swivel-pad screw.
TOH-240-W G-clamps Pack of 4 **£4·55**


TOH-240

G-CLAMPS, malleable iron, with ball-end steel screw and socket swivel head, enamelled finish.
TOH-260-030W G-clamp, 50mm opening **£1·87**
TOH-260-050Q G-clamp, 100mm opening **£3·22**
TOH-260-070K G-clamp, 150mm opening **£4·74**



TOH-260

HAND-DRILL BRACE, accepts drills up to 6·5mm diameter. With double pinion, ball thrust and machine-cut gears. In iron frame with polished hardwood handle.
TOH-310-M Hand drill brace **£5·39**


TOH-310

Griffin
MULTIPURPOSE TOOL

A miniature, precision built, battery-operated tool enabling many tasks to be accomplished which, due to inadvisability of using mains voltages or inaccessibility of standard-sized tools, have hitherto been impossible. The tool is primarily intended for light duty and should not be used for tasks requiring heavy duty mains-operated power tools.

May be used for drilling, shaping and polishing wood, plastics, mild steel and most non-ferrous metals. Also ideally suited for lapidary work and, when fitted with diamond drill TOH-370-512M, can be used to bore holes in gemstones up to hardness 6 (Mohs' scale).

To obtain maximum performance a 12V accumulator or transformer/rectifier supplying 12V d.c. at 4A should be employed (see Accessories). Body dimensions 115mm long × 40mm diameter, overall length when fitted with chuck 170mm.


TOH-350

MULTIPURPOSE TOOL, *GRIFFIN*, as specified, with 2-core cable and three chucks giving a capacity from 0 to 3·2mm.
TOH-350-H Multipurpose tool **£11·52**

ACCESSORIES

Tool set comprising 8 various-sized unmounted abrasive stones, 9 mounted abrasive stones, 6 mandrels, 9 burrs, 3 cutters, 2 hard felt wheels, mounted brushes in nylon, brass and steel, separating saw and felt polishing pad, in plastics case.
TOH-370-502P Tool set **£17·10**

Diamond-tipped drill, hollow, diameter 1·9mm. For lapidary work, the specimen should be embedded in Plasticine or putty and submerged in water to a depth of about 3mm before drilling.
TOH-370-512M Diamond-tipped drill **£5·06**

Gemstone rock collection — *See LDF-300-D*
Accumulator, 12V — *See BMP-700-H*
GRIFFIN LT variable voltage supply — *See EKR-650*


TOH-370-502

DRILL, electric, variable speed, with ⅜in. 3-jaw key chuck. Speed variable between 1100 and 3000rev/min. Net mass 1·5kg. Load 450W. For 230–250V a.c. single phase supplies.
TOH-400-L Drill **£21·89**

ACCESSORY

Drill stand, with depth control stop. Overall height 750mm, depth to feed 70mm, maximum height between chuck and table 500mm.
TOH-420-500A Drill stand **£19·20**


TOH-400


TOH-420-500



TOH-450

TWIST DRILLS, high-speed steel, for use in hand and electric portable drills. Set of eight, $\frac{1}{16}$ to $\frac{5}{32}$in. in steps of $\frac{1}{32}$in., in plastics box.

TOH-450-W Twist drills — Set **£3·92**



TOH-490

TWIST DRILL, tungsten carbide tipped bit No. 8, 4·3mm diameter.

TOH-470-Y Twist drill — **£0·56**

ENGRAVER, a portable, solenoid-operated tool for engraving metallurgical specimens and many other applications. Vibrates at 50 strokes/s and the stroke length is adjustable. With four extra-hard point engraving heads. For 230–250V 50Hz single phase supplies.

TOH-490-R Engraver — **£6·88**

SPARE PART

TOH-510-030K Engraving head, extra-hard point — **£0·39**

ACCESSORY

TOH-510-502S Engraving head, diamond point — **£2·86**



TOH-590



TOH-610

AMPOULE FILES, flat.

TOH-570-A Ampoule files — Pack of 1000 **£3·63**

Ampoule cutters — *See GTB-450-W to GTB-490-R*



TOH-630

FILE, flat, second cut, length 200mm. **Without** handle.

TOH-590-J File, flat — **£1·50**



TOH-650

FILE, round, (rat tail), second cut, length 150mm. **Without** handle.

TOH-610-L File, round — **£1·05**

FILE, triangular, second cut, length 150mm, double ended.

TOH-630-U File, triangular — **£1·09**



TOH-670

FILE, triangular, second cut, length 150mm. **Without** handle.

TOH-650-G File, triangular — **£1·32**

FILE HANDLES, round, hardwood, with brass ferrule.

TOH-670-P File handles — Pack of 12 **£1·86**



TOH-740

HAMMER, ball pein, with 350g head and wood handle.

TOH-740-F Hammer, ball pein — **£2·90**



TOH-760

HAMMER, steel claw, with 453g steel head and wood handle.

TOH-760-X Hammer, steel claw — **£5·57**

HAMMER, Warrington pattern, with 225g steel head having polished face and pein, and wood handle.

TOH-780-A Hammer, Warrington pattern — **£2·06**



TOH-780

ALLEN KEYS, imperial, set of eight, sizes $\frac{1}{16}$, $\frac{5}{64}$, $\frac{3}{32}$, $\frac{7}{64}$, $\frac{1}{8}$, $\frac{9}{64}$, $\frac{5}{32}$ and $\frac{3}{16}$in. across flats, in plastics wallet.

TOH-850-N Allen keys, Imperial — Set **£1·94**

ALLEN KEYS, metric, set of 9, sizes 1·5mm to 10mm across flats, in plastics wallet.

TOH-870-W Allen keys, metric — Set **£2·59**

KNIFE, trimming, with 50mm reversible steel blade held in alloy handle. With blade guard and five spare blades inside handle.
TOH-930-T Knife **£0·97**



TOH-930

Ladder *See TOJ-207E in Addenda*

LEVEL, T-pattern, with two bubbles, in metal body 32 × 25mm with two fixing holes.
TOJ-300-W Level, T-pattern **£2·09**



TOJ-300

LEVEL, circular pattern, tough plastics body, with flange 28·5mm diameter and three fixing holes.
TOJ-320-Y Level, circular pattern **£0·63**



TOJ-320

LEVEL, spirit filled, in hardwood case, 200mm long, with brass top plate.
TOJ-340-R Level **£1·50**



TOJ-340

Mirror, 25mm diameter, with handle *See DKC-850-A*

PLANERFILE, *STANLEY* **SURFORM,** dual purpose tool with reversible plastics handle which permits use either as a plane or a file. A removable flat blade 250mm long with wide, staggered teeth giving cut over the full width, is mounted on a metal carrier shaped for use with wood, rubber, etc. An interchangeable blade suitable for use with metals, plastics, etc, is available as an accessory.
TOJ-450-C Planerfile **£2·85**



TOJ-450

SPARE PART
TOJ-470-010Y Blade, suitable for wood, rubber, etc. **£0·57**

ACCESSORY
TOJ-470-504G Blade, suitable for metals, plastics, etc. **£0·66**

PLIERS, combination, with insulated handles. Length 150mm.
TOJ-530-Y Pliers, combination **£2·59**



TOJ-530

PLIERS, snipe nose, with insulated handles. Length 140mm.
TOJ-560-K Pliers, snipe nose **£2·59**



TOJ-560

PLIERS, side cutting. Length 125mm.
TOJ-590-M Pliers, side cutting **£2·95**



TOJ-590

CENTRE PUNCH, round, knurled grip, 3mm.
TOJ-630-A Centre punch **£0·78**



TOJ-630

HACKSAW, adjustable, tubular frame for 230 to 305mm blades.
TOJ-670-S Hacksaw **£3·38**



TOJ-670

HACKSAW BLADES, best quality steel, length 255mm.
TOJ-690-E Hacksaw blades Pack of 10 **£1·45**

SAW, *ECLIPSE*, general purpose, with tungsten steel tapered blade, length 410mm, having 390 teeth/m which may be set to nine different angles relative to the diecast handle. Suitable for cutting all woods, plastics, mild steel, copper, brass, lead and aluminium. Overall length 490mm.
TOJ-720-W Saw **£2·11**



TOJ-720

SPARE PART
TOJ-740-010F Blade **£1·23**



TOJ-790

SCISSORS, stainless steel.

TOJ-790-030K	Scissors, length 150mm	**£1·46**
TOJ-790-050E	Scissors, length 180mm	**£1·67**

Scissors, dissecting — See *DKH-200 to DKH-390-Y*



TOJ-830

SCREWDRIVERS, length of blade 75mm, with plastics handle.

TOJ-830-H	Screwdrivers	Pack of 16 **£0·98**



TOJ-850

SCREWDRIVERS, electricians', shaft insulated with PVC sleeve and with plastics handle. Dimensions given are blade length × width.

TOJ-850-030H	Screwdriver, 75 × 3mm	**£0·90**
TOJ-850-050B	Screwdriver, 150 × 4mm	**£1·22**
TOJ-850-070S	Screwdriver, 200 × 5mm	**£1·43**



TOJ-880

SCREWDRIVER/MAINS TESTER, for checking circuit continuity and polarity on voltages in the range 110–380V a.c./d.c. A neon indicator lamp in the transparent plastics handle glows when the blade touches the live side of the mains supply and the cap is held in the hand. Blade 24mm long × 3mm wide, overall dimensions 127mm long × 15mm diameter. Fitted with pocket clip. (F)

TOJ-880-S	Screwdriver/mains tester	**£0·90**



TOJ-950

SCREWDRIVER, heavy duty, with blade 150mm long × 10mm wide.

TOJ-920-G	Screwdriver	**£1·52**



TOJ-980

SCREWDRIVERS, PHILLIPS type, with plastics handle.

Blade length, mm	50	75	100
Point size	0	1	2
TOJ-950-030W	Screwdriver, 50mm		**£0·54**
TOJ-950-050Q	Screwdriver, 75mm		**£1·04**
TOJ-950-070K	Screwdriver, 100mm		**£1·16**

SCREWDRIVER, watchmakers', for fine mechanical work. Nickel plated with blade approximately 2·5mm wide, revolving head and fluted handle.

TOJ-980-K	Screwdriver	**£0·78**



TOK-270

PLASTICS SEALER, wheel type, for welding thermoplastics sheets. With chromium plated wheel and wheel holder. Temperature of wheel varied by movement of wheel holder along 45 W electrically heated rod mounted in handle. Must be used with non-adhering cellulose film between wheel and weld. With cable and one each plain, milled and bevelled edge wheels but **without** cellulose film. For 230–250V supplies.

TOK-270-R	Plastics sealer	**£9·35**

ACCESSORY

TOK-290-502C	Cellulose film, 1000 × 925mm	**£0·39**



TOK-340

SNIPS, tinmen's, length 200mm.

TOK-340-H	Snips	**£2·23**



TOK-390

SOLDERING IRON, 65 W, with round pencil bit. Overall length 350mm. For 220–240V supplies.

TOK-390-S	Soldering iron	**£7·74**

SOLDERING IRON, miniature, 15 W, with nickel plated bit, 4mm tip diameter. Overall length 180mm. For 220–240V supplies.

TOK-420-N	Soldering iron	**£3·58**

ACCESSORIES for TOK-420-N

TOK-440-502V	Bits, nickel plated, set comprising one each of 2·3, 4 and 4·7mm tip diameters. Bits	Set **£1·19**
TOK-440-516K	Bench stand with chromium plated steel spring to retain soldering iron, two sponge pads for cleaning bits and recesses to accommodate up to six spare bits. Bench stand	**£1·41**



TOK-420



TOK-490

SOLDER, resin cored, wire form, 2·6mm diameter.
TOK-450-P Solder — Reel of 100g **£1·40**

SPANNER, adjustable, 15° angled head. Length 150mm, maximum jaw opening 20mm. (F)
TOK-490-K Spanner, adjustable — **£4·48**

SPANNERS, BA, tempered steel, cadmium plated. Set of six, range 0 to 11 BA.
TOK-510-M Spanners, BA — Set **£0·86**

TAPS AND DIES, BA thread, in set comprising $\frac{13}{16}$in. diameter dies, die stock, taper taps, plug taps and tap wrench in hardwood case. Cutting sizes 0, 2, 4, 6 and 8 BA.
TOK-550-H Taps and dies — Set **£18·39**

VICE, corrosion resistant alloy, with replaceable jaws which hold discs, flats, spheres, etc. with the minimum of applied pressure. One jaw can be positioned to allow tapered and irregular shaped objects to be held firmly. A pair of rubber faced jaws for holding delicate workpieces is available as an accessory. A lever operated suction pad secures the vice to most non-porous surfaces. Holes are provided for permanent fixing or a G-clamp TOK-610-512A is available as an accessory for securing vice to horizontal fixtures up to 60mm thick.

Maximum jaw opening	80mm
Jaw dimensions	100mm wide × 50mm deep
Overall dimensions	110mm high × 110mm wide × 240mm deep
Mass	2kg

TOK-590-C Vice — **£12·05**

SPARE PART

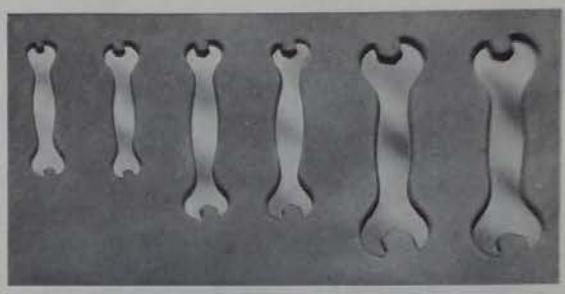
TOK-610-010B Jaws — Pair **£1·73**

ACCESSORIES

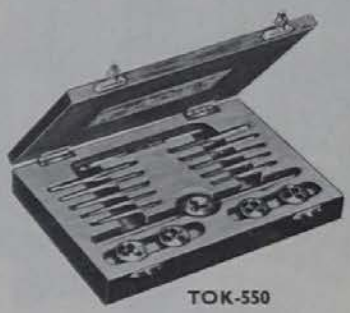
TOK-610-504W Jaws, rubber faced — Pair **£2·20**
TOK-610-512A G-clamp — **£2·53**

WIRE STRIPPER, can be adjusted for different wire or cable sizes by means of a rotatable eccentric flange with fixing screw and also serves as a wire cutter. One arm has a 4 BA hexagonal spanner and the other has a 6 BA spanner incorporated.
TOK-650-W Wire stripper — **£0·73**

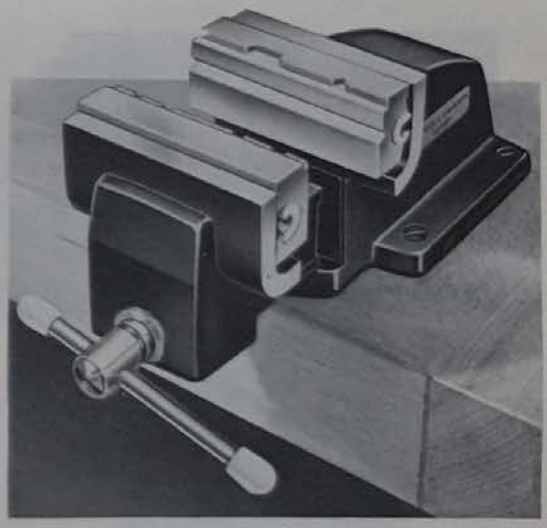
MOLE WRENCH, a multipurpose self-grip wrench, 180mm long, with immense gripping power. Fitted with a quick release lever which facilitates easy removal from the workpiece. The lever is spring-loaded and is normally retained close against the lower handle.
TOK-690-R Mole wrench — **£4·86**



TOK-510



TOK-550



TOK-590



TOK-650



TOK-690

Gallenkamp

TOOL KITS

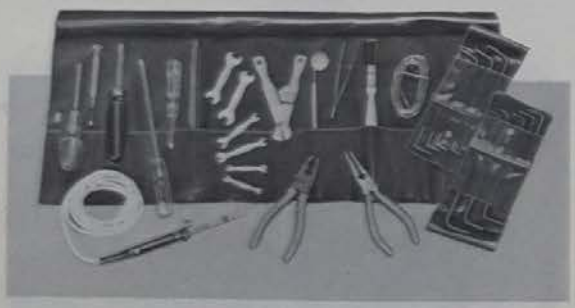


TOL-200

TOOL KIT, 'chemists and analysts'. A personal set of instruments useful for all actively concerned in chemical analysis. Comprises one each of the following in a plastics wallet:

Brush, dusting
Calliper, boxwood, 100mm
File, triangular, 150mm
Forceps, nickel plated steel, 125mm
Magnifier, acrylic, ×2
Pencil, ALL-STABILO, black
Platinum wire in glass rod
Scalpel, stainless steel blade
Scissors, nickel plated steel, 150mm
Spatula, stainless steel, offset spoon, 190mm
Spatula, stainless steel, Chattaway, 150mm
Spatula, stainless steel, micro Chattaway, 150mm
Spatula, polythene, 125mm
Syringe, plastics, 1ml with needle

TOL-200-K Tool kit **£10·37**



TOL-240

TOOL KIT, instrument and electronic, comprising one each of the following in a plastics roll:

Brush, dusting, 13mm bristle point brush
Forceps, fine point, 125mm
Screwdriver/mains tester, 3mm blade
Screwdriver, 200 × 5mm blade
Screwdriver, Phillips type, size 0
Screwdriver, Phillips type, size 1
Screwdriver, watchmakers'
Pliers, combination
Pliers, snipe nose
Wire stripper
Allen keys, Imperial
Allen keys, metric
Mirror, dental pattern
Solder
Soldering iron
Spanners, BA set
File, general purpose, double ended, 3 square, 150mm

TOL-240-F Tool kit **£26·04**



TOL-290

TOOL KIT, laboratory workshop, in strong metal case with carrying handle and provision for padlocking. Small tools can be placed in a removable tray. Tool kit TOL-240-F can be carried inside. Comprises one each of the following:

Pliers, side cutting
Drills, set
Drill, hand brace
File, flat
File, round
File handles (two)
Hammer
Centre punch
Hacksaw
Hacksaw blades, pack of 10
Snips, tinmen's
Mole wrench
Screwdriver, heavy duty
Screwdriver, Phillips type, size 2
Scissors, 180mm
Measuring tape, 2m
Rule, 10in.
Spanner, adjustable
Knife
Duster

TOL-290-Q Tool kit **£66·54**

TOOL KIT, woodworkers', in portable, double-drop front, polished wood chest with two full-length trays, handle at each end and reinforced leather handle at top. Comprises one each of the following:

Hand saw, 560mm
Tenon saw, 255mm
Firmer chisels, 6·5, 13 and 19mm
Ratchet brace, 255mm
Centre bits, fast cutting, 6·5, 13 and 19mm
Countersink bit, 13mm
Smoothing plane, metal, 50mm
Claw hammer
Nail punch
Nail set
Screwdrivers, 100 and 150mm
Insulated screwdriver, 150mm
Pincers, 150mm
Pliers, combination, 150mm
Bradawl
Gimlet
Tack lifter
Handisaw
Cold chisel, 150mm
Cabinet scraper, 125 × 65mm
Mitre block, 230mm
Boxwood rule
Mallet, 100mm
Trimming knife, with five blades
Marking gauge
Rosewood square, 150mm
Cork sanding block
Pack of sandpaper
Book on carpentry

TOL-350-N Tool kit **£60·23**



TOL-350

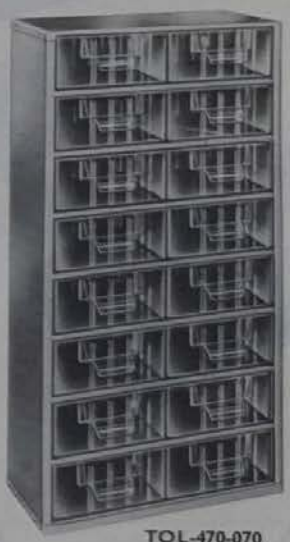
STORAGE CABINETS

Robust enamelled steel cabinets with strong transparent plastics drawers for visible storage of small articles. Drawers have label holders and safety stop. Overall dimensions of all cabinets 150 × 310 × 560mm high. (F)

		H.	×	W.	×	D.
Drawer dimensions:	Size A	35	×	62	×	135mm
	Size B	57	×	135	×	135mm
	Size C	57	×	270	×	135mm

No. of drawers	48	30	16	8
Size of drawers	48 × Size A	24 × Size A 4 × Size B 2 × Size C	16 × Size B	8 × Size C

TOL-470-030F Cabinet, 48 drawer **£17·33**
TOL-470-050W Cabinet, 30 drawer **£17·33**
TOL-470-070Q Cabinet, 16 drawer **£17·33**
TOL-470-090K Cabinet, 8 drawer **£17·33**



TOL-470-070

OTHER USEFUL TOOLS

will be found under the following page headings:

Burners
Brushes
Dissection
Electrical accessories
Glassblowing tools
Gas lighters
Gauges
Labels
Magnifiers
Measures
Presses
Rules
Soil science
Spatulas
Tachometers

Gallenkamp

TRAYS



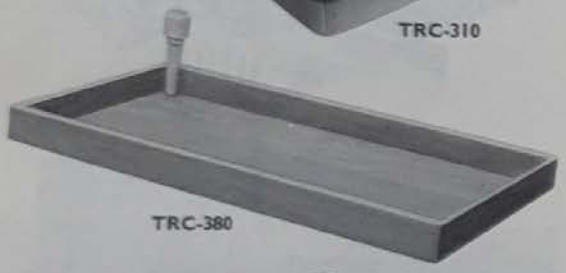
TRC-200



TRC-240



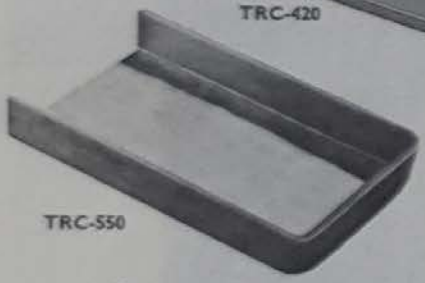
TRC-310



TRC-380



TRC-420



TRC-550

TRAYS, high impact polystyrene, white.

TRC-200-050G	Tray, 300 × 150 × 25 mm deep	Pack of 3 **£1·52**
TRC-200-090R	Tray, 430 × 330 × 25 mm deep	Pack of 3 **£3·38**

TRAYS, rigid PVC, with end handles.

TRC-240-050B	Tray, 420 × 220 × 22 mm deep	**£5·61**
TRC-240-090M	Tray, 570 × 410 × 16 mm deep	**£8·97**

TRAYS, rigid PVC, stackable.

TRC-310-050X	Tray, 400 × 290 × 70 mm deep	**£2·08**
TRC-310-070Y	Tray, 400 × 290 × 160 mm deep	**£3·24**
TRC-310-090C	Tray, 510 × 380 × 150 mm deep	**£6·05**

TRAYS, mercury, varnished whitewood, with drain hole and plug.

TRC-380-050L	Tray, 380 × 230 × 25 mm deep	**£4·56**
TRC-380-090W	Tray, 600 × 300 × 25 mm deep	**£5·64**

TRAY, mercury, rigid PVC, with drain hole and plug, 410 × 320 × 20 mm deep.

TRC-420-X	Tray, 410 × 320 × 20 mm deep	**£7·87**

TRAYS, translucent silica, with a rim on three sides, suitable for use in GALLENKAMP muffle furnaces.

