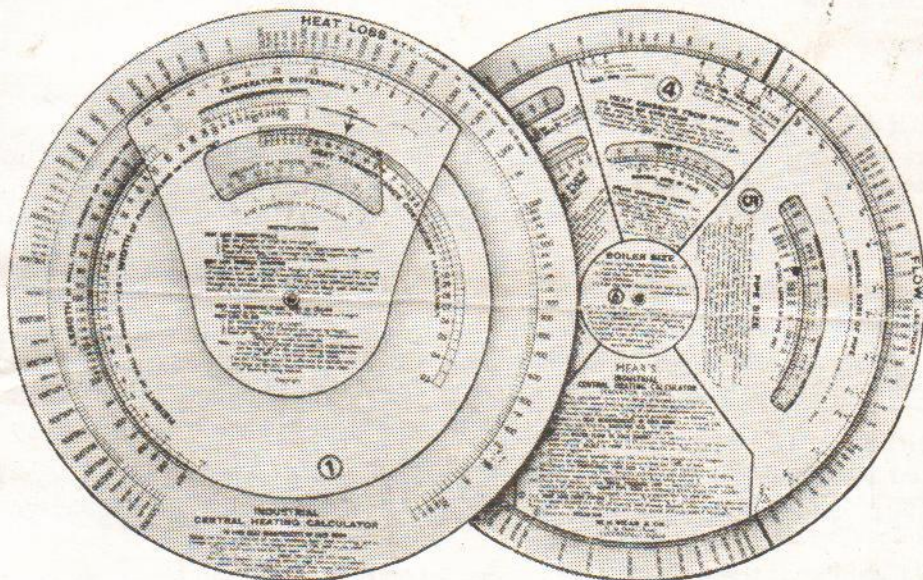




CALCULATOR CATALOGUE

for
HEATING
LIGHTING
FLUID FLOW
WEIGHT
CALCULATIONS
SPRING DESIGN
TIMBER
METRIC
CONVERSION
AIR CONDITIONING
PSYCHROMETRY
QUALITY
CONTROL



EACH CALCULATOR solves a particular frequently met problem in a simple yet accurate manner.

ANY COMPLEXITIES of the basic formula or method are built in and handled automatically by the instrument so that only a simple setting of dials to length, width, diameter, temperature, etc., is necessary.

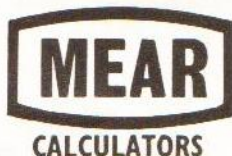
EASY TO USE - SUPERB QUALITY - PRECISION MADE

Large size mostly 7 $\frac{3}{8}$ " (196 mm) dia., engraved in two, three or four colours on thick perspex. Each is supplied complete in an attractive case with full instructions where needed.

M. H. MEAR & CO. LTD.

CALCULATOR DESIGNERS

56 NETTLETON ROAD, DALTON, HUDDERSFIELD, W. YORSHIRE, ENGLAND HD6 9TB. Telephone: (0484) 428589



We specialise in the design of high quality technical calculators for solving sometimes simple, but usually complex, frequently recurring problems common to many industries.

Our current range is shown in this booklet and all of them will be found to be tremendous time savers, up to date in design and technical detail, and capable of recovering their small cost in the time saving alone on the first few calculations.

CALCULATORS FOR ADVERTISING PURPOSES

Our standard instruments can be supplied engraved with clients' name and advertising copy in quantities of 100 or more at appreciable discounts, or for 50 or more we can gold block these details on the plastic cases. Special calculators can be made to customers' individual requirements.

CONSTRUCTION

Of the highest quality, precision made from non-warping white and clear acrylic, with main dials 3 mm thick and subsidiary dials 1.5 mm thick. All scales and lettering are clearly and sharply engraved, not printed, and filled in multicolours to facilitate use.

METRIC AND U.S. MODELS

Standard instruments are calibrated in Imperial units, but most of them are now available in exactly similar designs calibrated in S.I. Metric units. Several calculators are also available calibrated in U.S. gallons.

The availability of these alternatives, Imperial, Metric or U.S. models is indicated for each calculator.

ON APPROVAL TERMS

Because the full capabilities and value of our instruments can only be appreciated by actual handling and use, we are glad to supply on 10 days' free trial to United Kingdom business addresses who have an account with us. To private addresses and business addresses who do not have an account with us, we can supply against cash with order with a 10 day money back guarantee if not found suitable.

DELIVERY is normally by return of post, post free.