Dimensions, mm	67 × 114	118 × 175	152 × 248
For muffle size, mm	125 × 150	150 × 235	170 × 380

TRC-550-050Q	Tray, 67 × 114 mm	**£4·42**
TRC-550-090E	Tray, 118 × 175 mm	**£8·17**
TRC-550-130S	Tray, 152 × 248 mm	**£15·53**

Bottle trays *See Bottles*
Embedding trays *See Histology*
Staining trays *See Histology*
See also headings Boxes and Dishes

TRIANGLES



TRT-300



TRT-350



TRT-400

TRIANGLES, iron wire, with pipeclay tubes.

TRT-300-030S	Triangles, 39 mm side	Pack of 10 **£1·46**
TRT-300-050M	Triangles, 50 mm side	Pack of 10 **£1·46**
TRT-300-070G	Triangles, 63 mm side	Pack of 10 **£1·46**
TRT-300-090A	Triangles, 76 mm side	Pack of 10 **£1·69**

TRIANGLES, nickel-chromium wire, with silica tubes.

TRT-350-030G	Triangle, 39 mm side	**£0·69**
TRT-350-050A	Triangle, 50 mm side	**£0·69**
TRT-350-070R	Triangle, 63 mm side	**£0·96**
TRT-350-090L	Triangle, 76 mm side	**£1·17**

TRIANGLE, translucent silica, 63 mm side.

TRT-400-070V	Triangle, 63 mm side	**£3·15**

Troughs *See GFD-270 et seq*

TROLLEYS



TSF-320

TROLLEY, constructed of stoved enamel rectangular steel tube. With 100mm diameter rubber-covered castors and two removable stoved enamel trays 610×370mm with lip and handles. Overall dimensions 800×430×790mm high.

TSF-320-E Trolley **£45-23**

SPARE PART

TSF-340-010K Tray **£4-73**



TSF-420

TROLLEYS, constructed of stoved enamel steel tube with steel angle side members. With 100mm diameter rubber-covered castors and two removable trays. Trays are 40mm deep and have reinforced edges. Supplied in flat pack and can be assembled or dismantled quickly.

Tray size, mm	760×460	1070×610
No. of trays	2	3
Height of top tray, mm	840	915
Distance between trays, mm	505	305
Mass, kg	26	40

TSF-420-030K Trolley, 760×460mm trays **£48-58**
TSF-420-050E Trolley, 1070×610mm trays **£70-38**



TSF-510

TROLLEY, flat bed/sack truck, constructed of steel tube with adjustable removable handle, removable pivot wheel assembly and baseboard. Wheels are plastics with rubber tyres. Can be converted quickly from a four-wheel flat trolley to a two-wheel sack truck.

Dimensions as a flat trolley	1400mm long (including extended handle) × 355mm wide
Dimensions as a sack truck	1000mm long × 355mm wide
Mass	7kg

TSF-510-S Trolley **£35-66**

VACUUM PUMP TROLLEYS

- **Alternative metal or wood construction**
- **Fitted gauge, manifold and valves**
- **Castor wheels for mobility**

See PYD-600-T and PYD-700-L



Gallenkamp

SPECIMEN TUBES

Dimensions given are length × diameter



TUL-430



TUL-460



TUL-490



TUL-520



TUL-680



TUL-720



TUL-760

GLASS TUBES

TUBES, specimen, glass, straight sided, clear, with bark cork.

TUL-430-030N	Tubes, specimen, 50 × 12 mm	Pack of 144 **£3·07**
TUL-430-050H	Tubes, specimen, 50 × 25 mm	Pack of 72 **£3·58**
TUL-430-090S	Tubes, specimen, 75 × 19 mm	Pack of 144 **£5·20**
TUL-430-110P	Tubes, specimen, 75 × 25 mm	Pack of 72 **£3·68**
TUL-430-150D	Tubes, specimen, 100 × 25 mm	Pack of 72 **£4·08**
TUL-430-170U	Tubes, specimen, 100 × 32 mm	Pack of 72 **£4·50**

TUBES, specimen, glass, straight sided, clear, with push-in polythene closure.

TUL-460-030P	Tubes, specimen, 50 × 12 mm	Pack of 50 **£0·99**
TUL-460-050J	Tubes, specimen, 50 × 19 mm	Pack of 50 **£1·53**
TUL-460-070D	Tubes, specimen, 50 × 25 mm	Pack of 50 **£2·39**
TUL-460-090U	Tubes, specimen, 75 × 19 mm	Pack of 50 **£1·69**
TUL-460-110R	Tubes, specimen, 75 × 25 mm	Pack of 50 **£2·59**
TUL-460-190Q	Tubes, specimen, 150 × 25 mm	Pack of 50 **£3·54**

TUBES, specimen, glass, straight sided, clear, with snap-on polythene closure.

TUL-490-030R	Tubes, specimen, 25 × 23 mm	Pack of 150 **£5·63**
TUL-490-050L	Tubes, specimen, 40 × 24 mm	Pack of 130 **£5·57**
TUL-490-070F	Tubes, specimen, 60 × 25 mm	Pack of 115 **£6·12**
TUL-490-090W	Tubes, specimen, 70 × 28 mm	Pack of 95 **£6·00**

TUBES, specimen, glass, straight sided, clear, with black plastics screw cap lined with cork disc.

TUL-520-030M	Tubes, specimen, 58 × 17 mm	Pack of 285 **£8·61**
TUL-520-050G	Tubes, specimen, 67 × 17 mm	Pack of 276 **£9·17**
TUL-520-070A	Tubes, specimen, 86 × 21 mm	Pack of 182 **£7·74**
TUL-520-080U	Tubes, specimen, 96 × 23 mm	Pack of 150 **£7·79**

PLASTICS TUBES

TUBES, specimen, polystyrene, transparent, with polythene push-in cap.

TUL-680-030Y	Tubes, specimen, 60 × 13 mm	Pack of 24 **£0·69**
TUL-680-090N	Tubes, specimen, 72 × 18 mm	Pack of 24 **£0·84**

TUBES, specimen, polythene, fitted with hinged lid.

TUL-720-030T	Tubes, specimen, 60 × 16 mm	Pack of 25 **£0·55**
TUL-720-090B	Tubes, specimen, 75 × 24 mm	Pack of 25 **£0·97**

TUBES, specimen, polypropylene, for the storage and transit of tablets, powders, pastes and small components. Comprises a full aperture tube and a polythene cap which, once fitted, is securely held until the tear-tab is pulled and the lower part peeled away. In position, the cap provides a high resistance to loss of gas and vapour from the tube. When the tear-tab has been removed, the upper part of the cap becomes a push-on lid, ideal as a temporary closure. The tubes are not recommended for the transit of liquids.

TUL-760-030X	Tubes, specimen, 41 × 28 mm	Pack of 150 **£2·73**
TUL-760-050Y	Tubes, specimen, 52 × 35 mm	Pack of 100 **£2·30**
TUL-760-070C	Tubes, specimen, 75 × 49 mm	Pack of 40 **£2·44**
TUL-760-090T	Tubes, specimen, 113 × 62 mm	Pack of 25 **£2·49**

TUBING

GENERAL PROPERTIES OF BOROSILICATE AND SODA-LIME GLASSES

Borosilicate glass has good resistance to thermal shock and can be worked in a blowpipe flame using gas together with compressed air enriched with oxygen. After working it should be annealed in a furnace at 565 to 570°C for 15 minutes then allowed to cool slowly and uniformly no faster than 200°/hour to below 150°C.

Soda-lime glass can be worked in a Bunsen or gas/air burner flame without devitrification. It should be annealed; the technique of cooling in a luminous flame until carbon is deposited is adequate but furnace annealing at 515 to 520°C followed by slow cooling is preferable.

Both types of glasses have excellent chemical resistance, borosilicate being slightly less alkali resistant but more acid resistant than soda-lime glass.

TECHNICAL DATA

TYPICAL CHEMICAL ANALYSIS

Constituent	Composition	
	Borosilicate	Soda-lime
Silica	80·6%	71%
Boric oxide	12·6%	–
Sodium oxide	4·15%	15%
Aluminium oxide	2·2%	2·2%
Calcium oxide	0·1%	5·7%
Magnesium oxide	0·05%	2·9%
Barium oxide	5 ppm	1·7%
Potassium oxide	–	1·2%

PHYSICAL PROPERTIES

Property	Borosilicate	Soda-lime
Linear expansivity	$3{\cdot}3\times10^{-6}$/°C	$9{\cdot}2\times10^{-6}$/°C
Density	2·23 g/cm³	2·50 g/cm³
Refractive index (n_D)	1·475	1·513
Strain point	520°C	475°C
Annealing point	565°C	515°C
Softening point	820°C	710°C

SODA-LIME GLASS TUBING

All dimensions, tolerances and pack quantities quoted are nominal

TUBING, soda-lime glass, light wall, in lengths of approximately 1·5m.

External dia., mm	4 to 24	26 to 30	41
Tolerance, mm	±0·2	±0·5	±0·75
Wall thickness, mm	0·75	1·1	1·6

The dimension given is the external diameter.

TWL-300-040R	Tubing, 4mm	Pack of 33 **£2·31**
TWL-300-050X	Tubing, 5mm	Pack of 27 **£2·31**
TWL-300-060L	Tubing, 6mm	Pack of 33 **£2·31**
TWL-300-070Y	Tubing, 7mm	Pack of 40 **£2·31**
TWL-300-080F	Tubing, 8mm	Pack of 35 **£3·38**
TWL-300-090C	Tubing, 9mm	Pack of 31 **£3·38**
TWL-300-100C	Tubing, 10mm	Pack of 26 **£3·38**
TWL-300-110W	Tubing, 11mm	Pack of 23 **£3·38**
TWL-300-120T	Tubing, 12mm	Pack of 21 **£4·50**
TWL-300-130Q	Tubing, 13mm	Pack of 19 **£4·50**
TWL-300-140N	Tubing, 14mm	Pack of 18 **£4·50**
TWL-300-150K	Tubing, 15mm	Pack of 17 **£4·50**
TWL-300-160H	Tubing, 16mm	Pack of 16 **£4·50**
TWL-300-180B	Tubing, 18mm	Pack of 14 **£4·50**
TWL-300-200V	Tubing, 20mm	Pack of 12 **£4·50**
TWL-300-220P	Tubing, 22mm	Pack of 11 **£4·50**
TWL-300-240J	Tubing, 24mm	Pack of 10 **£4·50**
TWL-300-260D	Tubing, 26mm	Pack of 3 **£1·74**
TWL-300-280U	Tubing, 28mm	Pack of 3 **£1·74**
TWL-300-300R	Tubing, 30mm	Pack of 2 **£1·74**
TWL-300-410K	Tubing, 41mm	Pack of 2 **£1·74**

TUBING, soda-lime glass, heavy wall, in lengths of approximately 1·5m.

External dia., mm	12·5	15·5
Tolerance, mm	±0·5	±0·5
Wall thickness, mm	2·25	2·25

TWL-340-050J	Tubing, 12·5mm	Pack of 5 **£2·81**
TWL-340-090U	Tubing, 15·5mm	Pack of 4 **£2·81**

TUBING, soda-lime glass, capillary bore, in lengths of approximately 1·5m.

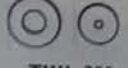
External dia., mm	4·5 to 5·5	6 to 6·5
Tolerance, mm	±0·5	±0·25
Bore tolerance, mm	±0·25	±0·1

The dimensions given are external diameter × bore.

TWL-380-030K	Tubing, 4·5 × 0·75mm	Pack of 3 **£1·69**
TWL-380-040H	Tubing, 4·5 × 1·25mm	Pack of 3 **£0·65**
TWL-380-050E	Tubing, 5·5 × 1·75mm	Pack of 3 **£0·65**
TWL-380-060B	Tubing, 5·5 × 2·25mm	Pack of 3 **£0·65**
TWL-380-070V	Tubing, 6 × 0·5mm	Pack of 2 **£2·53**
TWL-380-090P	Tubing, 6·5 × 1·1mm	Pack of 3 **£2·53**
TWL-380-100P	Tubing, 6·5 × 1·8mm	Pack of 4 **£2·53**



TWL-300
TWL-500 is similar



TWL-380

BOROSILICATE GLASS TUBING

All dimensions, tolerances and pack quantities quoted are nominal

TUBING, *PYREX* **borosilicate glass,** light wall, in lengths of approximately 1·5m.

External dia., mm	4 to 5	6 to 14	15 to 28	30 to 36
Tolerance, mm	±0·4	±0·4	±0·5	±0·8
Wall thickness, mm	0·8	1	1·2	1·4
External dia., mm	40 to 44	50 to 54	60 to 70	80
Tolerance, mm	±1	±1	±1·5	±1·8
Wall thickness, mm	1·6	1·8	2·2	2·5

The dimension given is the external diameter.

TWL-500-040B	Tubing, 4mm	Pack of 14 **£3·75**
TWL-500-042U	Tubing, 4mm	Pack of 360 **£32·72**
TWL-500-050V	Tubing, 5mm	Pack of 12 **£3·75**
TWL-500-052R	Tubing, 5mm	Pack of 260 **£29·67**
TWL-500-060S	Tubing, 6mm	Pack of 12 **£3·75**
TWL-500-062X	Tubing, 6mm	Pack of 240 **£25·88**
TWL-500-070P	Tubing, 7mm	Pack of 10 **£3·75**
TWL-500-072L	Tubing, 7mm	Pack of 200 **£25·88**
TWL-500-080M	Tubing, 8mm	Pack of 9 **£3·75**
TWL-500-082Y	Tubing, 8mm	Pack of 180 **£27·60**
TWL-500-090J	Tubing, 9mm	Pack of 8 **£3·75**
TWL-500-092F	Tubing, 9mm	Pack of 150 **£25·86**
TWL-500-100J	Tubing, 10mm	Pack of 8 **£3·75**
TWL-500-102F	Tubing, 10mm	Pack of 132 **£20·24**
TWL-500-110G	Tubing, 11mm	Pack of 8 **£3·75**
TWL-500-112C	Tubing, 11mm	Pack of 120 **£19·95**
TWL-500-120D	Tubing, 12mm	Pack of 7 **£3·75**
TWL-500-122W	Tubing, 12mm	Pack of 108 **£19·95**
TWL-500-130A	Tubing, 13mm	Pack of 6 **£3·75**
TWL-500-132T	Tubing, 13mm	Pack of 100 **£19·95**
TWL-500-140U	Tubing, 14mm	Pack of 5 **£3·75**
TWL-500-142Q	Tubing, 14mm	Pack of 76 **£20·01**
TWL-500-150R	Tubing, 15mm	Pack of 4 **£3·75**
TWL-500-152N	Tubing, 15mm	Pack of 68 **£19·72**
TWL-500-160X	Tubing, 16mm	Pack of 4 **£3·75**
TWL-500-162K	Tubing, 16mm	Pack of 64 **£19·84**
TWL-500-170L	Tubing, 17mm	Pack of 4 **£3·75**
TWL-500-172H	Tubing, 17mm	Pack of 60 **£19·95**
TWL-500-180Y	Tubing, 18mm	Pack of 3 **£3·75**
TWL-500-182E	Tubing, 18mm	Pack of 56 **£19·84**
TWL-500-190F	Tubing, 19mm	Pack of 3 **£3·75**
TWL-500-192B	Tubing, 19mm	Pack of 52 **£19·67**
TWL-500-200F	Tubing, 20mm	Pack of 3 **£3·75**
TWL-500-202B	Tubing, 20mm	Pack of 52 **£22·48**
TWL-500-220W	Tubing, 22mm	Pack of 2 **£3·75**
TWL-500-222S	Tubing, 22mm	Pack of 44 **£21·05**
TWL-500-240Q	Tubing, 24mm	Pack of 2 **£3·75**
TWL-500-242M	Tubing, 24mm	Pack of 40 **£22·08**
TWL-500-260K	Tubing, 26mm	Pack of 2 **£3·75**
TWL-500-262G	Tubing, 26mm	Pack of 40 **£22·60**
TWL-500-280E	Tubing, 28mm	Pack of 2 **£3·75**
TWL-500-282A	Tubing, 28mm	Pack of 32 **£19·78**
TWL-500-300B	Tubing, 30mm	Each **£3·75**
TWL-500-302U	Tubing, 30mm	Pack of 32 **£26·34**
TWL-500-320S	Tubing, 32mm	Each **£3·75**
TWL-500-322X	Tubing, 32mm	Pack of 20 **£18·06**
TWL-500-340M	Tubing, 34mm	Each **£3·75**
TWL-500-342Y	Tubing, 34mm	Pack of 20 **£18·80**
TWL-500-360G	Tubing, 36mm	Each **£3·75**
TWL-500-362C	Tubing, 36mm	Pack of 20 **£19·78**
TWL-500-400U	Tubing, 40mm	Each **£3·75**
TWL-500-402Q	Tubing, 40mm	Pack of 15 **£16·39**
TWL-500-440Y	Tubing, 44mm	Each **£3·75**
TWL-500-442E	Tubing, 44mm	Pack of 15 **£22·77**
TWL-510-050X	Tubing, 50mm	Each **£3·75**
TWL-510-052K	Tubing, 50mm	Pack of 15 **£28·52**
TWL-510-054G	Tubing, 54mm	Pack of 4 **£8·05**
TWL-510-060L	Tubing, 60mm	Pack of 4 **£11·62**
TWL-510-070Y	Tubing, 70mm	Pack of 4 **£13·40**
TWL-510-080F	Tubing, 80mm	Pack of 4 **£16·16**

For illustration *see p. 715.*

GLASSWORKING BLOWPIPES



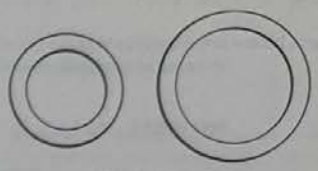
Models for use with coal gas, natural (methane) gas or LPG.
See B1G-300-U et seq.

TUBING, *PYREX* **borosilicate glass,** medium wall, in lengths of approximately 1·5m.

External dia., mm	6 to 14	16 to 18	
Tolerance, mm	±0·4	±0·4	
Wall thickness, mm	1·5	1·8	
External dia., mm	20 to 24	26 to 30	56
Tolerance, mm	±0·5	±0·8	±1
Wall thickness, mm	1·8	2	2·5

The dimension given is the external diameter.

TWL-530-060U	Tubing, 6mm	Pack of 9 **£3·75**
TWL-530-062Q	Tubing, 6mm	Pack of 150 **£22·25**
TWL-530-070R	Tubing, 7mm	Pack of 6 **£3·75**
TWL-530-072N	Tubing, 7mm	Pack of 140 **£33·12**
TWL-530-080X	Tubing, 8mm	Pack of 5 **£3·75**
TWL-530-082K	Tubing, 8mm	Pack of 115 **£30·19**
TWL-530-090L	Tubing, 9mm	Pack of 4 **£3·75**
TWL-530-092H	Tubing, 9mm	Pack of 100 **£31·11**
TWL-530-100L	Tubing, 10mm	Pack of 6 **£3·75**
TWL-530-102H	Tubing, 10mm	Pack of 90 **£19·21**
TWL-530-110Y	Tubing, 11mm	Pack of 5 **£3·75**
TWL-530-112E	Tubing, 11mm	Pack of 75 **£17·88**
TWL-530-120F	Tubing, 12mm	Pack of 5 **£3·75**
TWL-530-122B	Tubing, 12mm	Pack of 70 **£18·57**
TWL-530-130C	Tubing, 13mm	Pack of 4 **£3·75**
TWL-530-132V	Tubing, 13mm	Pack of 65 **£18·57**
TWL-530-140W	Tubing, 14mm	Pack of 4 **£3·75**
TWL-530-142S	Tubing, 14mm	Pack of 55 **£17·19**
TWL-530-160Q	Tubing, 16mm	Pack of 3 **£3·75**
TWL-530-162M	Tubing, 16mm	Pack of 45 **£18·57**
TWL-530-180K	Tubing, 18mm	Pack of 2 **£3·75**
TWL-530-182G	Tubing, 18mm	Pack of 36 **£17·19**
TWL-530-200H	Tubing, 20mm	Pack of 2 **£3·75**
TWL-530-202D	Tubing, 20mm	Pack of 32 **£18·69**
TWL-530-220B	Tubing, 22mm	Pack of 2 **£3·75**
TWL-530-222U	Tubing, 22mm	Pack of 32 **£20·82**
TWL-530-240S	Tubing, 24mm	Pack of 2 **£3·75**
TWL-530-242X	Tubing, 24mm	Pack of 28 **£19·95**
TWL-530-260M	Tubing, 26mm	Pack of 2 **£3·75**
TWL-530-262Y	Tubing, 26mm	Pack of 20 **£17·88**
TWL-530-300D	Tubing, 30mm	Pack of 2 **£3·75**
TWL-530-302W	Tubing, 30mm	Pack of 20 **£21·33**
TWL-530-356W	Tubing, 56mm	Pack of 4 **£12·65**



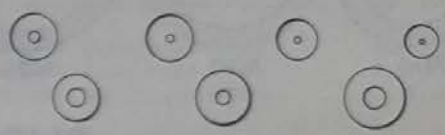
TWL-530

TUBING, *PYREX* **borosilicate glass,** capillary bore, in lengths of approximately 1·5m.

External dia. tolerance, mm	±0·8
Bore tolerance, mm	±0·25 for 0·5 to 1mm ±0·4 for 1·6 to 3mm

The dimensions given are external diameter × bore.

TWL-560-050C	Tubing, 5 × 0·5mm	Pack of 7 **£3·75**
TWL-560-052V	Tubing, 5 × 0·5mm	Pack of 120 **£22·83**
TWL-560-060W	Tubing, 6 × 0·75mm	Pack of 5 **£3·75**
TWL-560-062S	Tubing, 6 × 0·75mm	Pack of 85 **£24·38**
TWL-560-070T	Tubing, 7 × 1mm	Pack of 4 **£3·75**
TWL-560-072P	Tubing, 7 × 1mm	Pack of 65 **£24·38**
TWL-560-080Q	Tubing, 7 × 1·4mm	Pack of 4 **£3·75**
TWL-560-082M	Tubing, 7 × 1·4mm	Pack of 65 **£24·38**
TWL-560-090N	Tubing, 7 × 2·5mm	Pack of 4 **£3·75**
TWL-560-092J	Tubing, 7 × 2·5mm	Pack of 65 **£21·74**
TWL-560-100N	Tubing, 8 × 2mm	Pack of 3 **£3·75**
TWL-560-102J	Tubing, 8 × 2mm	Pack of 50 **£24·38**
TWL-560-110K	Tubing, 9 × 3mm	Pack of 2 **£3·75**
TWL-560-112G	Tubing, 9 × 3mm	Pack of 40 **£22·83**



TWL-560



TWL-770

GLASS TUBING RACK

TUBING RACK, hardwood, with partitions for 12 sizes of tubing. Overall dimensions 760 × 150 × 915mm high.

TWL-770-R Tubing rack **£20·03**

GLASS TUBING ACCESSORIES

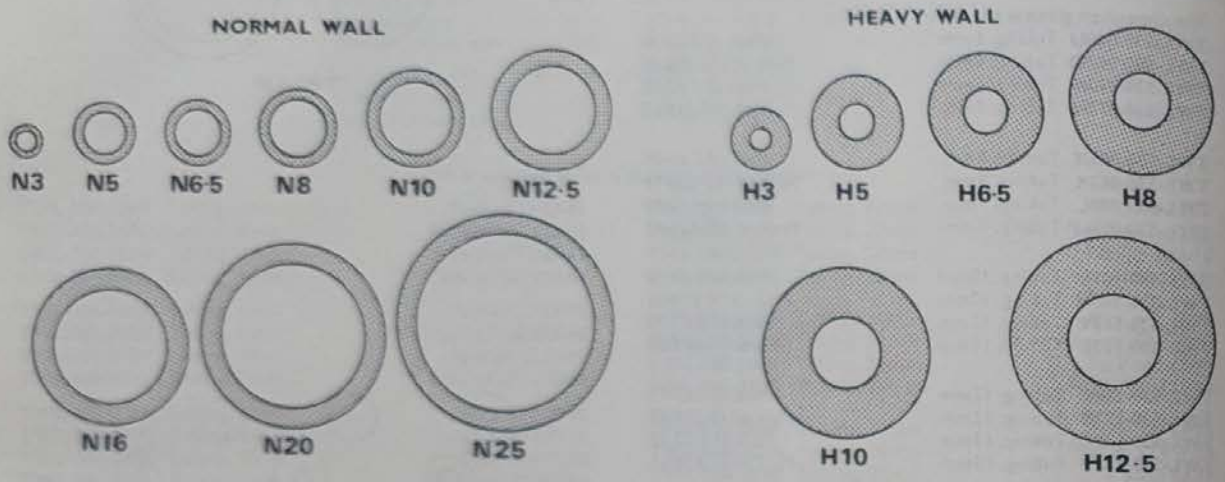
Cutting tools — See GTB-450-W etc.
Safety grip — See GTB-400-L

Gallenkamp

FLEXIBLE TUBING

SIZE DESIGNATIONS

The illustrations below are approximately full size corresponding to the normal wall (N) and heavy wall (H) size designations given in BS 2775. Wherever possible, the tubings listed on the following pages conform to these designations.



RUBBER TUBING

NORMAL WALL

TUBING, natural rubber, BS 2775, normal wall. The dimensions given are bore × wall thickness.

TWR-250-110E	Tubing, N3, 3 × 0·75mm	Pack of 10m £1·69
TWR-250-130V	Tubing, N5, 5 × 1·5mm	Pack of 10m £2·46
TWR-250-150P	Tubing, N6·5, 6·5 × 1·5mm	Pack of 10m £2·59
TWR-250-170J	Tubing, N8, 8 × 2mm	Pack of 10m £3·07
TWR-250-190D	Tubing, N10, 10 × 2mm	Metre £0·41
TWR-250-192W	Tubing, N10, 10 × 2mm	Pack of 10m £3·41
TWR-250-210A	Tubing, N12·5, 12·5 × 2·25mm	Metre £0·55
TWR-250-212T	Tubing, N12·5, 12·5 × 2·25mm	Pack of 10m £4·65
TWR-250-230R	Tubing, N16, 16 × 3·25mm	Metre £0·79
TWR-250-232N	Tubing, N16, 16 × 3·25mm	Pack of 10m £6·77
TWR-250-270F	Tubing, N20, 20 × 3·25mm	Metre £1·02
TWR-250-272B	Tubing, N20, 20 × 3·25mm	Pack of 10m £8·90
TWR-250-290W	Tubing, N25, 25 × 3·25mm	Metre £2·23
TWR-250-292S	Tubing, N25, 25 × 3·25mm	Pack of 10m £19·23

TUBING, Neoprene, BS 2775, normal wall. The dimensions given are bore × wall thickness.

TWR-290-110W	Tubing, N3, 3 × 0·75mm	Pack of 10m £1·91
TWR-290-130Q	Tubing, N5, 5 × 1·5mm	Pack of 10m £2·97
TWR-290-150K	Tubing, N6·5, 6·5 × 1·5mm	Pack of 10m £3·20
TWR-290-170E	Tubing, N8, 8 × 2mm	Pack of 10m £4·02
TWR-290-190V	Tubing, N10, 10 × 2mm	Metre £0·52
TWR-290-192K	Tubing, N10, 10 × 2mm	Pack of 10m £4·55
TWR-290-210S	Tubing, N12·5, 12·5 × 2·25mm	Metre £0·71
TWR-290-212X	Tubing, N12·5, 12·5 × 2·25mm	Pack of 10m £6·24
TWR-290-230M	Tubing, N16, 16 × 3·25mm	Metre £1·09
TWR-290-232Y	Tubing, N16, 16 × 3·25mm	Pack of 10m £10·46

TUBING, silicone rubber, translucent, BS 2775, normal wall, non-toxic. Can be sterilised in steam at 121°C or air at 160°C. The dimensions given are bore × wall thickness.

TWR-330-110K	Tubing, N3, 3 × 0·75mm	Metre £0·54
TWR-330-130E	Tubing, N5, 5 × 1·5mm	Metre £1·01
TWR-330-150V	Tubing, N6·5, 6·5 × 1·5mm	Metre £1·09
TWR-330-170P	Tubing, N8, 8 × 2mm	Metre £1·91

HEAVY WALL

TUBING, natural rubber, BS 2775, heavy wall. The dimensions given are bore × wall thickness.

TWR-460-110E	Tubing, H3, 3 × 3mm	Metre £0·38
TWR-460-112A	Tubing, H3, 3 × 3mm	Pack of 10m £3·21
TWR-460-130V	Tubing, H5, 5 × 4mm	Metre £0·59
TWR-460-132R	Tubing, H5, 5 × 4mm	Pack of 10m £4·98
TWR-460-150P	Tubing, H6·5, 6·5 × 5mm	Metre £0·79
TWR-460-152L	Tubing, H6·5, 6·5 × 5mm	Pack of 10m £6·64
TWR-460-170J	Tubing, H8, 8 × 6mm	Metre £1·02
TWR-460-172F	Tubing, H8, 8 × 6mm	Pack of 10m £8·96
TWR-460-190D	Tubing, H10, 10 × 7mm	Metre £1·35
TWR-460-192W	Tubing, H10, 10 × 7mm	Pack of 10m £11·54
TWR-460-210A	Tubing, H12·5, 12·5 × 8·5mm	Metre £2·73
TWR-460-212T	Tubing, H12·5, 12·5 × 8·5mm	Pack of 10m £25·71

TUBING, Neoprene, outer cover polyester reinforced and nitrile rubber bore. Suitable for working pressures up to 1500kN/m² (15kgf/cm²). The dimensions given are nominal bore × wall thickness.

TWR-520-150M	Tubing, 6 × 9mm	Metre £1·09
TWR-520-190A	Tubing, 10 × 9mm	Metre £1·35
TWR-520-210U	Tubing, 13 × 10mm	Metre £1·50
TWR-520-230X	Tubing, 16 × 11mm	Metre £1·77

TUBING, Neoprene, BS 2775, heavy wall. The dimensions given are bore × wall thickness.

TWR-550-110D	Tubing, H3, 3 × 3mm	Metre £0·48
TWR-550-112W	Tubing, H3, 3 × 3mm	Pack of 10m £4·21
TWR-550-130U	Tubing, H5, 5 × 4mm	Metre £0·78
TWR-550-132Q	Tubing, H5, 5 × 4mm	Pack of 10m £6·84
TWR-550-150X	Tubing, H6·5, 6·5 × 5mm	Metre £1·04
TWR-550-152K	Tubing, H6·5, 6·5 × 5mm	Pack of 10m £9·97
TWR-550-170Y	Tubing, H8, 8 × 6mm	Metre £1·35
TWR-550-172E	Tubing, H8, 8 × 6mm	Pack of 10m £13·13

Silicone tubing for peristaltic pumps See P700-070

PVC TUBING

TUBING, PVC, colourless, normal wall, transparent, non-toxic. Can be steam sterilised at 121°C. The dimensions given are bore × wall thickness and are to BS 2775.

TWR-670-110E	Tubing, N3, 3×0·75mm	Pack of 10m **£0·37**
TWR-670-130V	Tubing, N5, 5×1·5mm	Pack of 10m **£1·04**
TWR-670-150P	Tubing, N6·5, 6·5×1·5mm	Pack of 10m **£1·11**
TWR-670-170J	Tubing, N8, 8×2mm	Pack of 10m **£2·04**
TWR-670-190D	Tubing, N10, 10×2mm	Metre **£0·27**
TWR-670-192W	Tubing, N10, 10×2mm	Pack of 10m **£2·42**
TWR-670-210A	Tubing, N12·5, 12·5×2·25mm	Metre **£0·42**
TWR-670-212T	Tubing, N12·5, 12·5×2·25mm	Pack of 10m **£3·63**
TWR-670-230R	Tubing, N16, 16×3·25mm	Metre **£0·59**
TWR-670-232N	Tubing, N16, 16×3·25mm	Pack of 10m **£5·76**
TWR-670-270F	Tubing, N20, 20×3·25mm	Metre **£0·70**
TWR-670-272B	Tubing, N20, 20×3·25mm	Pack of 10m **£7·09**
TWR-670-290W	Tubing, N25, 25×3·25mm	Metre **£0·82**
TWR-670-292S	Tubing, N25, 25×3·25mm	Pack of 10m **£8·61**

TUBING, PVC, opaque green, with smooth bore and low gas permeability being especially suitable for use where contamination cannot be tolerated as in blood gas determinations, etc. Recommended for use with Van Slyke apparatus. Bore × wall thickness 6·35 × 3·2mm.

TWR-710-W	Tubing, 6·35×3·2mm	Metre **£0·83**

TUBING, PVC, colourless, transparent, with terylene mesh reinforced wall. A flexible tubing of great inherent strength. Suitable for moderate pressure or vacuum applications. The dimensions given are bore × wall thickness.

TWR-750-130E	Tubing, 5×2·5mm	Metre **£0·35**
TWR-750-150V	Tubing, 6·5×3mm	Metre **£0·42**
TWR-750-170P	Tubing, 8×3mm	Metre **£0·52**
TWR-750-190J	Tubing, 10×3mm	Metre **£0·61**
TWR-750-210G	Tubing, 13×3mm	Metre **£0·80**
TWR-750-230A	Tubing, 16×3·5mm	Metre **£1·11**
TWR-750-270L	Tubing, 19×3·5mm	Metre **£1·35**

GAS BURNER TUBING

TUBES, GAS BURNER, nitrile rubber, with reinforced ends for fitting to Bunsen burner and gas tap. Suitable for use with coal and natural (methane) gas burners. Bore × wall thickness 5×1·5mm.

TWS-210-030U	Tube, length 600mm	**£0·82**
TWS-210-050X	Tube, length 900mm	**£0·92**

TUBING, GAS BURNER, Neoprene, suitable for use with LPG (butane/propane) and natural (methane) gas burners. Bore × wall thickness 8×3mm, length 2m.

TWS-240-Y	Tubing	**£0·80**

TUBING, GAS BURNER, PVC, with helical steel wire reinforced wall. Flexible, crush and kink resistant, thus reducing hazards. Suitable for large gas burners and larger pieces of gas operated equipment. Approximately 8mm bore.

TWS-290-T	Tubing	Metre **£1·09**

OTHER PLASTICS TUBINGS

TUBES, acrylic, transparent, rigid, bore × wall thickness 24×3mm.

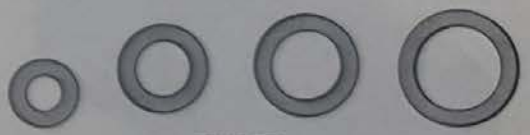
TWS-470-030Y	Tubes, length 200mm	Pack of 3 **£2·08**
TWS-470-050C	Tubes, length 300mm	Pack of 3 **£2·97**
TWS-470-110K	Tube, length 1000mm	Each **£2·34**

TUBING, polythene, natural grade, medium wall, tough and flexible. Can be manipulated by softening in hot water. The dimensions given are bore × wall thickness.

TWS-530-070Q	Tubing, 1·5×1·5mm	Pack of 10m **£0·64**
TWS-530-110H	Tubing, 3×1·5mm	Pack of 10m **£0·81**
TWS-530-130B	Tubing, 4·5×1·5mm	Pack of 10m **£1·11**
TWS-530-150S	Tubing, 6·3×1·5mm	Pack of 10m **£1·22**
TWS-530-170M	Tubing, 8×1·5mm	Pack of 10m **£1·42**
TWS-530-210D	Tubing, 12·5×2mm	Pack of 10m **£2·93**



TWS-210



TWS-530
4·5 to 12·5mm bores

TUBING CLIPS AND CONNECTORS





Tubing connectors, straight, T and Y shapes in glass and plastics

See ADF-300-010R et seq.

Wide range of clips for compressing flexible tubings up to 50mm diameter

See CNK-300-010R et seq

Gallenkamp

ULTRASONIC CLEANING APPARATUS



ULJ-300

ULTRASONIC CLEANING APPARATUS, suitable for cleaning delicate mechanisms, electrical components, small pieces of glassware and medical instruments, etc.

Comprises 50kHz generator, transducer and stainless steel bath mounted in a single module. The generator requires no warm-up time and tunes automatically to take account of liquid level, cleaning load and input voltage. It develops power at frequencies above the audible limit, pulsed at mains frequency, and the signal is transmitted to a transducer bonded to the base of the bath. Some unavoidable audible harmonic resonance is produced. The bath is suitable for liquid temperatures up to approximately 150°C. Some hot solutions can, however, damage the bath and the instructions must be followed with regard to the use of hot cleaning solutions.

With instructions, for 220–240V 50–60Hz single phase supplies.

ULJ-300-030L	Ultrasonic apparatus, 1·7 litres	**£126·50**
ULJ-300-050F	Ultrasonic apparatus, 5 litres	**£214·50**
ULJ-300-070W	Ultrasonic apparatus, 13 litres	**£385·00**

ACCESSORIES

ULJ-320-500J	Cover, stainless steel, for 1·7 litre apparatus	**£5·50**
ULJ-320-520D	Cover, stainless steel, for 5 litre apparatus	**£11·00**
ULJ-320-540U	Cover, stainless steel, for 13 litre apparatus	**£16·50**
	Cleaning solution, general purpose	*See CMD-300-J*
	Cleaning solution, special purpose	*See CMD-400*

Capacity, litres	1·7	5	13
Peak output, W	100	200	400
Internal dimensions, mm	160 × 110 × 110 deep	250 × 155 × 150 deep	340 × 250 × 150 deep
Overall dimensions, mm	185 × 145 × 245 high	285 × 185 × 270 high	370 × 280 × 270 high

VACUUM PUMPS



- **Single and double stage models**
- **Evacuation range 0·0001 to 5 torr**
- **Gas ballast facility**
- **Anti-suckback device on all models**

See PYB-550-M et seq.

For vacuum filter pumps *See PYX-220-W et seq.*

OTHER VACUUM APPARATUS



Desiccators	*See DES-260, DES-350, etc.*
Dewar vessels	*See DFH-300 et seq.*
Embedding baths	*See HJC-850 et seq.*
Evaporator	*See EVF-300*
Manometer	*See GML-700 et seq.*
Ovens	*See OVL-600*
Stopcocks	*See STA-600 et seq.*
Tubing	*See TWR-460 and TWR-750*

Gallenkamp UNIVERSAL TORSION VISCOMETER

For testing liquids with Newtonian or anomalous viscosities

Suitable for testing:

oils, dairy products, paints,

rubber latex, glues, gums,

inks, chocolates, sugars,

cosmetics, ceramics and many other materials

- **Viscosity range 0·25 to 10^3 poise extended to 10^6 poise with accessories**
- **Rapid results obtainable by unskilled operator**
- **Interchangeable torsion wires and cylinders**
- **Water jacketed cup for tests at temperatures other than ambient**



VHA-200

Essentially the viscometer comprises a vertical torsion wire, a flywheel mounted above a graduated scale and a cylinder suspended below the scale. The damping effect of the sample on the overswing of the cylinder, when the flywheel is rotated through 360° and released, is a measure of the viscosity. The higher the viscosity, the greater is the drag and the less is the overswing. A sample support table which swivels to one side and has two fixed vertical positions is provided. The viscometer is mounted on levelling feet but the guide aperture at the lower end of the torsion wire is fitted with a low friction bearing which makes critical levelling unnecessary.

The viscometer has an additional graduated scale at the top of the torsion wire so that torsion can be applied, without disturbing the sample, for thixotropic and anomalous viscosity investigations.

VISCOMETER, universal torsion, *GALLENKAMP*, as specified, with two graduated scales, two interchangeable torsion wires 30 and 36 swg, three cylinders ¼, ½ and 1¼in. diameter and comprehensive instructions manual which includes calibration curves for cylinder and wire combinations supplied. For use as a viscometer and thixotrometer.

VHA-200-M	Viscometer	£87·19

SPARE PARTS

VHA-220-030M	Cylinder, ¼in. dia.	£1·77
VHA-220-050G	Cylinder, ½in. dia.	£2·41
VHA-220-070A	Cylinder, 1¼in. dia.	£3·59
VHA-220-210K	Torsion wire, 30 swg	£2·03
VHA-220-230E	Torsion wire, 36 swg	£2·03

ACCESSORIES

VHA-220-504Q	Cylinder, ¼in. dia.	£1·89
VHA-220-514N	Cylinder, ½in. dia.	£2·57
VHA-220-530P	Torsion wire, 24 swg	£2·03
VHA-220-534H	Torsion wire, 26 swg	£2·03
VHA-220-538W	Torsion wire, 28 swg	£2·03
VHA-220-542Y	Torsion wire, 32 swg	£2·03
VHA-220-546A	Torsion wire, 34 swg	£2·03
VHA-224-502T	Sample cup, plated metal, 47mm internal diameter × 60mm deep, with locating grass to fit centring guides of the support table and with thermometer pocket. Sample cup	£6·41
VHA-224-508H	Sample cup, as VHA-224-502T but, water-jacketed to allow temperature control by circulation of water. Sample cup	£22·73
VHA-224-518E	Stirrer for cups VHA-224-502T to VHA-224-508H	£4·95

ROTATING CYLINDER VISCOMETERS



VHA-500

For direct determination of the flow properties of Newtonian or thixotropic liquids at temperatures up to 100°C.

An outer cylinder driven by a synchronous motor rotates the sample and causes a drag on a coaxial inner cylinder. The resulting angular deflection of the latter is proportional to the viscosity. As the measurement of angular deflection is displayed continuously, the way in which viscosity varies with time (and temperature) at fixed ratio of shear can be studied.

VISCOMETER, rotating cylinder, *FERRANTI* **Model VL,** with set of VL, VH and VM cylinders and 20g/cm torque spring. Viscosity range 0·168 to 97 poise; speed range 99·5 to 297·3 rev/min; shear rate 43 to 950/s. For use at temperatures up to 100°C. In leather case. For 200–250V 50Hz single phase supplies.

VHA-500-L Viscometer **£889·35**

VISCOMETER, rotating cylinder, *FERRANTI* **Model VM,** with set of VM, VH and VL cylinders and 20g/cm torque spring. Viscosity range 0·33 to 1460 poise; speed range 15 to 159·1 rev/min; shear rate 4·7 to 508/s. For use at temperatures up to 100°C. In leather case. For 200–250V 50Hz single phase supplies.

VHA-520-U Viscometer **£922·90**

FLOW CUPS



VHA-580
VHA-620
VHA-650

Size or type	Orifice dimensions		Approximate viscosity range,* stokes
	Diameter mm	Length mm	
2	2·38	4·62	0·1 to 1
4	3·97	5·26	0·8 to 7
6	7·14	6·50	6 to 30
ISO	6	20	0·2 to 1·5
FORD No. 4	–	–	1 to 10

* Anomalous flow can cause an apparent variation from these ranges. BS 3900: A6 advises against conversion of flow times to viscosities.

FLOW CUPS, *GALLENKAMP*, BS 3900: A6, with integral skirt to protect the orifice.

VHA-580-030P Flow cup, size 2 **£14·06**
VHA-580-070D Flow cup, size 4 **£14·06**
VHA-580-110R Flow cup, size 6 **£14·06**

FLOW CUP, ISO 2431.

VHA-620-M Flow cup, ISO 2431 **£20·90**

FLOW CUP, *GALLENKAMP*, **FORD No. 4,** adjusted to give a flow time of 50s with an oil having a viscosity of 1·63 stokes. With integral skirt to protect the orifice.

VHA-650-X Flow cup, Ford No. 4 **£18·56**



VHA-670-520

ACCESSORY for VHA-580 to VHA-650-X

Stand, with rod having adjustable support bracket and with base fitted with levelling feet.

VHA-670-502W Stand **£9·45**

Engler viscometer See PEM-610-010B
Redwood viscometer See PEM-660-010M
Saybolt viscometer See PEM-510-010J
Standard tar viscometer See PEM-570-010N

Technico FALLING SPHERE VISCOMETER

VISCOMETER, FALLING SPHERE, *TECHNICO*, **BS 188,** for transparent liquids of high viscosity possessing Newtonian flow characteristics. Requires no calibrating liquid.

Borosilicate glass, comprising a fall tube, 40mm bore and graduated at six points, fitted by means of a 24/29 joint with a stopper having a sphere release tube 5mm bore with a funnel top and small vent hole. **Without** spheres.

VHB-200-C	Viscometer	**£6·07**

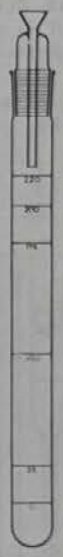
SPARE PARTS

VHB-220-030C	Fall tube	**£4·37**
VHB-220-050T	Stopper	**£2·28**

ACCESSORIES

Spheres, steel, density 7·785g/ml.

	Diameter, in.	Viscosity range stokes	
VHB-220-504G	Spheres, $\frac{1}{16}$in. dia.	10 to 375	Pack of 100 **£1·28**
VHB-220-508V	Spheres, $\frac{5}{32}$in. dia.	25 to 850	Pack of 100 **£0·59**
VHB-220-512H	Spheres, $\frac{1}{8}$in. dia.	45 to 1500	Pack of 100 **£0·68**
VHB-220-516W	Spheres, $\frac{3}{32}$in. dia.	70 to 2350	Pack of 100 **£0·92**



VHB-200

Technico U-TUBE VISCOMETERS

VISCOMETERS, U-TUBE, *TECHNICO*, Type BS/IP, to ASTM D445-IP 71 and ASTM D2515, and Type BS/U to BS 188. For transparent liquids.

Viscometer size	0	A	B	C	D
Nominal constant, cSt/s	0·001	0·003	0·01	0·03	0·1
Viscosity range, approximate, cSt	0·3 to 3	1·5 to 10	4 to 10	7·5 to 35	20 to 120

Viscometer size	E	F	G	H
Nominal constant, cSt/s	0·3	1	3	10
Viscosity range, approximate, cSt	60 to 500	200 to 1000	600 to 4000	2000 to 15000

VHB-300-030Y	Viscometer, size 0	**£7·59**
VHB-300-050C	Viscometer, size A	**£7·59**
VHB-300-070T	Viscometer, size B	**£7·59**
VHB-300-090N	Viscometer, size C	**£7·59**
VHB-300-110K	Viscometer, size D	**£7·59**
VHB-300-130E	Viscometer, size E	**£7·59**
VHB-300-150V	Viscometer, size F	**£7·59**
VHB-300-170P	Viscometer, size G	**£7·59**
VHB-300-190J	Viscometer, size H	**£7·59**

VISCOMETERS, U-TUBE, *TECHNICO*, as VHB-300 but with Works' certificate of calibration.