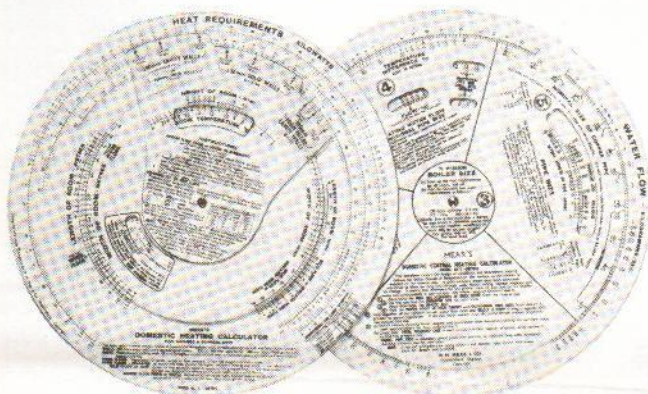
CENTRAL HEATING CALCULATORS

AS USED AND RECOMMENDED THROUGHOUT THE HEATING INDUSTRY

Each calculator carries out a complete, logical and easily followed design sequence for heating calculations, every step clearly set out and dealt with by an individual section of the instrument.

These are accepted practically universally in Britain and many years of use in all branches of the Heating Industry have proved their accuracy and time saving capabilities. They are also used on training schemes by Colleges and the larger firms and are strongly recommended by many leading authorities.

DOMESTIC HEATING CALCULATOR for COMPLETE INSTALLATION DESIGN



An instrument, simple and quick to use, which determines the heating requirements for all types of domestic premises and also the sizes of all the equipment needed for the installation.

Gives answers close to those obtained by detailed calculation.

Imperial model No. 10A

Metric model No. 9A

The latest models give answers for insulated walls and roofs, and also indicate allowances for double glazing.

Complete in attractive case with comprehensive instruction booklet. 4 colour, 7 $\frac{3}{8}$ " dia.

Simply set two dials to:—length, width, height of room, temperature required and type of construction and the Calculator gives immediately an assessment of the total Heat required. Automatic correction is made to allow for the lower ratio of heat loss through walls of large rooms and many other relevant factors such as the lower heat loss with increasing room height as against a proportional increase in length or width.

RADIATOR, BOILER AND PIPE SIZES including smallbore and microbore.

These are quickly obtained from the reverse side. A preliminary pipe size for each circuit is indicated directly from the heat requirements and enables pipe layouts to be readily arranged. Alternative sizes are shown for small bore and microbore, the microbore section selecting the size according to the available pressure loss per foot of pipe.

WARM AIR HEATING CALCULATOR

for Domestic and other small Installations.

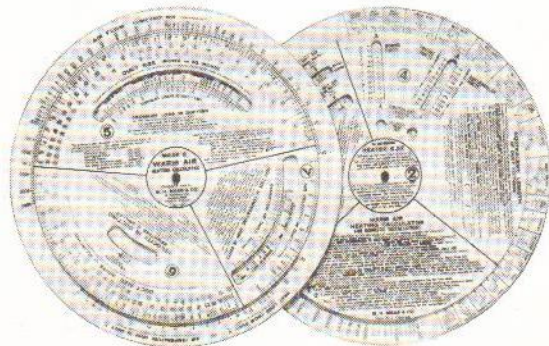
A complete method for designing Warm Air Heating Installations once the room heat requirements have been determined (using Domestic Heating Calculator).

Gives warm air volume, heater size, duct size, pressure loss, equivalent length of duct fittings, velocities and also heat loss from ducting. Deals with installations up to 24 in. dia. duct size.

A comprehensive INSTRUCTION booklet explains the basis of design and the method of use with worked out example.

Imperial model

Size 7 $\frac{3}{8}$ " dia. Engraved in 3 colours or Metric model



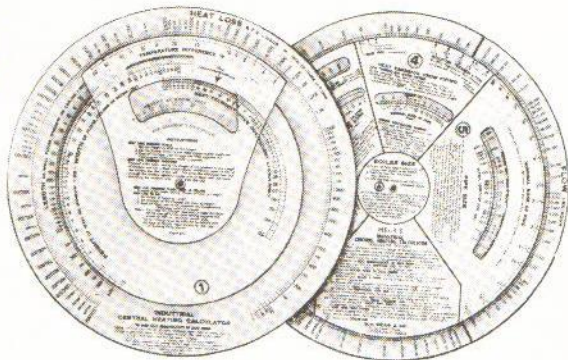
INDUSTRIAL HEATING CALCULATOR

An instrument designed to simplify the calculations for all the larger heating installations where a full analysis of the heat losses must be made.

HEAT LOSSES through the structure are handled on one side of the calculator, each wall, floor, window, etc., being treated individually by simply setting length to breadth, and using the temperature difference and the transmittance coefficient to obtain the heat loss. The heat loss from air change is obtained in a similar manner.