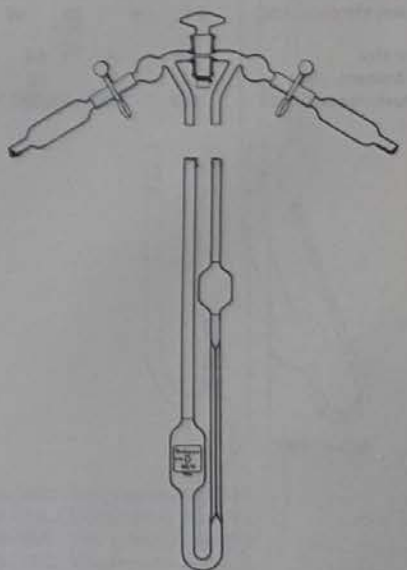
VHB-320-030R	Viscometer, size 0	**£16·45**
VHB-320-050L	Viscometer, size A	**£16·45**
VHB-320-070F	Viscometer, size B	**£16·45**
VHB-320-090W	Viscometer, size C	**£16·45**
VHB-320-110T	Viscometer, size D	**£16·45**
VHB-320-130N	Viscometer, size E	**£16·45**
VHB-320-150H	Viscometer, size F	**£16·45**
VHB-320-170B	Viscometer, size G	**£16·45**
VHB-320-190S	Viscometer, size H	**£16·45**

ACCESSORY for VHB-300 to VHB-320

Sealing device comprising stopcock branch tube and two desiccant bulbs.

VHB-340-502L	Sealing device	**£4·69**

CALIBRATION Glass viscometers require calibration before use because nominal constants can vary by up to 10%. Users without their own calibration facilities should order those viscometers which are complete with Works' certificate of calibration.



VHB-300 with VHB-340-502

Technico REVERSE FLOW U-TUBE VISCOMETERS

VISCOMETERS, REVERSE FLOW U-TUBE, *TECHNICO*, Type BS/IP to ASTM D445-IP 71 and ASTM D2515, and Type BS/IP/RF to BS 188. For transparent and opaque liquids.

Viscometer size	1	2	3	4	5	6
Nominal constant, cSt/s	0·003	0·01	0·03	0·1	0·3	1
For minimum viscosity, cSt	1·2	2	6	20	60	200

Viscometer size	7	8	9	10	11
Nominal constant, cSt/s	3	10	30	100	300
For minimum viscosity, cSt	600	2000	6000	20000	60000



VHB-400

VHB-400-030A	Viscometer, size 1	£8·23
VHB-400-050R	Viscometer, size 2	£8·23
VHB-400-070L	Viscometer, size 3	£8·23
VHB-400-090F	Viscometer, size 4	£8·23
VHB-400-110C	Viscometer, size 5	£8·23
VHB-400-130T	Viscometer, size 6	£8·23
VHB-400-150N	Viscometer, size 7	£8·23
VHB-400-170H	Viscometer, size 8	£8·23
VHB-400-190B	Viscometer, size 9	£8·23
VHB-400-210V	Viscometer, size 10	£8·23
VHB-400-230P	Viscometer, size 11	£8·23

VISCOMETERS, REVERSE FLOW U-TUBE, *TECHNICO*, as VHB-400 but with Works' certificate of calibration.

VHB-420-030J	Viscometer, size 1	£20·88
VHB-420-050D	Viscometer, size 2	£20·88
VHB-420-070U	Viscometer, size 3	£20·88
VHB-420-090X	Viscometer, size 4	£20·88
VHB-420-110L	Viscometer, size 5	£20·88
VHB-420-130F	Viscometer, size 6	£20·88
VHB-420-150W	Viscometer, size 7	£20·88
VHB-420-170Q	Viscometer, size 8	£20·88
VHB-420-190K	Viscometer, size 9	£20·88
VHB-420-210H	Viscometer, size 10	£20·88
VHB-420-230B	Viscometer, size 11	£20·88

ACCESSORY for VHB-400 to VHB-420

VHB-440-502D	Pipette, for adjusting filling level	£2·92

Technico SUSPENDED LEVEL VISCOMETERS

VISCOMETERS, SUSPENDED LEVEL, *TECHNICO*, Type BS/IP/SL, to ASTM D445-IP 71, ASTM D2515 and BS 188. For transparent liquids.

Viscometer size	1	1A	2	2A	3
Nominal constant, cSt/s	0·01	0·03	0·1	0·3	1
For minimum viscosity, cSt	3·5	6	20	60	200

Viscometer size	3A	4	4A	5
Nominal constant, cSt/s	3	10	30	100
For minimum viscosity, cSt	600	2000	6000	20000



VHB-500

VHB-500-030P	Viscometer, size 1	£8·23
VHB-500-050J	Viscometer, size 1A	£8·23
VHB-500-070D	Viscometer, size 2	£8·23
VHB-500-090U	Viscometer, size 2A	£8·23
VHB-500-110R	Viscometer, size 3	£8·23
VHB-500-130L	Viscometer, size 3A	£8·23
VHB-500-150F	Viscometer, size 4	£8·23
VHB-500-170W	Viscometer, size 4A	£8·23
VHB-500-190Q	Viscometer, size 5	£8·23

VISCOMETERS, SUSPENDED LEVEL, *TECHNICO*, as VHB-500 but with Works' certificate of calibration.

VHB-520-030B	Viscometer, size 1	£17·71
VHB-520-050S	Viscometer, size 1A	£17·71
VHB-520-070M	Viscometer, size 2	£17·71
VHB-520-090G	Viscometer, size 2A	£17·71
VHB-520-110D	Viscometer, size 3	£17·71
VHB-520-130U	Viscometer, size 3A	£17·71
VHB-520-150X	Viscometer, size 4	£17·71
VHB-520-170Y	Viscometer, size 4A	£17·71
VHB-520-190C	Viscometer, size 5	£17·71

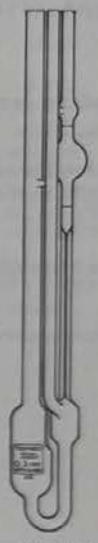
Technico UBBELOHDE SUSPENDED LEVEL VISCOMETERS TO ASTM D445-IP 71

VISCOMETERS, SUSPENDED LEVEL, *TECHNICO*, **Ubbelohde,** to ASTM D445-IP 71 and ASTM D2515. For transparent liquids.

Viscometer size	1	1C	1B	2	2C
Nominal constant, cSt/s	0·01	0·03	0·05	0·1	0·3
Viscosity range, approximate, cSt	2 to 10	6 to 30	10 to 50	20 to 100	60 to 300

Viscometer size	2B	3	3C	3B	4
Nominal constant, cSt/s	0·5	1	3	5	10
Viscosity range, approximate, cSt	100 to 500	200 to 1000	600 to 3000	1000 to 5000	2000 to 10000

VHB-570-030M	Viscometer, size 1	£10·72
VHB-570-050G	Viscometer, size 1C	£10·72
VHB-570-070A	Viscometer, size 1B	£10·72
VHB-570-090R	Viscometer, size 2	£10·72
VHB-570-110X	Viscometer, size 2C	£10·72
VHB-570-130Y	Viscometer, size 2B	£10·72
VHB-570-150C	Viscometer, size 3	£10·72
VHB-570-170T	Viscometer, size 3C	£10·72
VHB-570-190N	Viscometer, size 3B	£10·72
VHB-570-210K	Viscometer, size 4	£10·72



VHB-570

VISCOMETERS, SUSPENDED LEVEL, *TECHNICO*, as VHB-570 but with Works' certificate of calibration.

VHB-590-030V	Viscometer, size 1	£18·98	**VHB-590-130R**	Viscometer, size 2B	£18·98
VHB-590-050P	Viscometer, size 1C	£18·98	**VHB-590-150L**	Viscometer, size 3	£18·98
VHB-590-070J	Viscometer, size 1B	£18·98	**VHB-590-170F**	Viscometer, size 3C	£18·98
VHB-590-090D	Viscometer, size 2	£18·98	**VHB-590-190W**	Viscometer, size 3B	£18·98
VHB-590-110A	Viscometer, size 2C	£18·98	**VHB-590-210T**	Viscometer, size 4	£18·98

Technico CANNON-FENSKE VISCOMETERS

VISCOMETERS, CANNON-FENSKE, *TECHNICO*, routine, to ASTM D445-IP 71 and ASTM D2515, and Type BS/IP/CF to BS 188. For transparent liquids.

Viscometer size	25	50	100	150	200	300
Nominal constant, cSt/s	0·002	0·004	0·015	0·035	0·1	0·25
Viscosity range, approximate, cSt	0·4 to 1·6	0·8 to 3·2	3 to 12	7 to 28	20 to 80	50 to 200

Viscometer size	350	400	450	500	600
Nominal constant, cSt/s	0·5	1·2	2·5	8	20
Viscosity range, approximate, cSt	100 to 400	240 to 960	500 to 2000	1600 to 6400	4000 to 16000

VHB-650-030S	Viscometer, size 25	£8·79
VHB-650-050M	Viscometer, size 50	£8·79
VHB-650-070G	Viscometer, size 100	£8·79
VHB-650-090A	Viscometer, size 150	£8·79
VHB-650-110U	Viscometer, size 200	£8·79
VHB-650-130X	Viscometer, size 300	£8·79
VHB-650-150Y	Viscometer, size 350	£8·79
VHB-650-170C	Viscometer, size 400	£8·79
VHB-650-190T	Viscometer, size 450	£8·79
VHB-650-210Q	Viscometer, size 500	£8·79
VHB-650-230K	Viscometer, size 600	£8·79



VHB-650

VISCOMETERS, CANNON-FENSKE, *TECHNICO*, as VHB-650 but with Works' certificate of calibration.

VHB-670-030E	Viscometer, size 25	£16·45			
VHB-670-050V	Viscometer, size 50	£16·45	**VHB-670-150R**	Viscometer, size 350	£16·45
VHB-670-070P	Viscometer, size 100	£16·45	**VHB-670-170L**	Viscometer, size 400	£16·45
VHB-670-090J	Viscometer, size 150	£16·45	**VHB-670-190F**	Viscometer, size 450	£16·45
VHB-670-110G	Viscometer, size 200	£16·45	**VHB-670-210C**	Viscometer, size 500	£16·45
VHB-670-130A	Viscometer, size 300	£16·45	**VHB-670-230T**	Viscometer, size 600	£16·45

Gallenkamp

Gallenkamp VISCOMETER BATH, 120°C

For the determination of kinematic viscosity by capillary viscometer methods including those specified in ASTM D445-IP 71, BS 188, DIN 51550 and 51562. Also for any other methods involving the precise measurement of viscosity such as control of polymer molar mass by specific or relative viscosity measurement

- **Accommodates up to eight viscometers**
- **Unique turntable holder permits each viscometer to be brought to the front as required**
- **Workspace illuminated brilliantly but without glare**
- **Temperature controlled by contact thermometer**
- **Designed for easy cleaning and simple maintenance**
- **Built-in boost for initial heating**
- **Suitable for use up to 120°C (250°F)**



VHC-220 with accessories

Technical data

Temperature range	*Ambient to 120°C
Temperature fluctuation	Up to 40°C ±0·005°C Up to 100°C ±0·015°C

* For operation near or just below ambient temperature cooling coil VHC-240-570P must be fitted and supplied with cold water.

Power rating, maximum	1 kW
Tank capacity, approximate	17 litres
Overall dimensions, height × width × depth	790 × 420 × 500 mm

Controls

Two energy input controls are fitted to minimise temperature fluctuations resulting from thermostat switching. Coarse control is by a switch which selects suitable circuits for low and high temperature operation respectively; fine control is by a variable autotransformer.

Thermostatic control is by contact thermometers which have short ranges to suit all the common standard test temperatures.

Construction

The viscometer bath is a compact and self-contained unit comprising a borosilicate glass tank, with a light diffusing panel at the rear. The tank is enclosed in a grey stoved enamel finished steel case with levelling feet. The case, which has a white interior, is fitted with a toughened glass front window and a laminated plastics top. A freely moving annular turntable with positions for eight viscometer holders is built into the top and permits each viscometer as required to be brought to the front without disturbance. Blank covers are available for turntable positions not in use. The thermoregulating unit is supported over the centre of the bath by a cantilever from the rear of the top cover. All electrical controls are mounted on a drawer chassis in the lower part of the case beneath the bath. An 8 W fluorescent lamp is mounted on the rear panel of the case behind the diffusing panel of the glass tank.

NOTE: Water is a suitable bath liquid for temperatures up to 60°C but for continuous working above this temperature ethane diol (ethylene glycol) or white mineral oil may be used to advantage.

Gallenkamp VISCOMETER BATH, 120°C

VISCOMETER BATH, thermostatic, *GALLENKAMP*, as specified, comprising cylindrical borosilicate glass tank, fluorescent lamp, stirring motor and paddle, viscometer turntable for eight viscometers, control and boost heaters, variable autotransformer, spare fluorescent lamp and instructions. **Without** contact thermometer, indicating thermometer, viscometer holders or blank covers. For single phase supplies.

VHC-220-010V	Viscometer bath, 220–240V 50Hz	**£534·38**
VHC-220-030P	Viscometer bath, 110–120V 60Hz	**£545·63**

SPARE PARTS

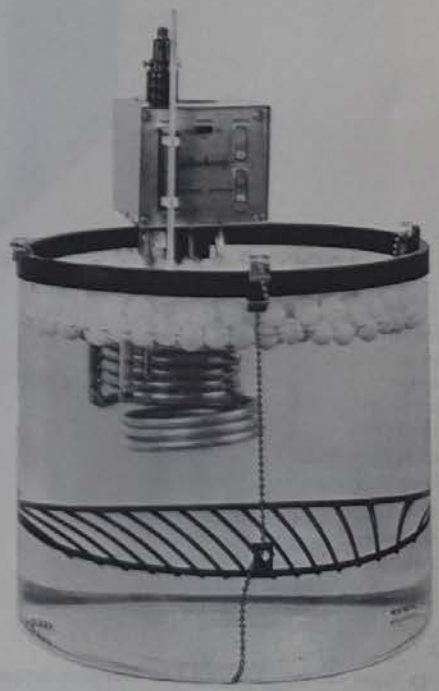
VHC-240-030B	Tank, with diffusing panel	**£51·19**
VHC-240-050S	Fluorescent lamp	**£1·05**

ACCESSORIES

VHC-240-504F	Viscometer holder for VHB-300 and VHB-500-030D to VHB-500-150F	**£12·71**
VHC-240-508U	Viscometer holder for VHB-500-170W and VHB-500-190Q	**£12·71**
VHC-240-512G	Viscometer holder for VHB-570	**£12·71**
VHC-240-516V	Viscometer holder for VHB-400 and VHB-650	**£12·71**
	Contact thermometers, with connectors.	
VHC-240-532A	Contact thermometer, 60 to 80°F	**£26·66**
VHC-240-534T	Contact thermometer, 80 to 110°F	**£26·66**
VHC-240-536P	Contact thermometer, 115 to 135°F	**£26·66**
VHC-240-538L	Contact thermometer, 125 to 145°F	**£26·66**
VHC-240-540B	Contact thermometer, 195 to 215°F	**£26·66**
VHC-240-560S	Blank cover for turntable	**£3·60**
VHC-240-570P	Cooling coil, for 8mm bore flexible tubing	**£11·25**
	Lubricant for stirrer motor	*See LUB-230-E*

Gallenkamp THERMOSTATIC WATER BATH

- **Maximum temperature 90°C**
- **Capacity 20 litres**
- **Good visibility – all glass tank**
- **Internal depth 300mm**
- **Control by Thermo Stirrer with contact thermometer and solid state switching**



See BJP-350-010L

Gallenkamp VISCOMETER BATH, 250°C

For viscosity determinations at temperatures between 30 and 250°C

- **Dewar pattern tank for minimum heat loss**
- **Insulated top with holes to accept two viscometer holders**
- **Workspace illuminated brilliantly but without glare**
- **Temperature controlled by contact thermometer**
- **Designed for easy cleaning and simple maintenance**
- **Built-in boost for initial heating**
- **Suitable for use up to 250°C**



VHC-400 with accessories

Technical data

Temperature ranges:	
using water	Ambient + 10°C to 60°C
using white oil	60 to 120°C
using silicone oil	120 to 250°C
Temperature fluctuation	± 0·025°C
Power rating, maximum	1 kW
Tank capacity, approximate	7 litres
Overall dimensions, height × width × depth	820 × 500 × 400 mm

Controls

Two energy input controls are fitted to minimise temperature fluctuations resulting from thermostat switching. Coarse control is by a switch which selects suitable circuits for low and high temperature operation respectively; fine control is by a variable autotransformer.

Thermostatic control is by contact thermometer, range 0 to 250°C.

Construction

The viscometer bath is a Dewar tank, internally silvered except for clear strips at the front and back for illuminating and viewing the viscometers. The tank is housed in a grey stoved enamel finished steel case with a toughened glass front window, insulated laminated plastics top and levelling feet. The top cover has holes to accept two purpose-made viscometer holders with insulated tops. When not in use, these may be replaced by blank covers. The thermoregulating unit is supported over the centre of the bath by a cantilever from the rear of the top cover. All electrical controls are mounted on a drawer chassis in the lower part of the case beneath the bath. An 8 W fluorescent lamp is situated behind the bath, on the rear panel of the case.

Gallenkamp VISCOMETER BATH, 250°C

VISCOMETER BATH, *GALLENKAMP*, **thermostatic,** high temperature, as specified, to accommodate two viscometer tubes VHC-440 and VHC-450 for temperatures up to 250°C, with cylindrical Dewar tank, fluorescent lamp, stirring motor and paddle, contact thermometer range 0 to 250°C, insulated covers for two test positions, control and boost heaters, variable autotransformer, spare fluorescent lamp and instructions. **Without** viscometers, viscometer holders, indicating thermometer or filling liquid. For single phase supplies.

VHC-400-010T	Viscometer bath, 220–240V 50Hz	**£778·50**
VHC-400-030N	Viscometer bath, 110–120V 60Hz	**£789·75**

SPARE PARTS

Contact thermometer, with connector lead and plug.

VHC-420-030W	Contact thermometer	**£19·80**
VHC-420-090E	Dewar tank	**£17·16**
	Fluorescent lamp	*See VHC-240-050S*

ACCESSORIES

Viscometers, extended limb.

VHC-440-030Y	Viscometer, size 0, U-tube	**£12·80**	**VHC-446-030S**	Viscometer, size 1, s/level	**£12·80**
VHC-440-050C	Viscometer, size A, U-tube	**£12·80**	**VHC-446-050M**	Viscometer, size 1A, s/level	**£12·80**
VHC-440-070T	Viscometer, size B, U-tube	**£12·80**	**VHC-446-070G**	Viscometer, size 2, s/level	**£12·80**
VHC-440-090N	Viscometer, size C, U-tube	**£12·80**	**VHC-446-090A**	Viscometer, size 2A, s/level	**£12·80**
VHC-440-110K	Viscometer, size D, U-tube	**£12·80**	**VHC-446-110U**	Viscometer, size 3, s/level	**£12·80**
VHC-440-130E	Viscometer, size E, U-tube	**£12·80**	**VHC-446-130X**	Viscometer, size 3A, s/level	**£12·80**
VHC-440-150V	Viscometer, size F, U-tube	**£12·80**	**VHC-446-150Y**	Viscometer, size 4, s/level	**£12·80**
VHC-440-170P	Viscometer, size G, U-tube	**£12·80**	**VHC-446-170C**	Viscometer, size 4A, s/level	**£12·80**
VHC-440-190J	Viscometer, size H, U-tube	**£12·80**	**VHC-446-190T**	Viscometer, size 5, s/level	**£12·80**
VHC-442-030T	Viscometer, size 1, reverse flow	**£12·80**	**VHC-450-030B**	Viscometer, size 25, Cannon-Fenske	**£12·80**
VHC-442-050N	Viscometer, size 2, reverse flow	**£12·80**	**VHC-450-050S**	Viscometer, size 50, Cannon-Fenske	**£12·80**
VHC-442-070H	Viscometer, size 3, reverse flow	**£12·80**	**VHC-450-070M**	Viscometer, size 100, Cannon-Fenske	**£12·80**
VHC-442-090B	Viscometer, size 4, reverse flow	**£12·80**	**VHC-450-090G**	Viscometer, size 150, Cannon-Fenske	**£12·80**
VHC-442-110V	Viscometer, size 5, reverse flow	**£12·80**	**VHC-450-110D**	Viscometer, size 200, Cannon-Fenske	**£12·80**
VHC-442-130P	Viscometer, size 6, reverse flow	**£12·80**	**VHC-450-130U**	Viscometer, size 300, Cannon-Fenske	**£12·80**
VHC-442-150J	Viscometer, size 7, reverse flow	**£12·80**	**VHC-450-150X**	Viscometer, size 350, Cannon-Fenske	**£12·80**
VHC-442-170D	Viscometer, size 8, reverse flow	**£12·80**	**VHC-450-170Y**	Viscometer, size 400, Cannon-Fenske	**£12·80**
VHC-442-190U	Viscometer, size 9, reverse flow	**£12·80**	**VHC-450-190C**	Viscometer, size 450, Cannon-Fenske	**£12·80**
VHC-442-210R	Viscometer, size 10, reverse flow	**£12·80**	**VHC-450-210W**	Viscometer, size 500, Cannon-Fenske	**£12·80**
VHC-442-230L	Viscometer, size 11, reverse flow	**£12·80**	**VHC-450-230Q**	Viscometer, size 600, Cannon-Fenske	**£12·80**

For size designations see VHB-300 to VHB-650 on pages 723 to 725

Viscometer holders, with insulated top.

Type	For viscometers
U/SL	U-tube and suspended level sizes 1 to 4
SL	Suspended level sizes 4A and 5
RF/CF	Reverse flow and Cannon-Fenske

VHC-452-030M	Viscometer holder, U/SL	**£16·65**
VHC-452-050G	Viscometer holder, SL	**£16·65**
VHC-452-070A	Viscometer holder, RF/CF	**£16·65**
	Lubricant for stirrer motor	*See LUB-230-E*

TIMERS

For use in viscosity measurements



Multiple timing, split action stopwatch
See TKM-480-S

Digital readout, push-button operated timers
See TKM-600-M and TKM-650-A

Gallenkamp

SETAVIS VISCOMETERS

The viscometers of this series are used either manually or automatically to measure kinematic viscosity on micro samples. Transparent, opaque, new or used oils or many other Newtonian liquids may be quickly and accurately checked. Results obtained with SETAVIS have been found to correlate well with results obtained using conventional viscometers and specified methods to ASTM D445-IP 71.

SETAVIS is available in several versions. All share a similar design of console with an oil bath and thermistor temperature controller. The oil bath temperature range is ambient to 110°C, fluctuation ±0·01°C. This bath must be fitted with an oil bath thermometer. It also has provision for fitting six micro viscometer tubes. The viscometer tubes are reverse flow tubes similar in design to modified Atlantic viscometers. They are charged with about 0·3 ml of sample by syringe. After a short delay to equilibrate with bath temperature the sample flows down the viscometer capillary. As its leading edge passes between upper and lower timing marks, the time interval is measured and this may be related to viscosity. Nine tubes are available with constants covering the range 1 to 1000 centistokes. After a test the tube is cleaned by flushing through under vacuum with cleaning solvents followed by drying in an air stream. An internal reservoir collects waste sample and solvents.

The console also provides room for housing electronic timing devices of varying complexity.



VHJ-200

Technical data

Overall dimensions, mm	H. × W. × D.	Mass, kg
Phase 1	600 × 400 × 300	19
Phase 2	600 × 590 × 410	23
Phase 3	600 × 590 × 410	25

VISCOMETER, *SETAVIS* **PHASE 1,** comprises console, oil bath and temperature controller, reservoir for used samples and flushing solvents with manual changeover from measurement to cleaning mode. Requires but **is not provided** with six viscometer tubes with engraved timing marks, stopwatch or other timing device, oil bath thermometer or vacuum source. For 50–60 Hz single phase supplies.

VHJ-200-010L Viscometer SETAVIS Phase 1, 200–250 V **£467·50**

VHJ-200-030F Viscometer, SETAVIS Phase 1, 100–130 V **£467·50**

VISCOMETER, *SETAVIS* **PHASE 1 with timer,** as VHJ-200 but with electronic six channel crystal controlled timer built into the console. The timer has six independent start and stop buttons and a 4-digit display which can indicate any of the six channels either during or after a timing operation to the nearest 0·1 s. Dimensions 400 × 300 × 600 mm high. Power rating 450 W. For 50–60 Hz single phase supplies.

VHJ-240-010G Viscometer, SETAVIS Phase 1/timer, 200–250 V **£698·50**

VHJ-240-030A Viscometer, SETAVIS Phase 1/timer, 100–130 V **£698·50**

ACCESSORIES for SETAVIS Phase 1 viscometers

VHJ-270-502K	Oil bath thermometer, 38·6 to 41·4°C	£11·00
VHJ-270-506C	Oil bath thermometer, 48·6 to 51·4°C	£11·00
VHJ-270-510L	Oil bath thermometer, 98·6 to 101·4°C	£11·00
VHJ-270-514D	Oil bath thermometer, 97·5 to 102·5°C	£11·00
VHJ-270-518S	Oil bath thermometer, 119·5 to 124·5°C	£11·00
VHJ-270-522E	Oil bath thermometer, 208·5 to 213·5°C	£11·00
	Stopwatches and timing devices	*See TKM-440 et seq.*
	Vacuum pump to operate cleaning system when another vacuum source is not available.	
VHJ-280-501F	Vacuum pump, 220–240 V 50 Hz	£74·80
VHJ-280-503B	Vacuum pump, 110–120 V 60 Hz	£74·80
	Viscometer tubes, calibrated and marked with constants.	
VHJ-290-504P	Viscometer tube 1–3 cSt	£16·50
VHJ-290-508H	Viscometer tube 3–6 cSt	£16·50
VHJ-290-512Q	Viscometer tube 5–15 cSt	£16·50
VHJ-290-516Y	Viscometer tube 10–30 cSt	£16·50
VHJ-290-520R	Viscometer tube 30–60 cSt	£16·50
VHJ-290-524J	Viscometer tube 50–150 cSt	£16·50
VHJ-290-528B	Viscometer tube 1–3 St	£16·50
VHJ-290-532K	Viscometer tube 3–6 St	£16·50
VHJ-290-536C	Viscometer tube 5–10 St	£16·50
VHJ-290-545B	Viscometer tubes, 1 each above	Set of 9 £148·50



VHJ-400 in use

VISCOMETER, *SETAVIS* **PHASE 2.** Similar to Phase 1 instrument but with fibre optics light guides coupled to built-in automatic start and stop timing instrument. The timer has six 5-digit LED displays which display the run time on each tube continuously. Requires but **is not supplied** with six viscometer tubes with provision for fibre optics timing system, oil bath thermometer or vacuum source. Dimensions 730 × 350 × 600 mm high. Power rating 500 W. For 50–60 Hz single phase supplies.

VHJ-400-010S Viscometer SETAVIS Phase 2, 200–250 V **£1100-00**

VHJ-400-030M Viscometer SETAVIS Phase 2, 100–130 V **£1100-00**

VISCOMETER, *SETAVIS* **PHASE 3.** A fully automatic instrument which, like the Phase 2 instrument, automatically determines the viscometer flow times but also calculates and prints out results directly in viscosity units. A built-in keyboard provides for entry of sample identification data between runs and for programming the memory of the calculator with the constants of tubes.

This model also has a fully automatic cleaning cycle which flushes the tubes through with two different solvents and dries them by a flow of air.

Requires but **is not supplied** with six viscometer tubes, oil bath thermometer or vacuum source. If a vacuum source other than VHJ-280 is used, a solenoid valve accessory is essential for automatic tube cleaning. Power rating 550 W. For 50–60 Hz single phase supplies.

VHJ-460-010W Viscometer, SETAVIS Phase 3, 200–250 V **£4950-00**

VHJ-460-030Q Viscometer, SETAVIS Phase 3, 100–130 V **£4950-00**

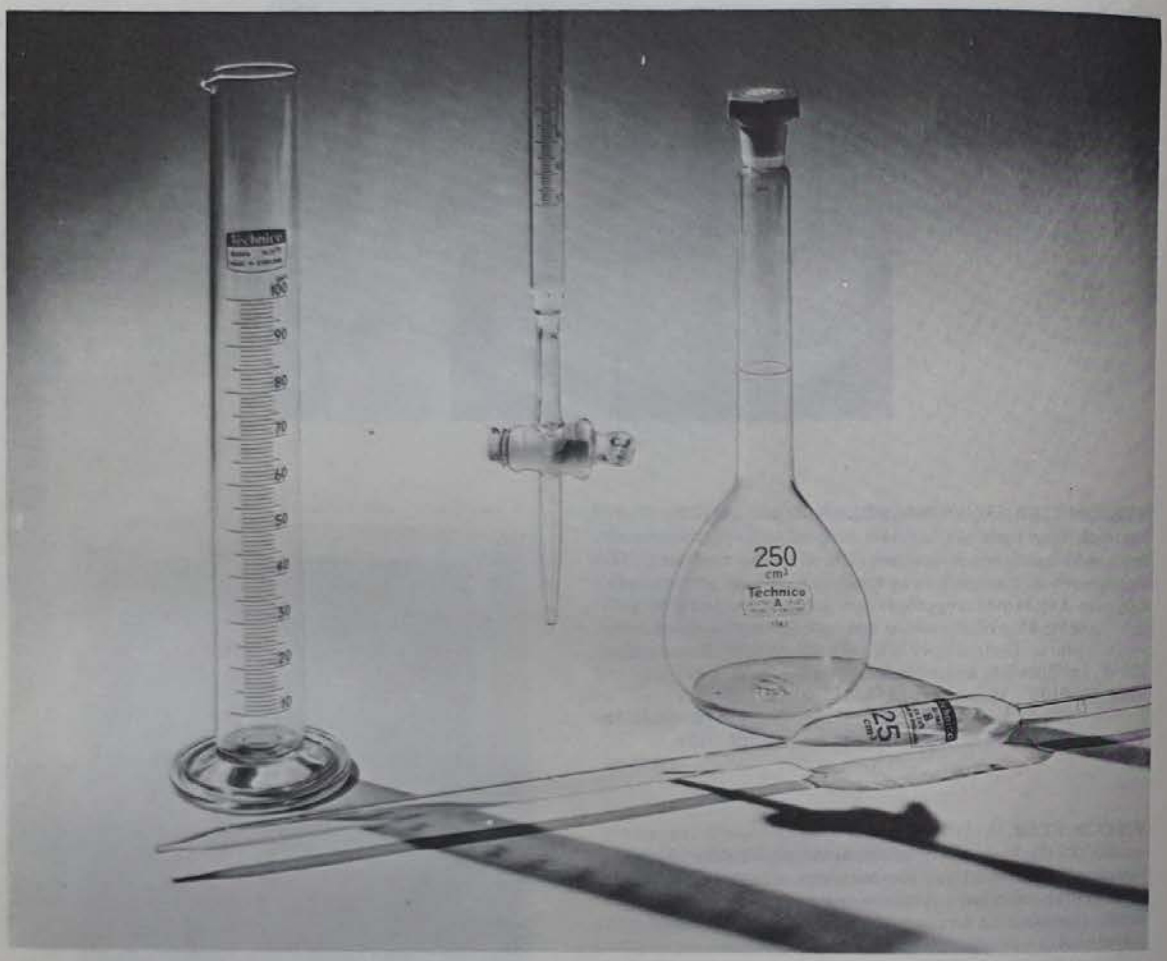


VHJ-460

ACCESSORIES for SETAVIS Phase 2 or 3

	Oil bath thermometers	See *VHJ-270*
	Vacuum pump to operate cleaning cycle	See *VHJ-280*
	Solenoid valve, to control vacuum where a vacuum source other than VHJ-280 is used with SETAVIS Phase 3 viscometers only.	
VJH-490-501F	Solenoid valve, 200–250 V	£30-80
VHJ-490-503B	Solenoid valve, 100–130 V	£30-80
	Viscometer tubes, calibrated and marked with constants to four significant figures.	
VHJ-500-502M	Viscometer tube 1–3 cSt	£11-00
VHJ-500-506E	Viscometer tube 3–6 cSt	£11-00
VHJ-500-510N	Viscometer tube 5–15 cSt	£11-00
VHJ-500-514F	Viscometer tube 10–30 cSt	£11-00
VHJ-500-518U	Viscometer tube 30–60 cSt	£11-00
VHJ-500-522G	Viscometer tube 50–150 cSt	£11-00
VHJ-500-526V	Viscometer tube 1–3 St	£11-00
VHJ-500-530H	Viscometer tube 3–6 St	£11-00
VHJ-500-534W	Viscometer tube 5–10 St	£11-00
VHJ-500-546P	Viscometer tubes, 1 each above	Set of 9 £148-50

Technico VOLUMETRIC GLASSWARE



ACCURACY GRADES

Class B.

Manufactured to BS Class B requirements to provide a reliable quality for routine work.

Class A.

Available with or without 'Works' certificate and suitable for work of the highest degree of accuracy.

Works' certificates are issued on the basis of BST approved methods of test and corrections are given to the same degree of accuracy.

Class A volumetric glassware has approximately twice the accuracy of Class B.

BRITISH STANDARDS

All articles for which British Standards (BS) exist are manufactured to such standards, the remainder being made to our own stringent specifications.

STOPCOCK LUBRICATION

Only a minimum of lubricating grease should be smeared evenly over the surface of the key.

NEVER use silicone grease to lubricate stopcocks on volumetric glassware because during use it 'migrates' and contaminates the inner surface of the glass.

CALIBRATION TEMPERATURE

TECHNICO volumetric glassware in accordance with British Standards is calibrated at 20°C.

INSCRIPTIONS

TECHNICO volumetric glassware has, wherever practicable, graduations and inscriptions applied as a dark amber stain which is completely resistant to all reagents except those which attack the glass itself. The white enamel used on other items is among the most resistant available but cannot be guaranteed not to discolour by repeated immersion in cleaning solutions.

METHODS OF USE

To obtain accurate results from volumetric glassware it is desirable that the method of use should be as close as possible to the method by which the article was originally calibrated. Methods of verification are detailed in each BS and in most instances provide a valuable guide to the best method of use.

Much useful information on accuracy and methods of use will be found in:

Notes on Applied Science No. 6. Volumetric Glassware. 1954. Her Majesty's Stationery Office.

Microdiffusion Analysis and Volumetric Error by E. J. Conway. M.B., D.Sc., F.R.S.

Technico VOLUMETRIC GLASSWARE

BURETTES

WITH PINCHCOCK

Class B. Capacity 50ml.
See BWF-300-G

WITH POLYTHENE STOPCOCK

Class B. Capacity 50ml.
See BWF-400-V

WITH PTFE STOPCOCK

Class B. Capacities 5 to 50ml.
See BWF-450

WITH STRAIGHT BORE GLASS STOPCOCK

Class B. Capacities 1 to 100ml.
See BWF-490

WITH STRAIGHT BORE INTERCHANGEABLE GLASS STOPCOCK

Class B. Capacities 5 to 50ml.

Class A. Capacities 1 to 100ml.

Class A, with **Works' certificate.** Capacities 1 to 100ml.

See BWF-520 to BWF-570

WITH DOUBLE OBLIQUE BORE GLASS STOPCOCK

Class B. Capacities 1 to 100ml.

Class A. Capacities 1 to 100ml.

Class A, with **Works' certificate.** Capacities 1 to 100ml.

See BWF-620 to BWF-670



Straight bore stopcock



Oblique bore stopcock



Automatic

Amber burettes	*See BWH-300*
Automatic burettes	*See BWJ-300*
Bulb burettes	*See BWH-600*
Dispensing burettes	*See BWH-650*
Gas burettes	*See GAV-920*
Micro burettes	*See BWJ-480*
Schellbach burettes	*See BWH-350*

WORKS CERTIFICATES FOR BURETTES

Works certificate values are quoted at 5 points different from the original calibration points to ensure absence of intermediate subdivision errors.

Technico VOLUMETRIC GLASSWARE



With spout



With stopper

GRADUATED CYLINDERS

WITH SPOUT

Class B. Capacities 5 to 2000 ml.
See CYL-300

Class B, with **Works' certificate.** Capacities 5 to 2000 ml.
See CYL-330

Class B, figured to read up and down. Capacities 10 to 1000 ml.
See CYL-370

WITH STOPPER

Class B. Capacities 5 to 2000 ml.
See CYL-420

Class B, with **Works' certificate.** Capacities 5 to 2000 ml.
See CYL-450

ONE-MARK FLASKS

CLEAR GLASS WITHOUT STOPPER

Class B. Capacities 10 to 500 ml.
See FHM-200

CLEAR GLASS WITH STOPPERS

Class B. Capacities 1 to 2000 ml.

Class A. Capacities 5 to 2000 ml.

Class A, with **Works' certificate.** Capacities 5 to 2000 ml.

See FHM-240 to FHM-290



Without stopper



With stopper

AMBER GLASS WITH STOPPERS

Class B. Capacities 25 to 1000 ml.
See FHM-340

Kohlrausch flasks	*See FHM-600*
Sugar flasks	*See FHM-680*
Brewers mash flask	*See FHM-740*
Hirschsohn flasks	*See FHM-780*

CLEANING OF VOLUMETRIC GLASSWARE

Always keep volumetric glassware clean and free from grease. A distorted meniscus or irregular drainage from the walls has a serious effect on accuracy. Organic solvents, sulphuric acid – dichromate mixture and modern detergents are effective cleaning materials. Articles should be filled with rather than immersed in the cleaning solution. Thorough cleaning can usually be accelerated by using an ultrasonic bath. After cleaning, glassware should be rinsed with distilled water. If allowed to dry without rinsing, stains may form inside which are often difficult to remove.

Technico VOLUMETRIC GLASSWARE

PIPETTES

Colour coded to BS 3996

ONE-MARK AND BULB

Class B. Capacities 0·5 to 100ml.
See PMC-200

Class B, with safety bulb. Capacities 5 to 25ml.
See PMC-240

Class A. Capacities 0·5 to 100ml.
See PMC-280

Class A, with **Works' certificate.** Capacities 0·5 to 100ml.
See PMC-310

GRADUATED

Class B, for delivery from top zero. Capacities 1 to 25ml.
See PMF-250

Class A, for delivery from top zero. Capacities 1 to 25ml.
See PMF-280

Class B, for delivery from any graduation. Capacities 1 to 25ml.
See PMF-330

Class A, for delivery from any graduation. Capacities 1 to 25ml.
See PMF-360

GRADUATED fast flow

Class B. Capacities 1 to 25ml.
See PMF-460

Class B, blow-out. Capacities 0·1 to 25ml.
See PMF-630 to PMF-670

HAEMATOLOGY

Blood and opsonic index
Ostwald-Van Slyke
Blood sugar
Haemacytometer
Haemoglobinometer.
See PMK-560 to PMK-790

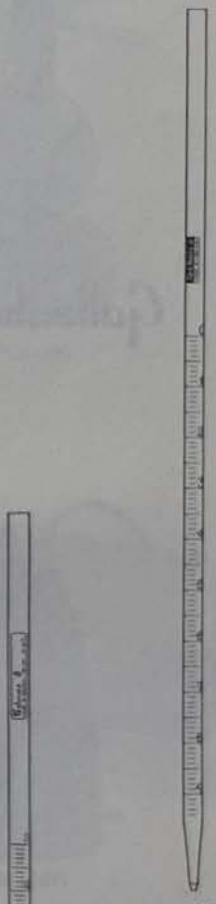
Micropipettes	*See PMP-310 et seq.*
Automatic pipettes	*See PMR-610 et seq.*

CALIBRATION

The methods of calibration and a sampling of finished TECHNICO volumetric glassware are checked gravimetrically using BS 1797 'Tables for use in the calibration of volumetric glassware'. These tables provide correction figures for variations of temperature and barometric pressure and enable weight in grammes to be converted into capacity.



Bulb


Fast flow


Graduated


Haemacytometer

WASHBOTTLES



WBS-300

GLASS WASHBOTTLE

WASHBOTTLE, borosilicate glass, comprising 500ml flat bottomed flask with rubber stopper, bent glass mouthpiece and delivery tube drawn to a jet. (The addition of a GRIFFIN Pinchvalve converts it into a continuous-flow washbottle.)

WBS-300-050B Washbottle, 500ml **£1·85**

GRIFFIN Pinchvalve See *BWF-330-Y*

Gallenkamp POLYTHENE WASHBOTTLES

Registered Design No. 918520

A streamlined design of squeeze bottle, easy to handle and control. The white polythene cap seals positively but is readily released. Caps are available as accessories in red and yellow for colour coding.



WBS-450

- **Translucent wall shows level of contents**
- **Stands firmly on the bench**
- **Delivers a powerful, clean jet of liquid**
- **Refilled without tilting or removing jet**
- **Stepped bore for adjusting jet diameter**

WASHBOTTLES, *GALLENKAMP*, polythene.

WBS-450-050E Washbottle, 250ml **£0·34**
WBS-450-070V Washbottle, 600ml **£0·38**

ACCESSORIES

Caps, polythene, coloured.
WBS-470-520C Caps, red Pack of 10 **£0·77**
WBS-470-540T Caps, yellow Pack of 10 **£0·77**

GAS WASHBOTTLES

- **Woulff and Drechsel patterns**
- **Capacities 125, 250 and 500ml**
- **Model with sintered glass distribution plates in alternative porosities**

See *GTR-200-030X et seq.*



WASHING EQUIPMENT

BOTTLE RINSER, for rinsing the interiors of bottles with neck diameters between 9·5 and 100mm at an approximate rate of 600/h. Comprises a spring-loaded nozzle mounted on a rigid base supplied with a length of hose. The sloping top surface of the distributor is channelled to allow water to flow away and is fitted with four plastics coated sidearms to support larger bottle necks.

WCK-300-Q	Bottle rinser	**£43·03**

ACCESSORY

	Nozzle, for test tubes and syringes, with four plastics coated sidearms.	
WCK-320-520W	Nozzle	**£8·47**



WCK-300

WASHING MACHINE, with a quick release chuck taking interchangeable nylon brushes for cleaning syringes, test tubes and round bottles up to to 250ml using water or mild detergent solutions. An extension spindle is supplied for use with the test tube brushes. Mounted on a cast aluminium base with an anti-splash shield, enamelled tray and incorporating a $\frac{1}{15}$ h.p. motor for 200–250V 50Hz single phase supplies. Dimensions 630 × 270 × 270mm. **Without** brushes.

WCK-360-U	Washing machine	**£245·48**

ACCESSORIES

	Brushes, nylon, for round bottles.	
WCK-380-512C	Brush, for 30ml bottle	**£0·63**
WCK-380-520D	Brush, for 120ml bottle	**£0·91**
WCK-380-530A	Brush, for 250ml bottle	**£0·91**
	Brushes, nylon, for test tubes.	
WCK-400-512E	Brush, 8mm dia.	**£0·54**
WCK-400-520F	Brush, 11mm dia.	**£0·54**
WCK-400-530C	Brush, 14mm dia.	**£0·54**
WCK-400-540W	Brush, 19mm dia.	**£0·54**
WCK-400-550T	Brush, 22mm dia.	**£0·54**
WCK-400-560Q	Brush, 25mm dia.	**£0·54**



WCK-360 with brush

DRAINING AND DRYING

Draining racks	*See DRF-340-J et seq.*
Hot-air dryers	*See DTF-300-010M et seq.*
Drying ovens	*See OVL-220-010W et seq.*

PIPETTE WASHERS

Of a moulded construction with water inlet designed to minimise the risk of back siphoning even if the water pressure falls. Will operate with water inputs of from 2 to 12 litres/min.

PIPETTE WASHERS, polythene, automatic siphoning, as specified. With PVC tubing for water inlet and outlet nozzles but without basket or soaking jar. Internal diameter 165mm. The dimension given is the maximum length of pipette which can be accommodated. (F)

WCK-550-030C	Pipette washer, 350mm	**£42·90**
WCK-550-050T	Pipette washer, 600mm	**£49·50**

ACCESSORIES

	Basket, polythene, perforated, with lifting handle. Internal diameter 125mm. (F)		
WCK-570-502T	Basket		**£7·18**
	Soaking jars, polythene, moulded construction, weld and seam free.		
	For max. pipette length, mm	350	600
	Internal dia., mm	150	175
WCK-590-520D	Soaking jar, 350mm		**£7·26**
WCK-590-530A	Soaking jar, 600mm		**£7·50**



WCK-550

Gallenkamp

WASTE

All capacities and dimensions quoted are nominal



WDS-300



WDS-340



WDS-400



WDS-500 with sack
WDS-630 is similar



WDS-540 with sack

WASTE BINS

WASTE BIN, polythene, with removable, watertight inner container, capacity 9 litres, which tilts forward on application of pressure to a foot pedal and returns to the closed position when pedal is released. Container has carrying handle to facilitate waste disposal and bin casing also has carrying handle. Overall dimensions 254 x 305 x 393 mm high.

WDS-300-010X Waste bin **£3·94**

WASTE BIN, plastics, with rocking flap cover through which waste material is admitted. Cover is removable for ease of emptying. Overall dimensions 320 x 320 x 700 mm high.

WDS-340-010J Waste bin **£5·45**

ACCESSORY

WDS-360-520S Liners, polythene, disposable — Pack of 50 **£2·44**

WASTE BINS, polythene, circular, complete with lid.

Capacity, litres	70	90
Diameter, mm	470	480
Height, mm	510	600
WDS-400-030A Waste bin, 70 litres		**£6·33**
WDS-400-050R Waste bin, 90 litres		**£7·32**

WASTE SACKS AND HOLDERS

The advantage of disposable sack refuse disposal is that when full, the sack is simply detached, taken away, and a clean sack is fitted. The tough, high wet-strength sacks listed are particularly easy to handle. Sacks are held by strong metal holders with plastics lids which close over the tops of the fitted sacks.

WASTE SACK HOLDER, small size. A free-standing mobile holder with pedal-operated lid. The tubular stand is finished in white stove enamel and is small enough to slide under a laboratory bench of standard height. Overall dimensions (lid closed) 290 x 280 x 600 mm high. **Without** sacks.