**Imperial model
or Metric model
or U.S. model**

Complete in case with comprehensive instruction book.
SIZE 7 $\frac{3}{8}$ " dia. Engraved in 4 colours.

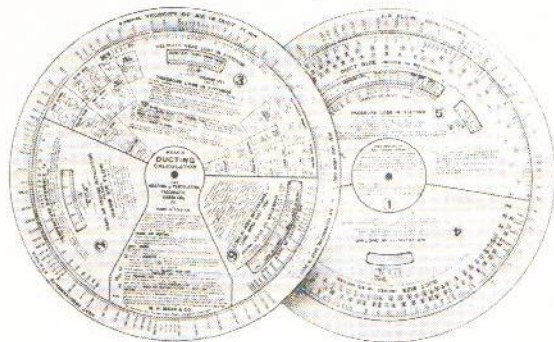


PIPE SIZING SIMPLIFIED

The calculator has an ingenious method of fixing pipe sizes which saves considerable time. It is only necessary to decide what pressure loss can be allowed per 100ft. run and all pipe sizes can be read off immediately according to BTU carried and flow to return temperature drop. At the same setting the water flow in the pipe is shown; or the pipe size can be obtained directly from the flow if desired:

RADIATOR SIZE, BOILER SIZE, PUMP SIZE are also obtained on the reverse side and a further section gives heat losses from piping, either insulated or left bare.

DUCTING CALCULATOR



A COMPLETE CALCULATOR FOR determining duct sizes, velocities and pressure losses for large or small ducting systems passing either warm or cold air. It is double sided and divided into sections which handle all aspects of duct sizing calculations. It gives answers for either round, square or rectangular ducts.

Velocity.—One section of the calculator gives the velocity in the duct or sizes the duct from any specific velocity requirement.

Pressure Loss.—A separate section deals with the pressure loss in the straight portions of the duct.

Pressure Loss in Fittings.—On many installations a large proportion of the pressure loss occurs in the various bends, branches and other fittings and a section deals specifically with this giving the loss in velocity heads for a wide variety of fittings and providing scales to convert this to actual pressure loss.

Warm Air Heating.—This section gives the volume of air required for warm air heating according to the heat requirements and the temperature differential between warm air and the room. In addition a further section gives the heat loss from the surface of the ducting carrying the warm air.

DUCT SIZES—up to 100" dia. and the equivalent rectangular or square.

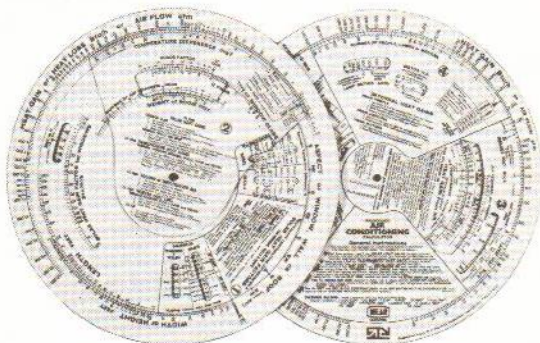
Size 7 $\frac{3}{8}$ " dia. in plastic case with comprehensive instruction booklet.

**Imperial model
or Metric model**

PACKAGED AIR CONDITIONING CALCULATOR

APPROVED BY THE AIR CONDITIONING ADVISORY BUREAU

This instrument has been specially produced to facilitate the design procedure for packaged systems developed by the Electricity Council and detailed in their Guide for climatic and sunshine conditions in Great Britain. It uses a logical step by step method, readily followed, each part of the complex calculation being simplified and handled by a separate segment of the instrument.



Imperial model or Metric model

Air Condition entering Evaporator

This particularly useful section determines the wet and dry bulb temperatures of the mixed air entering the evaporator thus completely eliminating reference to and the drawing of diagrams on psychrometric charts. It is also more accurate.

TWO CALCULATORS IN ONE - Normal Heat Loss Calculations Included

The instrument will also perform all the usual calculations for estimating the Winter Heat Loss, including both losses through the structure and to air change.

SOLAR HEAT GAINS & TRANSMISSION HEAT GAINS for British latitudes. By setting an arrow to the aspect, the Solar Heat Gain Factors and Equivalent Temperature Differences for windows, walls and roofs are obtained for five dates and times. These are used in the next section to give the gains according to the dimensions, shade factor, type of glass and U value.

HEAT GAIN from AIR. A further section determines the heat gain from the air supply according to infiltration, number of persons, or floor area, whichever calls for the maximum requirement and both sensible and latent portions of this gain are shown automatically opposite the location of the premises.