WDS-500-010V Waste sack holder **£15·21**

WASTE SACK HOLDER, small size as WDS-500-010V but with bracket for wall or bench-end mounting. With lid but **without** sacks.

WDS-540-010Q Waste sack holder **£8·39**

ACCESSORIES for WDS-500-010V and WDS-540-010Q

WDS-560-520C Waste sacks, polythene, light duty, 600 x 280 mm. Waste sacks — Pack of 100 **£3·93**

WDS-560-530W Waste sacks, 1-ply kraft, 600 x 280 mm. Waste sacks — Pack of 50 **£2·93**

WASTE SACK HOLDER, large size. A free-standing mobile holder, white stove enamelled, with pedal-operated lid. Overall dimensions (lid closed) 280 x 380 x 970 mm high. **Without** sacks.

WDS-630-010P Waste sack holder **£20·19**

ACCESSORIES

WDS-650-520B Waste sacks, polythene, 1000 x 330 mm. Waste sacks — Pack of 100 **£12·32**

WDS-650-530V Waste sacks, 2-ply high wet strength kraft, 1000 x 360 x 200 mm. Waste sacks — Pack of 50 **£6·26**

WASTE SACK HOLDER, sheet steel construction with an attractive grained outer laminate of PVC. The lid is biased closed with a spring and may be opened easily with foot pressure on a pedal. Waste sacks are retained by means of a metal ring which fits inside the lip of the holder. For waste sacks 600 × 280 mm.

WDS-780-V Waste sack holder **£21·15**

ACCESSORIES

Waste sacks *See WDS-560-520C and WDS-560-530W*

WASTE SACK HOLDER, as WDS-780-V but for waste sacks 1000 × 330 mm.

WDS-810-Q Waste sack holder **£28·46**

ACCESSORIES

Waste sacks *See WDS-650-520B and WDS-650-530V*

WASTE TRAP UNIT for fitting to a sink, complete with detachable catchport

See FYS-800-T



WDS-810
WDS-780 is similar

WATCH GLASSES

WATCH GLASSES, thin clear glass, with ground edge. (F)

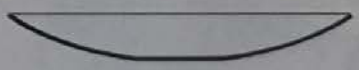
WEF-300-030M	Watch glasses, 50 mm dia.	Pack of 10 **£0·73**
WEF-300-050G	Watch glasses, 70 mm dia.	Pack of 10 **£0·80**
WEF-300-070A	Watch glasses, 80 mm dia.	Pack of 10 **£1·01**
WEF-300-090R	Watch glasses, 90 mm dia.	Pack of 10 **£1·07**
WEF-300-110X	Watch glasses, 100 mm dia.	Pack of 5 **£0·57**
WEF-300-130Y	Watch glasses, 130 mm dia.	Pack of 5 **£0·78**
WEF-300-150C	Watch glasses, 150 mm dia.	Pack of 5 **£1·16**
WEF-300-170T	Watch glasses, 200 mm dia.	Pack of 5 **£1·52**



WEF-300
WEF-350

WATCH GLASSES, *PYREX* **glass.**

WEF-350-010G	Watch glass, 25 mm dia.	Each **£0·59**
WEF-350-012C	Watch glasses, 25 mm dia.	Pack of 36 **£16·91**
WEF-350-030A	Watch glass, 50 mm dia.	Each **£0·62**
WEF-350-032T	Watch glasses, 50 mm dia.	Pack of 36 **£17·88**
WEF-350-050R	Watch glass, 65 mm dia.	Each **£0·70**
WEF-350-052N	Watch glasses, 65 mm dia.	Pack of 144 **£81·82**
WEF-350-070L	Watch glass, 75 mm dia.	Each **£0·70**
WEF-350-072H	Watch glasses, 75 mm dia.	Pack of 144 **£81·82**
WEF-350-110C	Watch glass, 100 mm dia.	Each **£0·78**
WEF-350-112V	Watch glasses, 100 mm dia.	Pack of 144 **£92·23**
WEF-350-130T	Watch glass, 125 mm dia.	Each **£0·87**
WEF-350-132P	Watch glasses, 125 mm dia.	Pack of 72 **£52·10**
WEF-350-150N	Watch glass, 150 mm dia.	Each **£1·00**
WEF-350-152J	Watch glasses, 150 mm dia.	Pack of 72 **£62·39**



WEF-400

WATCH GLASSES, clear glass, with flat base. (F)

WEF-400-030E	Watch glasses, 50 mm dia.	Pack of 10 **£1·98**
WEF-400-070P	Watch glasses, 70 mm dia.	Pack of 10 **£2·07**
WEF-400-090J	Watch glasses, 80 mm dia.	Pack of 10 **£2·27**

WATCH GLASSES, polypropylene, with flat base. (F)

WEF-500-050N	Watch glasses, 60 mm dia.	Pack of 5 **£2·30**
WEF-500-090B	Watch glasses, 80 mm dia.	Pack of 5 **£2·97**
WEF-500-130P	Watch glasses, 100 mm dia.	Pack of 5 **£3·15**

Watch glasses, adjusted to a predetermined mass
See BFX-460



WEF-500

Gallenkamp MODULAR WATER BATHS

Capacities 12, 20 and 30 litres



BKA-200

- **Maximum temperature 100°C**
- **Two control options**
  - **hydraulic thermostat**
  - **solid state thermostat**
- **Stainless steel bath**
- **Hinged cover protects controls**
- **Fitted drain cock**
- **Gabled cover accessory**

See BKA-200 et seq.

Also available:

20 litre modular shaking bath

See BKS-500 et seq.

OTHER WATER BATHS IN THE Gallenkamp RANGE INCLUDE:



BKM-250



BJE-400

- **Single and multiple place boiling water baths**
  See BJE-400-N et seq.
- **Inexpensive 20 litre stainless steel bath**
  See BJL-220-X et seq.
- **Circular glass bath, 20 litres capacity, thermostatic control**
  See BJP-350 et seq.
- **15, 30 and 70 litre capacity stainless steel baths with thermostatic control**
  See BJP-600 et seq.

Gallenkamp WATER DETERMINATION APPARATUS

TO IP 74 AND BS 756

For the determination of water content by the Dean and Stark method

CONDENSER, borosilicate glass, BS 756 Fig. 3 and IP 74, jacket length 400mm, with 19/26 cone.

WES-300-G	Condenser, BS 756, IP 74	**£3·45**

SPRAY TUBE, BS 756 Fig. 4.

WES-340-B	Spray tube, BS 756	**£0·78**

RECEIVERS, *TECHNICO*, borosilicate glass, with 24/29 cone and 19/26 socket. WES-390-050 is fitted with oblique bore stopcock.

Standard	Type	Capacity ml	Subdivisions ml
BS 756 Fig. 5	1	2	0·05
BS 756 Fig. 6	1	7·5	0·1
BS 756 Fig. 7	1	10	0·1
ASTM D95	–	10	0 to 1 × 0·1 1 to 10 × 0·2
BS 756 Fig. 8	1	25	0·2
BS 756 Fig. 12	2	12·5	0·1

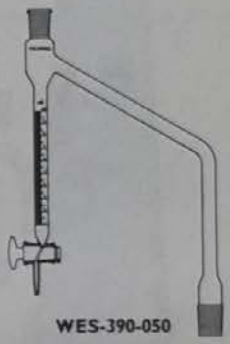
WES-390-010J	Receiver, BS 756 Fig. 5	**£7·08**
WES-390-030D	Receiver, BS 756 Fig. 6	**£7·73**
WES-390-050U	Receiver, BS 756 Fig. 7	**£10·74**
WES-390-070X	Receiver, ASTM D95	**£8·21**
WES-390-090Y	Receiver, BS 756 Fig. 8	**£7·84**
WES-390-110F	Receiver, BS 756 Fig. 12	**£8·60**

ACCESSORIES

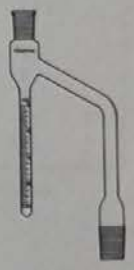
Distillation flask	*See QFH-290-H*
Flask heater, electric	*See HEA-360 to HEA-400*
Flask heater, gas	*See BYB-400 et seq.*
Retort stands and clamps	*See STA-440 to STE-300*
Tubing	*See TWR-250-150P*
Moisture balances	*See BDX-650-W and MRX-270-H*



WES-300



WES-390-050



WES-390-010
WES-390-030 and -090 are similar



WES-390-070

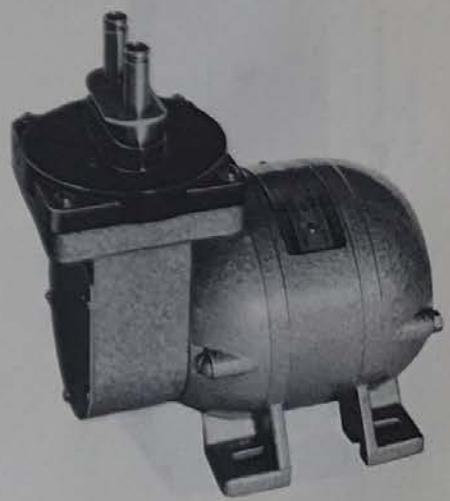


WES-390-110

WATER PUMPS

- **Centrifugal and diaphragm models**
- **Maximum flowrates from 0·8 to 30 litres/min**
- **Peristaltic model for flowrates from 10ml/min**

See PYH-250-W et seq.



WATER DETERMINATION APPARATUS

For the determination of water content by the Karl Fischer method



WES-500

KARL FISCHER APPARATUS, T & M

- **Battery operated**
- **Stirring of titration vessel contents by a stream of dry nitrogen**

KARL FISCHER APPARATUS, *T & M.* Comprises 25ml burette, twin platinum electrode, titration vessel, drying bottles, clips for 500ml reagent bottle, potentiometer and microammeter, mounted on a stand. Overall dimensions 310 × 250 × 950mm high. **Without** chemical reagents.

WES-500-N	Karl Fischer apparatus	**£111·10**

SPARE PARTS

WES-520-030N	Burette	**£3·62**
WES-520-130J	Titration vessel, without electrode	**£11·44**
WES-520-170U	Electrode, twin platinum, in glass sheath	**£4·84**

KARL FISCHER APPARATUS, B & T, BS 2511



WES-610

- **Mains operated**
- **Magnetic stirring of titration vessel contents**

KARL FISCHER APPARATUS, *B & T.* Comprises two 25ml burettes, two reagent reservoirs and filling funnels, guard tubes, vacuum control stopcock, glass titration vessel, magnetic stirrer, twin platinum electrode, microammeter and nitrogen drying nozzles, in metal cabinet. Overall dimensions 280 × 320 × 910mm high. **Without** chemical reagents.

WES-610-V	Karl Fischer apparatus, 220–240V 50Hz	**£460·63**

SPARE PARTS

WES-630-010E	Burette, left side	**£17·14**
WES-630-030V	Burette, right side	**£17·14**
WES-630-130R	Titration vessel, without electrode	**£2·78**
WES-630-170F	Twin platinum electrode	**£13·46**

ACCESSORIES

	Titration vessel, with side tube for filling and rubber cap	
WES-630-512D	Titration vessel	**£5·68**
	Titration vessel, as WES-630-512D but with draining tube and stopcock	
WES-630-522A	Titration vessel	**£16·94**

WATER STILLS

MANESTY WATER STILLS

Model	Method of heating	Output litres/h	Consumption kW	Height mm	Mass kg	Gross mass kg
Destil	Gas	1·1	–	540	5·5	13·5
Destil	Electric	1·1	1	540	5·5	13·5
OB	Electric	1·7	1·5	650	23	36
OOB	Electric	3·8 to 4·5	3	750	35	53
S75	Electric	3·8 to 4·5*	3*	750	7·2	21
1B	Steam	18	–	1030	98	144
2B	Steam	36	–	1340	105	160

* For model S75, the 110–120V version is fitted with one 1·5kW heater and the output is therefore one-half of that shown for the 220–240V version.

The stills are designed for wall mounting and have an identical method of operation. Water enters at the base of the condenser, circulates round the condenser tube and fills the boiling chamber to a height controlled by an overflow chamber. The water is preheated almost to boiling point by condensing steam before entering the boiling chamber, and dissolved gases are liberated and expelled. For efficient operation, a quantity of cooling water is required equal to approximately eight times the distillate output.

The electrically heated models have enclosed elements fitted with an automatic cutout which operates if the still overheats due to a fall in water level or excessive formation of scale.



WGS-220-010
WGS-220-030

NOTE: To comply with regulations, it is necessary when installing a still in the United Kingdom to complete Form EX3 which should be obtained from, and returned to, the local officer of the Board of Customs and Excise. The output and full boiling chamber capacity of each still have to be notified and these are:

Model	Output, litres/h	Boiling chamber capacity, litres
Destil	1·1	3
OB	1·7	4·1
OOB	3·8 to 4·5	11·8
S75	3·8 to 4·5*	6·8
1B	18	42·2
2B	36	40·8

* 1·9 to 2·25 for 110–120V version.

DESTIL MODELS. Low capacity stills with a toughened glass inner baffle and a removable condenser tube fitted below a metal lid.

The gas heated models are supplied with burner. The electrically heated models are for use on a.c. single phase supplies.

WGS-220-010V	Water still, coal gas	£69·30
WGS-220-030P	Water still, natural (methane) gas	£69·30
WGS-220-110R	Water still, electric, 220–240V	£64·35
WGS-220-130L	Water still, electric, 110–120V	£64·35

SPARE PARTS

WGS-240-110D	Heating element, 220–240V	£7·65
WGS-240-130U	Heating element, 110–120V	£7·65
WGS-240-210W	Baffle cup	£1·49



WGS-220-110
WGS-220-130

Continued overleaf



WGS-290



WGS-370

OB and OOB MODELS. Medium capacity stills with a stainless steel condenser tube and inner baffle, and a toughened glass baffle cup and lid. For a.c. single phase supplies.

WGS-290-010S	Water still, OB, 220–240V	**£93·50**
WGS-290-030M	Water still, OB, 110–120V	**£93·50**
WGS-290-110X	Water still, OOB, 220–240V	**£137·50**
WGS-290-130Y	Water still, OOB, 110–120V	**£137·50**

SPARE PARTS

WGS-310-010U	Heating element, 1·5kW, 220–240V	**£7·10**
WGS-310-030X	Heating element, 1·5kW, 110–120V	**£7·10**
	NOTE: Two elements are required for WGS-290-110X and 130Y.	
WGS-310-110Q	Lid	**£6·60**
	Baffle cup	*See WGS-240-210W*

S75 MODEL. A medium capacity still with all operating parts of stainless steel or borosilicate glass. The still has a polished stainless steel finish. For a.c. single phase supplies.

WGS-370-010B	Water still, S75, 220–240V	**£160·60**
WGS-370-030S	Water still, S75, 110–120V	**£160·60**

SPARE PARTS

WGS-390-010K	Heating element, 1·5kW	**£8·97**
	NOTE: Two elements are required for the 220–240V version. One element is required for the 110–120V version.	
	Lid	*See WGS-310-110Q*
	Baffle cup	*See WGS-240-210W*

STEAM MODELS. Large capacity stills which operate on steam pressures of 170 to 400kN/m² (1·7 to 4kgf/cm²). The average consumption is 1kg of steam at 250kN/m² (2·5kgf/cm²) for each litre of distilled water.

WGS-480-050U	Water still, 1B, steam heated	**£429·00**
WGS-480-070X	Water still, 2B, steam heated	**£511·50**

It is recommended that a suitable valve be fitted in the steam supply to the still so that the pressure can be regulated to give the optimum output.

SPARE PART

	Lid	*See WGS-310-110Q*

DEIONISERS



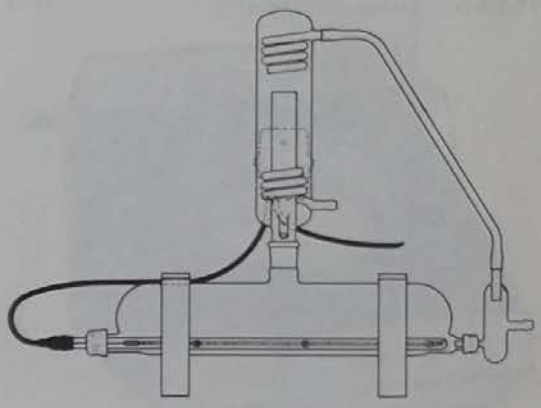
- **Models with expendable resin cartridge and for regeneration in situ**
- **Outputs from 30 to 4000 litres**
- **Flow rates from 15 to 120 litres/hour**

See DCF-300-5 et seq.

GLASS WATER STILLS

ELECTRICALLY HEATED

- **Output approximately 4 litres/h**
- **Distillate quality 0·5 to 1 μS**
- **Minimum cooling water usage and high efficiency achieved by returning condenser water to still body**
- **Automatic cutout operates if water supply fails**
- **Preset constant level device**
- **Requires only 800 × 250 mm bench space**
- **Silica sheathed 3 kW immersion heating element**



WGS-600

WATER STILL, *QUICKFIT* **14 WSC,** glass and PTFE, single distillation. A water-cooled condenser is fitted by a 34/35 joint on a horizontal glass still body which houses the heating element. Two end-support brackets are provided for bench or wall mounting. For 190–250 V 50–60 Hz supplies.

WGS-600-G	Water still, QUICKFIT 14 WSC	**£91·48**

SPARE PARTS

WGS-620-030G	Condenser, CX 13/5, with 34/35 cone	**£25·76**
WGS-620-070R	Heating element, HSD 3, for 190–250 V supplies	**£17·71**
WGS-620-090L	Rubber ring, QR 28/15	**£0·41**
WGS-620-130C	Cutout device, thermostatic, TS 1	**£15·93**
WGS-620-170N	Bracket, end support, WS 1, with clip	**£7·90**
WGS-620-210E	Still body, WS 1D/5, complete with fittings	**£23·52**
WGS-620-270J	Constant level device, WS 2	**£5·81**

STRIP ACTION

WATER STILL, strip action, borosilicate glass, for producing distilled water from mains steam, output 4·5 litres/h. Steam enters at the bottom and is fractionated in an air-cooled outer jacket, the steam being stripped of dirt, oil, etc., by the descending water fraction. The clean steam passes over an efficient helical water condenser and the distilled water emerges at the bottom, while the fraction containing the dirt leaves through a trap. If the mains steam is exceptionally clean, the air jacket can be lagged to reduce the proportion of steam fractionated out, and thus increase the distilled water output. The thermal efficiency of the still is high because cold water does not have to be boiled.

WGS-700-V	Water still	**£64·26**



WGS-700

ACCESSORY

WGS-720-502G	Bracket, for wall mounting	**£16·83**

WATER TESTING

SEDIMENTATION

SEDIMENTATION CONE, Imhoff, for determining amount of solid matter in sewage. Capacity 1000ml with lower end graduated to 40ml

WHT-220-D Sedimentation cone **£7·74**



WHT-220



WHT-310

WATER TESTING TABLETS

A series of tablets for quick and easy testing of water samples in the field or laboratory. Tablets are added to the sample until an easily recognisable colour change occurs. The results are calculated from the number of tablets required.

Valuable information about the terrain over which the water has passed can be obtained using the tablets. In addition to total and calcium hardness, magnesium hardness can be calculated by subtraction. Total alkalinity gives an estimate of the amount of temporary hardness and deducting this figure from the total hardness, the amount of permanent hardness can be assessed. The series also includes tablets for pH and chloride ion determinations.

Each tablet contains precisely weighed quantities of chemicals required for the test. For most tests they are crushed in the water sample, one at a time, until a colour change occurs. The number of tablets used enables the results to be calculated in ppm or mg/litre. The pH test tablets contain universal indicator and after adding one tablet to the sample, the colour is compared with a colour chart to obtain the pH value.

TABLETS, water testing, total alkalinity, for measuring the concentration of carbonate and hydroxide ions. Results expressed in ppm of calcium carbonate. For waters containing carbonate alkalinity, the hydroxide ion concentration is negligible and the results are therefore an estimate of the temporary hardness. With instructions.

WHT-310-030Q Tablets, total alkalinity Pack of 250 **£2·70**

TABLETS, water testing, for measuring the concentration of chloride ions up to 1000 ppm. Suitable for freshwater tests but not for investigations on sea water. With instructions.

WHT-310-050K Tablets, chloride Pack of 250 **£3·35**

TABLETS, water testing, calcium hardness, for measuring the concentration of calcium ions. Results expressed in ppm of calcium carbonate. With instructions.

WHT-310-090V Tablets, calcium hardness Pack of 250 **£2·70**

TABLETS, water testing, total hardness, for measuring the concentration of calcium and magnesium ions. Results expressed in ppm of calcium carbonate. With instructions.

WHT-310-110S Tablets, total hardness Pack of 250 **£2·70**

TABLETS, water testing, pH, containing universal indicator. With colour chart.

WHT-310-130M Tablets, pH Pack of 250 **£5·29**

Gallenkamp INCUBATORS



Modular and Fan convection ranges

High quality incubators, for use in the fields of biology, microbiology, bacteriology and virology. *See INC-250-010V et seq.*

Cooled range

Refrigerated incubators with heaters for working at temperatures below, near to and above ambient temperature. Suitable for:

Membrane filter technique for water examination

Micro organism culture studies

Biochemical oxygen demand (B.O.D.) testing

See INF-600-010R et seq.

CO_2/Humidity range

For use in techniques of open dish tissue cell culture.

See INL-350-010F et seq.

Shaking and Orbital ranges

High quality incubators for growing cultures of micro organisms and tissue cells under controlled conditions of temperature and agitation. *See INS-300-010F and INR-200-010C et seq.*

Gallenkamp APPARATUS FOR WATER TESTING

COLONY COUNTER

With transistorised digital counter for counting bacterial and mould colonies.

- **Digital display of colony count**
- **Bright, dazzle free peripheral illumination**

See CNW-300-010M et seq.



CNW-300

MODULAR FERMENTER

For the growth and study of micro organisms under batch or continuous culture conditions.

- **Range of separate modules allows system to be built up as required**
- **Magnetic stirring with true speed control**
- **Vessel working capacity up to 800 ml**

See FBL-200-W et seq.



FBL-200

MEMBRANE FILTER HOLDERS

For the separation or examination and analysis of particulate and biological matter.

- **Stainless steel bodies**
- **Models for gravity, vacuum and pressure filtration**
- **Suitable for membrane filter technique for examination of water supplies**

See FDC-300-N et seq.



FOC-300

ANAEROBIC JARS

For the growth of anaerobes utilising catalyst active above 0°C.

- **Choice of glass or aluminium jar**
- **Provided with needle valves for evacuating and filling**

See ANF-250-V et seq.



ANF-250

Other apparatus for water testing will be found under the following page headings:

Baths
Bottles
Colorimeters
Dishes
Flame analyser
Labels
Microscopes
Microscope access.
Ovens
Physical chemistry
pH
Safety

Gallenkamp

TINTOMETER WATER POLLUTION TEST KITS



Drinking water test kit

WATER POLLUTION TEST KITS, *TINTOMETER.* Complete field kits for testing water supplies, factory effluents, rivers and lakes, to give a quantitative assessment of the actual concentration of pollution. These kits are suitable for public health authorities, river boards, industrial undertakings, biologists and agriculturalists. All comparator discs contain glass colour standards.

DRINKING WATER TEST KIT. Supplied in fitted wood case with carrying handle containing:

1 Lovibond 1000 Comparator
1 Nessler attachment
4 Nessler tubes, calibrated at 50ml
4 Rectangular moulded cells, calibrated from 3 to 12ml
1 Cleaning brush
1 Rod for crushing tablets.

For pH test:

1 Disc of colour standards, range 6 to 7·6 × 0·2pH
1 Disc of colour standards, range 6·8 to 8·4 × 0·2pH
2 Bottles of appropriate indicator solutions and pipettes

For free and/or combined chlorine test:

1 Disc of colour standards, range 0·05 to 0·5 ppm
1 Disc of colour standards, range 0·2 to 4 ppm
Supply of DPD tablets

For hardness test:

1 Disc of colour standards, range 0 to 60 ppm
Supply of Palin Eriochrome tablets

For colour test:

1 Disc of colour standards, Hazen scale, range 0 to 70

For fluoride test:

1 Disc of colour standards, range 0 to 1·6 ppm
Supply of reagent tablets

DRINKING WATER TEST KIT, as specified, with instructions.
WHT-500-Q Drinking water kit **£150·21**



Sewage and domestic effluents test kit

SEWAGE AND DOMESTIC EFFLUENTS TEST KIT.
Supplied in fitted wood case with carrying handle, containing:

1 Lovibond 1000 Comparator
6 Rectangular moulded cells, calibrated from 3 to 12ml
2 Optical glass cells, 5mm, for chlorine test 1 to 10 ppm
1 Cleaning brush
1 Rod for crushing tablets

For pH test:

1 Disc of colour standards, range 3·6 to 5·2 ×0·2pH
1 Disc of colour standards, range 4·8 to 6·4 ×0·2pH
1 Disc of colour standards, range 6 to 7·6 ×0·2pH
1 Disc of colour standards, range 7·2 to 8·8 ×0·2pH
1 Disc of colour standards, range 4 to 11 ×1pH
5 Bottles of appropriate indicator solutions and pipettes

For free and/or combined chlorine test:

1 Disc of colour standards, range 0·2 to 4 ppm
1 Disc of colour standards, range 1 to 10 ppm
Supply of DPD tablets

For 'permanganate value' test:

1 Disc of colour standards, range 0 to 66 ppm
1 Empty stoppered bottle for sample
1 Empty stoppered bottle for sulphuric acid
2 Empty stoppered bottles for permanganate solution
1 Graduated cylinder, 50ml
1 Thermometer
Funnel and filter paper
Supply of potassium iodide tablets.

SEWAGE AND DOMESTIC EFFLUENTS TEST KIT, as specified, with instructions.
WHT-550-E Sewage effluents kit **£132·44**

RIVER AND UNTREATED WATER TEST KIT. This kit also covers tests for estuarine waters, agricultural land drainage and effluents from food, milk, paper and other industries. Supplied in fitted wood case with carrying handle, containing:

1 Lovibond 1000 Comparator
1 Nessler attachment
4 Nessler tubes, calibrated at 50ml
6 Rectangular moulded cells, calibrated from 3 to 12ml
2 Pipettes, 2ml
1 Graduated cylinder, 50ml
2 Bottles for distilled water, 500ml
Funnel and filter paper
Cleaning brush
Rod for crushing tablets

For pH test:

1 Disc of colour standards, range 4·8 to 6·4 ×0·2pH
1 Disc of colour standards, range 6 to 7·6 ×0·2pH
1 Disc of colour standards, range 7·2 to 8·6 ×0·2pH
1 Disc of colour standards, range 4 to 11 ×1pH
4 Bottles of appropriate indicator solutions and pipettes

For iron test:

1 Disc of colour standards, range 2 to 20 ppm
(may be extended to 100 ppm by dilution of sample)
1 Empty bottle, 25ml, with pipette for citric acid
1 Empty bottle, 25ml, with pipette for ammonia reagent
1 Empty bottle, 25ml, with pipette for thioglycollic acid

For ammonia test:

1 Disc of colour standards, range 0·02 to 0·2 ppm
1 Disc of colour standards, range 0·2 to 0·52 ppm
1 Disc of colour standards, range 0·56 to 1·2 ppm
Supply of Nessler's reagent

For 'permanganate value' test:

1 Disc of colour standards, range 0 to 66 ppm
1 Empty stoppered bottle for sample
1 Empty stoppered bottle for sulphuric acid
2 Empty stoppered bottles for permanganate solution
1 Thermometer
Supply of potassium iodide tablets

For hardness test:

1 Disc of colour standards, range 0 to 60 ppm
Supply of Palin Eriochrome tablets

For dissolved oxygen test:

1 Sampling bottle, 200ml
Supply of Winkler's reagent in ampoules
(Disc and potassium iodide tablets as used in 'permanganate value' test)

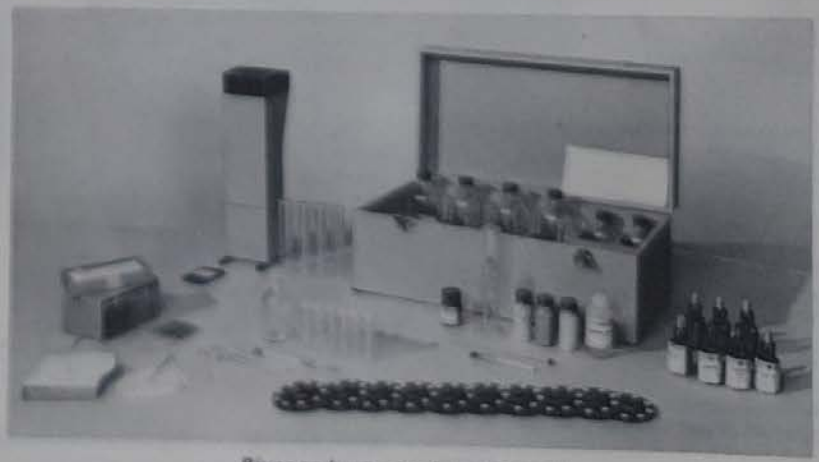
For alkalinity test:

1 Bottle for sample
Supply of tablets for M and P test

For colour test:

1 Disc of colour standards, Hazen scale, range 0 to 70

RIVER AND UNTREATED WATER TEST KIT, as specified, with instructions.
WHT-600-Y River water kit **£234·74**



River and untreated water test kit

Gallenkamp

NALFLOC WATER TESTING MINILABS

Regd. Trade Mark

A range of Minilabs for testing, boiler and other waters in land installations, developed for use in the *NALFLOC* System of Water Treatment and based on methods published by the British Standards Institution.

Supplied in fitted wooden working cabinets, with necessary apparatus and test methods but **without** chemicals. Sets of reagent chemicals are supplied separately as Chempacs as detailed below.

WATER TESTING MINILAB, *NALFLOC*, **Model GA1,** for determination of hardness by Wanklyn soap solution, alkalinity and sulphite. Requires but **does not include** one each Chempacs WHX-610-H and WHX-680-E.

WHX-300-P Minilab, GA1 **£53·44**

WATER TESTING MINILAB, *NALFLOC*, **Model GA3,** for the determination of total, calcium and magnesium hardness by EDTA, alkalinity and sulphite. Requires but **does not include** one each Chempacs WHX-610-H, WHX-630-Q and WHX-680-E.

WHX-320-B Minilab, GA3 **£54·56**

WATER TESTING MINILAB, *NALFLOC*, **Model GA2,** for determination of hardness by Wanklyn soap solution, alkalinity, sulphite and phosphate. Requires but **does not include** one each Chempacs WHX-610-H, WHX-650-C and WHX-680-E.

WHX-340-K Minilab, GA2 **£67·50**

WATER TESTING MINILAB, *NALFLOC*, **Model GA4,** for the determination of total, calcium and magnesium hardness by EDTA, alkalinity, sulphite and phosphate. Requires but **does not include** one each Chempacs WHX-610-H, WHX-630-Q, WHX-650-C and WHX-680-E.

WHX-360-T Minilab, GA4 **£68·63**

EXTENSION SETS FOR GA1, GA2, GA3 and GA4 MINILABS

CHLORIDE SET for the determination of chloride. Requires but **does not include** Chempac WHX-620-A.

WHX-390-502V Chloride set **£5·34**

HARDNESS SET for the determination of total, calcium and magnesium hardness by EDTA. Requires but **does not include** Chempac WHX-630-Q.

WHX-390-514N Hardness set **£5·79**

HYDROMETER SET for the determination of dissolved solids. With hydrometer calibrated at 60°F.

WHX-390-526G Hydrometer set, 60°F **£19·13**

HYDROMETER SET as WHX-390-526G but with hydrometer calibrated at 85°F for use in tropical climates.

WHX-390-528C Hydrometer set, 85°F **£19·13**

PHOSPHATE SET for the determination of phosphate by the limit method. Requires but **does not include** Chempac WHX-650-C.

WHX-390-542Y Phosphate set **£15·19**

SULPHATE SET for the determination of sulphate. Requires but **does not include** Chempac WHX-670-L.

WHX-390-554B Sulphate set **£9·56**

WATER TESTING MINILAB, *NALFLOC*, **Model O_2Z,** for determination of oxygen in feed water, range 0 to 0·12ml O_2/litre, by the indigo-carmine method, and hydrazine in boiler water by the colorimetric method. Requires but **does not include** two Chempacs WHX-640-J.

WHX-430-J Minilab, O_2Z **£151·88**

CHEMPACS FOR MINILABS

Chempacs comprise sets of reagents for various tests as listed below and are packed in cases suitable for home and export delivery. Prices include cost of bottles and cases which are non-returnable.

WHX-610-H	Chempac basic reagent	**£18·56**
WHX-620-A	Chempac chloride reagent	**£14·46**
WHX-630-Q	Chempac EDTA reagent	**£24·92**
WHX-640-J	Chempac oxygen hydrazine reagent	**£17·24**
WHX-650-C	Chempac phosphate reagent	**£15·60**
WHX-670-L	Chempac sulphate reagent	**£14·94**
WHX-680-E	Chempac sulphite reagent	**£11·93**

COMPONENTS OF NALFLOC MINILABS

Regd. Trade Mark

Burette, automatic, amber glass, with polythene reservoir labelled silver nitrate 0·02N.

WHX-820-030V Burette **£4·77**

Burette, spare for WHX-820-030V.

WHX-820-050P Burette **£3·75**

WHX-820-170F Hydrometer, 60°F **£17·78**

WHX-820-190W Hydrometer, tropical, 85°F **£17·78**

WHX-820-310P Stirring rod, polythene, 150 × 8mm

Pack of 5 **£1·99**

WEIGHING

ANALYTICAL BALANCES
Student, general purpose, semi-micro, micro and models.
Weighing ranges up to 1000g.
See BEW-340-G to BFM-340-D

LEVER BALANCE
Dual scale.
Weighing range up to 1000g.
See BCA-220-R

SLIDING AND ROTATING MASS BALANCES
Single- and double-pan models.
Weighing ranges up to 20kg.
See BCJ-200-K to BCJ-970-U

SPRING BALANCES
Extension and compression spring models.
Weighing ranges up to 50kg.
See BAW-200-030Y to BAW-880-P

TOP LOADING BALANCES
Mechanical, electronic and bridge weighing mechanisms.
Weighing ranges up to 20kg.
See BCT-300-R to BDF-790-F

TORSION BALANCES
Standard and precision models.
Weighing ranges up to 10g.
See BCA-300-030X to BCA-320-1301

Balance masses *See BGT-200-030S*
Balance tables *See BGX-500-J*
Desiccant *See BGX-310-S*
Weighing boats *See BGW-260-B*


BFB-260


BCJ-200



BAW-200


BCW-340


BAW-530



ADDENDA

The following pages contain items too late for insertion in alphabetical position in the catalogue

METTLER BALANCES



BDF-730

BALANCE, precision electronic, *METTLER* **PL301**

Weighing range 320g Readability 0·01g

As BDF-460-E but with memory facility of 320g, which enables the running net total of the weighed in substances to be displayed. For 110–250V 50–60Hz single phase supplies. (F)

BDF-468-C Balance, PL301 **£1039·50**

BALANCE, precision electronic, *METTLER* **PL3001**

Weighing range 3200g Readability 0·1g

As BDF-650-S but with memory facility of 3200g, which enables the running net total of weighed in substances to be displayed. For 110–250V 50–60Hz single phase supplies. (F)

BDF-658-Q Balance, PL3001 **£1182·50**

BALANCE, precision electronic, *METTLER* **PT15**

Weighing range 15kg Readability 0·1g
Capacity 15kg Precision ±0·05g

With single control bar operation, digital readout and BCD output. Taring range by subtraction 15kg. With large 440×320mm weighing platform. For 110–250V 50–60Hz single phase supplies. (F)

BDF-730-B Balance, PT15 **£2574·00**

BALANCE, micro electronic, *METTLER* **ME30**

Weighing range (electronic) 30mg
Readability 1μg
Precision ±1μg
Taring range electronic 0–30mg
Built in tare 990mg
Total capacity 1020mg
Supplied with built-in calibration mass 30mg ±1μg

For 110–250V 50–60Hz single phase supplies. (F)

BFM-400-A Balance, ME30 **£2579·50**



BFM-400

DUST CONTROL CLOTHS

CLOTHS, dust control, non-woven bonded cellulose impregnated with a light mineral oil which holds the dust. Size 610×406mm.

CMC-315-F Cloths, dust control Pack of 10 **£1·18**

CORNING LONG CELL ABSORPTIOMETER

A direct reading, photocell absorptiometer, which accepts cells from 2·5 to 100mm optical pathlength. Especially suitable for determinations involving solutions of weak concentration or low turbidity.

Readings are taken from a 100mm scale meter calibrated in optical density. A second scale is provided reading in percentage transmission. A turret provided, enables any one of nine 'spectrum' filters, or a neutral filter for turbidity measurements, to be selected. The 12V 24W lamp is supplied from an integral transformer which corrects for variations in mains voltage of about 10%. The light from the lamp is passed through a heat absorbing filter before it reaches the test solution.

Characteristics of 'spectrum' filters supplied.

Filter No.	Colour	Peak wavelength, nm
609	Deep red	690
608	Red	660
607	Orange	600
606	Yellow	580
605	Yellow-green	550
604	Green	520
603	Blue-green	490
602	Blue	470
601	Violet	425



COS-120 with cell

LONG CELL ABSORPTIOMETER, *CORNING*, as specified, with dust cover and instructions but **without** cells. For 220–240V 50Hz single phase supplies.

COS-120-A Long cell absorptiometer **£304·70**

ACCESSORIES

COS-140-506A	Cells, optical path 2·5mm	Pair **£7·10**
COS-140-509R	Cells, optical path 5mm	Pair **£7·10**
COS-140-512F	Cells, optical path 10mm	Pair **£7·10**
COS-140-515W	Cells, optical path 20mm	Pair **£7·87**
COS-140-518Q	Cells, optical path 40mm	Pair **£8·36**
COS-140-524V	Cells, optical path 100mm	Pair **£11·66**

METTLER AUTOMATIC MELTING POINT APPARATUS MODEL FP61

A self-contained instrument for the determination of melting points. Has output for connecting to a recorder.

Technical data

Maximum temperature	300°C
Accuracy, at 200°C	±0·5°C
at 300°C	±0·8°C
Reproducability	±0·1°C
Heating rates	0·2, 1, 2, 3 and 10°C/min
Recorder output	1V

The instrument provides a digital readout of melting point temperature and has rapid cooling and heating facilities. Suitable for one sample. For 110–240V 50–60Hz single phase supplies. (F)

MFM-420-P Melting point apparatus, FP61 **£2399·10**



MFM-420

OLYMPUS CH SERIES MICROSCOPES



MJF-700



MJF-930

PROVISIONAL SPECIFICATIONS

PRICES ON APPLICATION

The CH series of microscopes is designed to meet the requirements of the general purpose industrial and educational markets.

The system which is modular in design is based on the existing BH routine/research system and shares many of the accessories of the BH range.

The CH series comprises three basic stands CHC, CHB and CHA which vary only in the illumination systems employed

CHC has a mirror base
CHB has a simple illuminator with a 240V 20W mains lamp and dimming circuit
CHA has a 6V 10W low voltage illumination system with built-in transformer and dimming control

Features of the CH System

Large base with built-in hand rests
Coaxial coarse and fine focus controls
Tensioning device on the coarse adjustment
Fine focus over 40mm
Adjustable focus limit stop
Focusable condenser
Large plain stage drilled to accept a range of mechanical stages
Four position objective turret
Interchangeable heads
Wide range of accessory modules

The CH series outfits listed are complete but alternative outfits can be made up to suit individual requirements from the following system chart and the listing of individual components.

MODEL CHC

The *OLYMPUS* CHC microscope has a plain base with built-in hand rests and a mirror for use with an external light source which can be replaced by one of three different attachable illuminators. The coarse and fine focus controls are coaxial and share a common ball race guideway. The fine adjustment operates over the full 40mm of the coarse adjustment, there is a rack and pinion focusing and the substage fitted with an Abbe condenser. The plain stage with slide holders is drilled to accept one of a range of mechanical stages which are listed separately. There is a four position objective turret and the CHC comes with an inclined monocular head which is rotatable and interchangeable. (F)

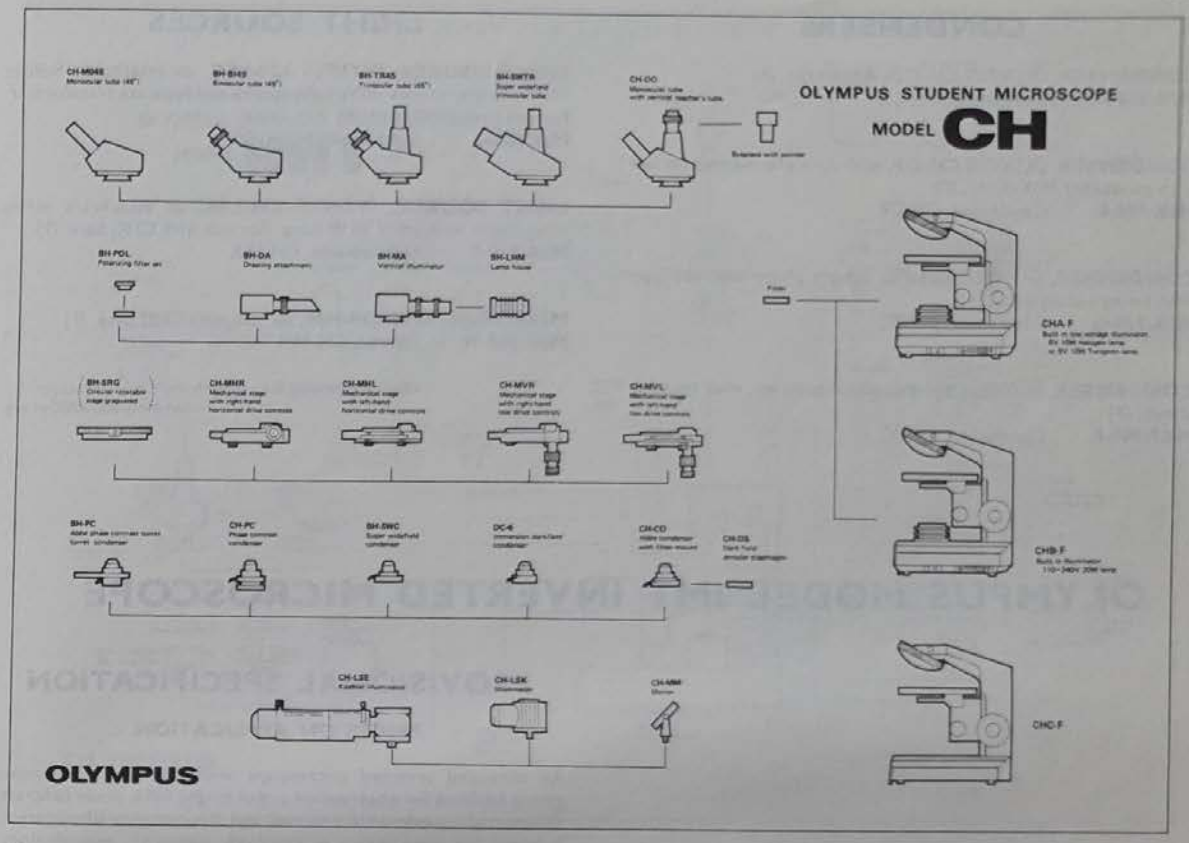
List No.	Model	Eyepieces	Achromatic objectives	Condenser
MJF-700-Y	CHC 001	WF10X	×4 ×10 ×40	Abbe
MJF-740-D	CHC 002	WF10X	×10 ×40 ×100	Abbe
MJF-780-V	CHC 003	WF10X	×4 ×10 ×40 ×100	Abbe

MODELS CHB and CHA

The *OLYMPUS* CHB and CHA microscopes are binocular and have built-in illumination plain stage with attachable mechanical stage having low positioned coaxial controls, coaxial coarse and fine focus with adjustable focus limit stop and tensioning device. Rack focusing substage condenser mount and Abbe condenser with objectives ×4, ×10, achromat, ×40 and ×100 sprung achromat, ×10 widefield eyepieces. In polystyrene pack with blue filter, immersion oil, spare lamp bulbs, dust cover and handbook.

MICROSCOPE, *OLYMPUS* **CHB213**, as specified, with 240V 20W illumination and electronic dimming control. (F)
MJF-900-P Microscope, CHB213

MICROSCOPE, *OLYMPUS* **CHA213**, as specified, with 6V 10W low voltage illumination. (F)
MJF-930-R Microscope, CHA213



MICROSCOPE STANDS

MICROSCOPE STAND, *OLYMPUS* **CHA-F,** comprising base with built-in 6V 10W low voltage illumination system, ON-OFF switch, sliding intensity controller and collector lens, limb with coaxial coarse and fine focus adjustment. Fine adjustment graduated in 2μm divisions working over 40mm range. Focusing condenser mount, plain stage and four position objective turret. (F)
MJK-100-G Microscope stand, CHA-F

MICROSCOPE STAND, *OLYMPUS* **CHB-F,** as MJK-100-G but with 240V 20W illuminator with electronic dimming control. (F)
MJK-130-Y Microscope stand, CHB-F

MICROSCOPE STAND, *OLYMPUS* **CHC-F,** with plain base. Accepts but does not include mirror. (F)
MJK-170-D Microscope stand, CHC-F

HEADS

MONOCULAR HEAD, *OLYMPUS* **CH-MO45,** rotatable inclined at 45°. (F)
MJK-290-E Monocular head

BINOCULAR HEAD, *OLYMPUS* **BH-BI45,** with adjustable interpupillary distance and tube length compensation facility. Inclined at 45°. (F)
MKF-250-010W Binocular head

TRINOCULAR HEAD, *OLYMPUS* **BH-TR45,** with adjustable interpupillary distance and tube length compensation facility. Incorporates light selector control giving 100% to the eyepieces or 80% to the camera and 20% to the eyepieces. Binocular eyepieces inclined at 45°. (F)
MKF-290-010R Trinocular head

MONOCULAR HEAD, *OLYMPUS* **CH-DO,** dual observation with focusing on vertical tube. (F)
MJK-330-P Monocular head, dual

STAGES

MECHANICAL STAGE, *OLYMPUS* **CH-MV,** with low positioned coaxial controls for right hand operation. (F)
MJK-480-S Mechanical stage, CH-MV

MECHANICAL STAGE, *OLYMPUS* **CH-MVL,** as MJK-480-S but for left hand operation. (F)
MJK-500-U Mechanical stage, CH-MVL

MECHANICAL STAGE, *OLYMPUS* **CH-MHL,** with coaxial high level controls for left hand operation. (F)
MJK-540-P Mechanical stage, CH-MHL

MECHANICAL STAGE, *OLYMPUS* **CH-MHR,** as MJK-540-P but for right hand operation. (F)
MJK-560-S Mechanical stage, CH-MHR

Continued overleaf

CONDENSERS

CONDENSER, *OLYMPUS* **CH-CD,** Abbe type. (F)
MJK-670-J Condenser, CH-CD

CONDENSER, *OLYMPUS* **CH-DF,** with dark ground stop for use with condenser MJK-670-J. (F)
MJK-700-E Condenser, CH-DF

CONDENSER, *OLYMPUS* **CH-PC,** simple phase contrast type with swing out annulus. (F)
MJK-730-G Condenser, CH-PC

CONDENSER, *OLYMPUS* **BH-PC,** phase contrast, with rotating annuli. (F)
MKF-900-E Condenser, BH-PC

LIGHT SOURCES

LIGHT SOURCE, *OLYMPUS* **CH-LSC,** an attachable Köhler illuminator with a 6V 30W light source and separate transformer. For use with CHC base. (F)
MJK-880-J Light source, CH-LSC

LIGHT SOURCE, *OLYMPUS* **CH-LSK,** an attachable mains illuminator with 240V 20W lamp. For use with CHC base. (F)
MJK-910-E Light source, CH-LSK

MIRROR, *OLYMPUS* **CH-MM,** for use with CHC base. (F)
MJK-950-W Mirror, CH-MM

Optical elements for use with the CH microscopes
See MMS-200-070C et seq.

OLYMPUS MODEL IMT INVERTED MICROSCOPE



MLA-200 with accessories

PROVISIONAL SPECIFICATION

PRICES ON APPLICATION

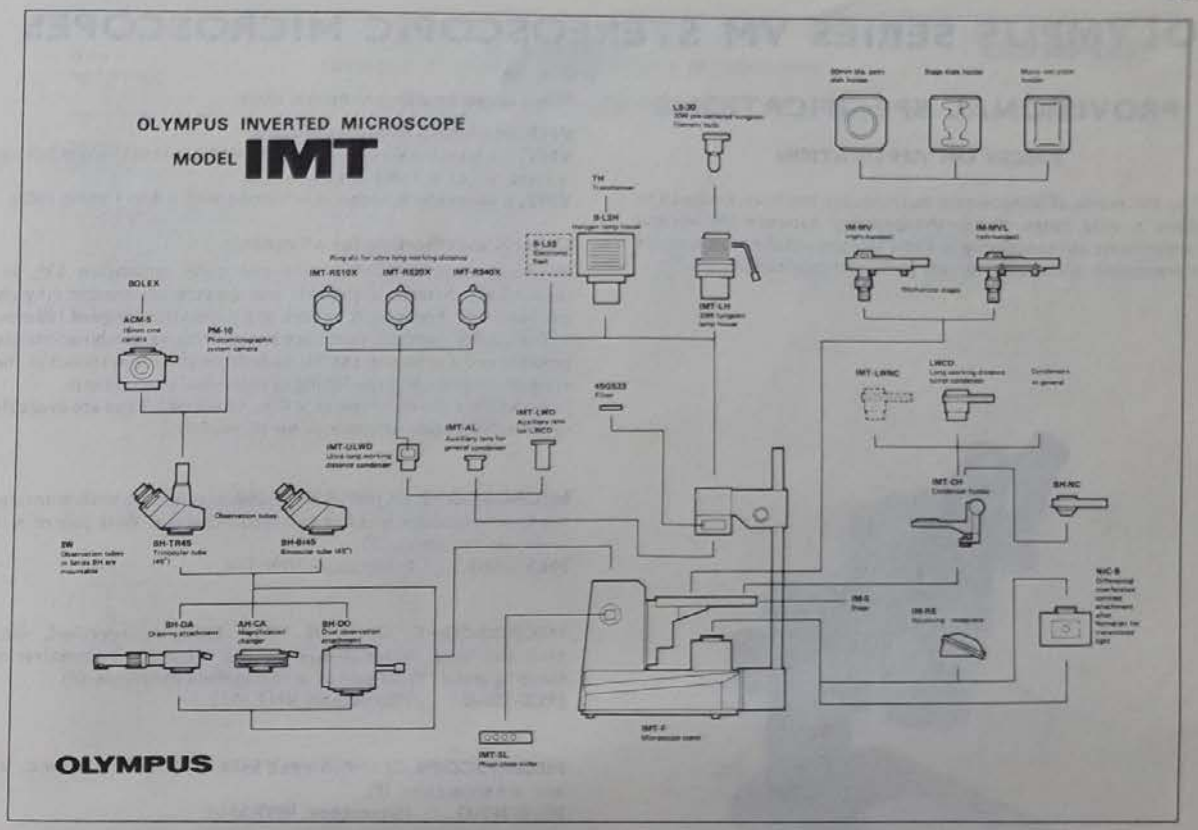
An advanced inverted microscope with modular components giving facilities for observation under bright field, phase contrast, differential interference contrast and fluorescence illumination. Suitable for applications in cytology, histology, microbiology, serology, virology and parasitology.

- **Long working distance objectives up to ×40**
- **Phase contrast phase plates on slider in instrument body**
- **Designed for easy use with minimum fatigue**
- **Long-life lamp – essential for time-lapse photography**
- **Accepts direct many accessories from BH range**
- **Stage does not move for focusing, will not cause de-focusing when loaded**

The IMT is an inverted microscope with coarse and fine focusing controls. Movements are on common ball-bearing guides and both coarse and fine focusing have the same travel. The 6V 30W tungsten illumination system operates from a variable power supply in the base. The trinocular head incorporates a light selector control giving 100% to the eyepieces, or 80% to the camera and 20% to the eyepieces. Binocular eyepieces inclined at 45°. With large plain stage, removable mechanical stage, phase contrast plates on slider in the body and separate annuli for ×10, ×20 and ×40 objectives.

Supplied with:

Objectives	achromatic ×4, ×10 and LWDC ×20 planachromatic LWDC ×40
Eyepieces	wide field, high eyepoint ×10
Condensers	ultra-long working distance (55mm) long working distance (20mm)



MICROSCOPE, inverted, *OLYMPUS* **IMT,** as specified, with spare bulb, green filter, soft plastics cover and instructions. For 220–240 V a.c. single phase supplies. (F)

MLA-200-H Microscope, IMT

SPARE PARTS

MLA-220-030H Lamp bulb, 6 V 30 W, precentred. (F)
MLA-220-060V Green filter. (F)

ACCESSORIES

MLA-550-502Q Electronic flash, B-LSS. (F)
MLA-550-508E Phase turret condenser, LWCD. (F)
MLA-550-514J Auxiliary lens, IMT-AL. (F)
MLA-550-519W Differential interference contrast outfit. (F)
MLA-550-525E Holder for 60mm Petri dishes. (F)
MLA-550-527A Holder for microscope slides. (F)
MLA-550-529T Holder for micro-titre plates. (F)
MLA-550-536W Adapter for 16mm cine camera, ACM-S. (F)
MLA-550-544A Incubation chamber. (F)

Photomicrographic systems, PM10 *See MMX-350-W*
Photo eyepieces, FK *See MMT-390-030C*
Drawing attachment, BH-DA *See MKH-240-306U*
Magnification changer, AH-CA *See MKH-210-504F*
Dual observation head, BH-DO *See MKH-220-530U*

OLYMPUS SERIES VM STEREOSCOPIC MICROSCOPES

PROVISIONAL SPECIFICATIONS

PRICES ON APPLICATION

The VM series of stereoscopic microscopes has been designed to allow a wide range of interchangeability between the various components and specifically to allow selection of the most suitable stereoscopic microscope for any particular application.



MLE-150

There are three different optical units.

VMF, which has a fixed magnification.
VMT, available in two different forms with a turret changer having × 1 and × 2 or × 1 and × 4 objectives.
VMZ, a zoom stereoscopic microscope with a 4 to 1 zoom ratio.

General specification for all models

Working distance 90mm, binocular tube inclination 55°, interpupillary distance adjustable and dioptre adjustment ring on left hand side. Focusing is by rack and pinion in a range of 105mm.

The outfits listed are complete but alternative combinations are possible and a selection can be made from the items shown in the systems diagram and the listing of individual components.

Attachable auxiliary lenses × 0·5, × 0·75, × 1·5 and are available as interchangeable accessories for all models.

MICROSCOPE, *OLYMPUS* **VMF 554,** as specified, with binocular head, × 4 objective lens fixed on focusing stand. With pair of × 10 widefield eyepieces. (F)
MLE-150-J Microscope, VMF 554

MICROSCOPE, *OLYMPUS* **VMT 5512,** as specified, with binocular head, turret changer having × 1 and × 2 objectives on focusing stand. With pair of × 10 widefield eyepieces. (F)
MLE-190-E Microscope, VMT 5512

MICROSCOPE, *OLYMPUS* **VMT 5514,** as MLE-190-E but with × 1 and × 4 objectives. (F)
MLE-210-G Microscope, VMT 5514

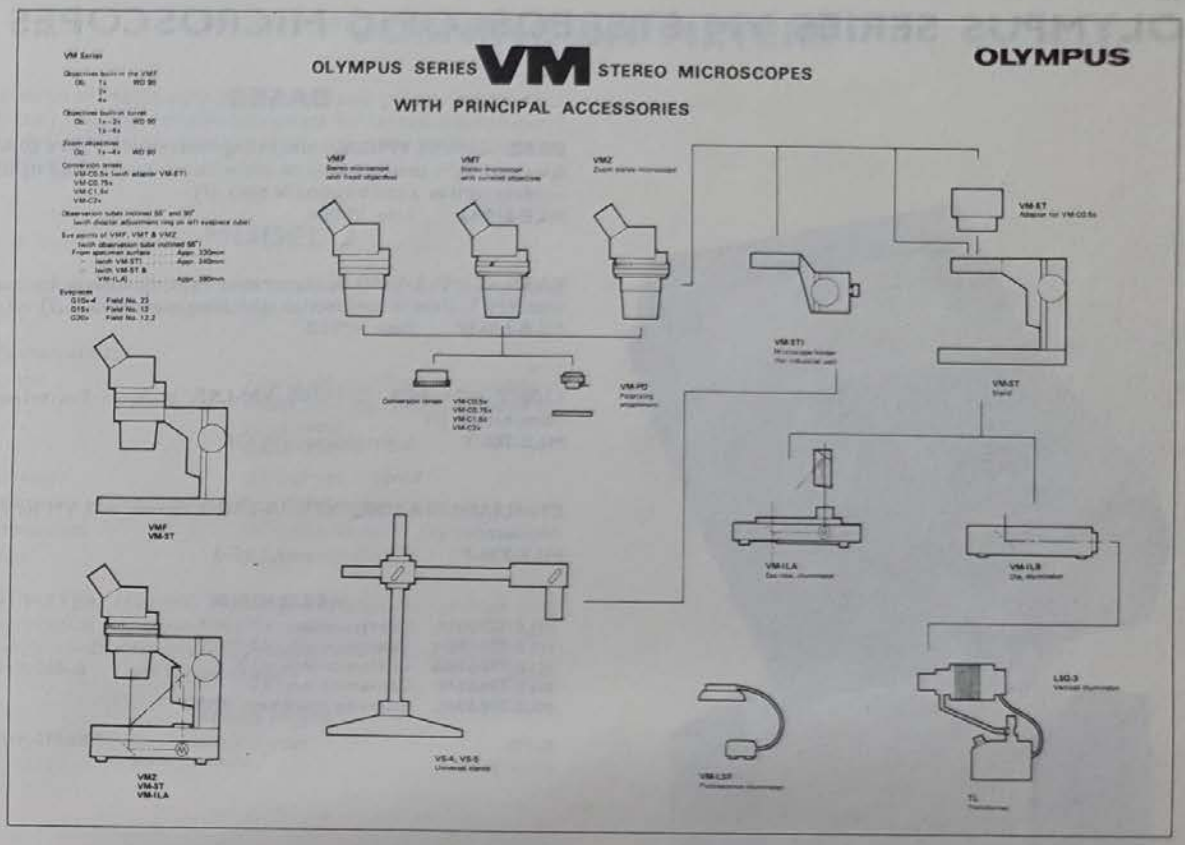
MICROSCOPE, *OLYMPUS* **VMZ 55, zoom,** magnification range × 1 to × 4 on focusing stand and including pair of × 10 widefield eyepieces. (F)
MLE-260-R Microscope, VMZ 55



MLE-190 with accessories



MLE-260 with accessories



HEADS

HEAD, *OLYMPUS*, **VMF optical unit only,** with fixed objective magnification × 4 and eyepieces. (F)
MLE-380-S Head, VMF optical unit

HEAD, *OLYMPUS*, **VMT 5512 optical unit only,** for turret stereo microscope with objectives × 1 and × 2 and eyepieces. (F)
MLE-410-N Head, VMT 5512 optical unit

HEAD, *OLYMPUS*, **VMT 5514 optical unit only,** as MLE-410-N but with objectives × 1 and × 4 and eyepieces. (F)
MLE-430-W Head, VMT 5514 optical unit

HEAD, *OLYMPUS*, **VMZ optical unit only,** for zoom stereo microscope eyepieces. (F)
MLE-470-R Head, VMZ optical unit

STANDS

STAND, *OLYMPUS* **VMST,** with rack and pinion focusing control and limb containing aperture to accept LSG-3 illuminator. (F)
MLE-520-V Stand, VMST

STAND, *OLYMPUS* **VMSTI,** with mounting bracket and focusing controls but **without** base to accept optical units to fit on to users equipment or on to long arm stand VS-4 or VS-5. (F)
MLE-540-H Stand, VMSTI

Long arm stand VS-4 — See MMW-370-S
Long arm stand VS-5 — See MMW-410-G



MLE-150 with MLE-720

Continued overleaf

Gallenkamp

OLYMPUS SERIES VM STEREOSCOPIC MICROSCOPES

BASES

BASE, *OLYMPUS* **VMILA,** illuminating base including 240 V 20 W lamp and light path selector to allow either transmitted light, incident light or a combination of both. (F)
MLE-610-U Base, VMILA

BASE, *OLYMPUS* **VMILB,** transmitted light illuminator for use with VMFT. Used in conjunction with illuminator LSG-3. (F)
MLE-640-W Base, VMILB

LIGHT SOURCE, *OLYMPUS* **VM-LSF,** provides fluorescent illumination. (F)
MLE-700-T Light source, VM-LSF

EPI-ILLUMINATOR, *OLYMPUS* **LSG-3,** for use with VM series microscopes. (F)
MLE-720-F Epi-illuminator, LSG-3

ACCESSORIES

MLE-770-502P	Conversion lens, ×0·5 with adapter
MLE-770-506M	Conversion lens, ×0·75
MLE-770-510Q	Conversion lens, ×1·5
MLE-770-514Y	Conversion lens, ×2
MLE-770-534C	Polarising attachment, VMPO



MPR-510 with clip plates and tubes

TUBE ROTATOR/MIXER

Suitable for vertical mixing or horizontal tube rotation. Can be used in an incubator at temperatures up to 37°C.

The drum accepts one plate of clips each side either all vertical, all horizontal or a combination of the two.

Rotation speed of the drum is variable between 6 and 60 rev/min. The drive motor is fitted with a clutch to allow the drum to be rotated by hand for easy loading and unloading. A timer range 0 to 60 min with continuous run and off positions is fitted. Overall dimensions 430 × 240 × 340 mm high.

TUBE ROTATOR/MIXER, as specified, **without** clip plates. For 220–240 V 50 Hz single phase supplies.
MPR-510-P Tube rotator/mixer **£126·50**

ACCESSORIES

MPR-520-504D	Clip plate, 12 × 12 mm dia. tubes, vertical	**£4·68**
MPR-520-508S	Clip plate, 10 × 16 mm dia. tubes, vertical	**£4·68**
MPR-520-512E	Clip plate, 8 × 19 mm dia. tubes, vertical	**£4·68**
MPR-520-516T	Clip plate, 7 × 24 mm dia. tubes, vertical	**£4·68**
MPR-520-533T	Clip plate, 10 × 12 mm dia. tubes, horizontal	**£4·68**
MPR-520-537L	Clip plate, 8 × 16 mm dia tubes, horizontal	**£4·68**

CORNING pH METERS

A series of high-quality pH meters ranging from the Model 3 battery operated portable instrument for routine measurements to the Model 113 digital readout meter for use in research applications.

MODEL 3

A battery operated portable instrument suitable for routine laboratory and field applications.

Technical data

Range	2 to 12 pH with 2 pH overranging at either end by resetting calibrate adjustment 300–0–300 mV
Accuracy	±0·2 pH or ±12 mV
Temperature compensation	0 to 100°C manual
Dimensions	152 × 99 × 58 mm
Mass	0·3 kg

pH METER, *CORNING* **Model 3, portable,** as specified with combination electrode, 2 × 9V batteries and carrying case complete with electrode filling solution and buffer solution.

PHR-200-G pH Meter, model 3 **£62·70**

SPARE PARTS

PHR-210-010T	Combination electrode	**£12·49**
	Buffer powders	*See PHM-870*



PHR-200

MODEL 7

A direct reading large-scale general purpose pH meter with facilities for Karl Fischer titrations.

Technical data

Ranges	0 to 14 pH 1400–0–1400 mV
Accuracy	±0·05 pH or ±14 mV
Scale length	178 mm
Temperature compensation	0 to 100°C manual as fitted or automatic with temperature compensator accessory
Recorder output	10 mV for FSD in pH range
Input impedance	10^{12} ohms
Polarising current for Karl Fischer titrations	−10 μA
Dimensions	320 × 165 × 200 mm
Mass	4 kg

pH METER, *CORNING* **Model 7,** as specified, with combination electrode, holder, support rod, shorting lead, buffer solution, potassium chloride solution and instructions. For 190–250V 50–60Hz single phase supplies.

PHR-280-T pH Meter, model 7 **£196·41**

SPARE PARTS

PHR-290-010J	Combination electrode	**£19·31**
	Buffer powders	*See PHM-870*

ACCESSORY

PHR-290-502L	Temperature compensator	**£33·55**



PHR-280

Gallenkamp

MODEL 12

A direct reading large-scale research pH meter with expanded scale and facilities for Karl Fischer titrations.



PHR-400

Technical data

Ranges	Normal 0 to 14pH 1400–0–1500mV Expanded 1 pH or 100mV spans Logarithmic 2 scales for ion activity measurements
Accuracy	±0·05 pH on normal range
Scale length	178mm
Temperature compensation	0 to 100°C manual as fitted or automatic with temperature compensator accessory
Recorder output	10 to 100mV FSD
Input impedance	10^{14} ohms on pH scale
Polarising current for Karl Fischer titrations	−5 μA
Dimensions	318×280×210mm
Mass	4·5kg

pH METER, *CORNING* **Model 12,** as specified, with combination electrode, holder, support rod, shorting lead, buffer solution, potassium chloride solution and instructions. For 190–250V 50–60Hz single phase supplies.

PHR-400-N pH Meter, model 12 **£355·30**

SPARE PARTS

Combination electrode	*See PHR-290-010J*
Buffer powders	*See PHM-870*

ACCESSORY

PHR-410-503D Temperature compensator **£62·70**

MODEL 109

A general purpose pH meter with digital readout.



PHR-570

Technical data

Ranges	0 to 14 pH 1900–0–1900mV
Accuracy	±0·01 pH
Digital display	3½ digits
Temperature compensation	0 to 100°C manual as fitted or automatic with temperature compensator accessory
Recorder output	±100mV on pH scale
Input impedance	10^{12} ohms
Dimensions	280×178×144mm
Mass	3kg

pH METER, *CORNING* **Model 109,** as specified with combination electrode, holder, support rod, base plate, shorting lead, buffer solution and instructions. For 190–250V 50Hz single phase supplies.

PHR-570-C pH Meter, model 109 **£355·30**

SPARE PARTS

Combination electrode	*See PHR-290-010J*
Buffer powders	*See PHM-870*

ACCESSORY

PHR-580-504N Temperature compensator **£19·31**

MODEL 113

A high-quality research pH meter with digital readout and scale expansion and Karl Fischer titration facility.

Technical data

Ranges	0 to 14 pH 1799–0–1799 mV
Accuracy	±0·005 pH
Digital display	3½ digits on normal 4½ digits expanded
Temperature compensation	0 to 100°C manual as fitted or automatic with temperature compensator accessory
Recorder output	±700 mV on pH scale
Input impedance	10^{13} ohms
Polarising current for Karl Fischer titrations	−10 μA
Dimensions	245 × 445 × 250 mm
Mass	5 kg

pH METER, *CORNING* **Model 113,** as specified, with combination electrode, holder, support rod, base plate, shorting lead, buffer solution and instructions. For 190–250V 50Hz single phase supplies.

PHR-700-M pH Meter, model 113 **£521·40**



PHR-700

SPARE PARTS

Combination electrode	*See PHR-290-010J*
Buffer powders	*See PHM-870*

ACCESSORY

Temperature compensator	*See PHR-580-504N*

METTLER MODULAR TITRATION OUTFIT

ADDITIONAL MODULES

MODEL DK14 HIGH IMPEDANCE AMPLIFIER

Similar to Model DK 10 but with recorder output of potential or its first derivative.

HIGH IMPEDANCE AMPLIFIER, *METTLER* **DK14,** as specified. For 180–250V 50–60Hz single phase supplies. (F)

TLD-495-X High impedance amplifier, DK14 **£905·30**

MODELS DK18 and DK19 PHOTO-TITRATOR MODULES

With continuously adjustable wavelength scanner for measurement of the visible spectrum in the range 400 to 700mm. Suitable for potentiometric, end point, recording and equilibrium titration when used in conjunction with the relevant DV/DK modules.

PHOTO-TITRATOR MODULE, *METTLER* **DK18,** as specified, complete with immersion probe. For 180–250V 50–60Hz single phase supplies. (F)

TLD-642-F Photo-titrator module, DK18 **£4202·00**

PHOTO TITRATOR MODULE, *METTLER* **DK19,** as model DK18 but with plug-in interference filters for routine titrations. For 180–250V 50–60Hz single phase supplies. (F)

TLD-648-P Photo-titrator module, DK19 **£3712·50**

MODEL DK31 DIGITAL INDICATOR

A digital indicator with 7-segment display suitable for electrode potentials or px-values.

Ranges:

Potentials	±1999·9 mV
px-values	0 to 19·999

Has BCD output for data transmission.

DIGITAL INDICATOR, *METTLER* **DK31,** as specified. For 180–250V 50–60Hz single phase supplies. (F)

TLD-660-D Digital indicator, DK31 **£1573·00**

Gallenkamp

LADDER



TOJ-270

LADDER, an invaluable aid to safety in the laboratory or storeroom. Strong lightweight metal construction with three wide, plastics-capped treads, safety grip bar and rubber capped feet. Folds flat when not in use. Height to top tread 635mm.

TOJ-270-E Ladder **£10·97**

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