INTERNAL HEAT GAINS from persons (both sensible and latent), from lighting and from electric motors.

SIZE of UNIT required is given in tons refrigeration and Room Air Supply in c.f.m.

SIZE 8 1/4" dia. with Instruction booklet and work sheets.

PSYCHROMETRIC CALCULATOR for Air Conditioning & Meteorology

This calculator determines all the properties of moist air directly from any of the three basic sources of measurement, i.e. by a simple setting of:

- Wet Bulb to Dry Bulb Temperature (screen or aspirated)
- or Wet Bulb Temperature to Depression " "
- or Dry Bulb Temperature to Relative Humidity " "

It gives:

Dew Point	Vapour Pressure	Specific Humidity
Frost Point	Moisture Content	Mixing Ratio
Latent Heat	Specific Enthalpy	Vapour Density
Sensible Heat	Specific Volume	Altitude Correction

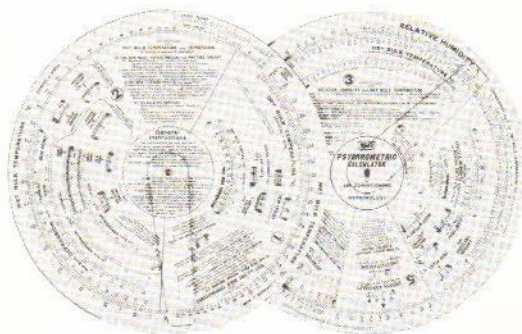
HIGH ACCURACY eliminates interpolation from tables and charts as temperature scales are calibrated in 0.2°C permitting settings to 0.1°C or less. The Relative Humidity scaling is also very accurate.

The basic properties are per kg of dry air at standard atmospheric pressure of 1013.25 mb but the Specific Humidity and Mixing Ratio are given for any barometric pressure down to 300 mb. Additional scales allow for correction of the Wet Bulb Depression for the effects of low barometric pressure or altitude. The properties of mixed air from two or more different streams can also be obtained. Size 7 3/4" dia. 3 colour. Imperial or Metric model

SCALE RANGES:

Wet Bulb Temperature	0 to 29°C	32 to 84°F
Ice Bulb Temperature	-50 to 0°C	-40 to 32°F
Dry Bulb Temperature	-53 to 44°C	-58 to 110°F

Complete in case with instruction book.



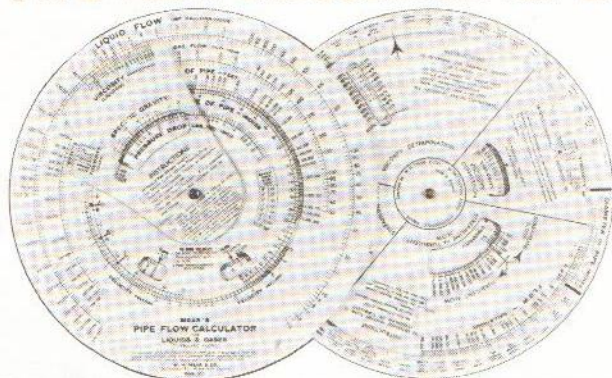
Frost Point	-50 to 0°C	-40 to 32°F
Dew Point	-53 to 29°C	-56 to 84°F
Depression	0 to 22 deg C	0 to 42 deg F

FLOW CALCULATORS

A range of instruments for sizing pipes and estimating pressure losses for all types of fluids flowing through pipelines.

THE CALCULATOR DESIGN in each case is based upon the Rational Flow Formula using the Colebrook-White equation for coefficient of friction, and pipe roughness factors as given by Colebrook-White and by Moody.

PIPE FLOW CALCULATOR for LIQUIDS & GASES (TURBULENT FLOW)



The majority of practical problems fall within the turbulent flow range and this calculator determines the required pipe size, flow or pressure loss for any liquid, e.g. water, fuel oils, acids, solvents, and also for any gas (at low pressures) flowing under turbulent conditions in steel or cast iron pipes.

PRESSURE LOSS, FLOW or PIPE SIZE are found from the front of the calculator by a simple setting of two dials to the known details of length, viscosity, specific gravity, etc.

Scales on the reverse side permit an instant check to be made on whether the flow conditions are turbulent or streamline.

VISCOSITIES OF OVER 50 LIQUIDS at various temperatures are also given on the reverse side along with scales for viscosity conversion — Redwood — Saybolt — Centistokes and on the Metric model — Engler degrees.

SIZE : 7 $\frac{5}{8}$ " dia. 3 colour. Imperial or Metric or U.S. model

SCALE RANGES

Diameter 6 to 1,000 mm
Length 1.5 to 2,000,000 m

Liquid Flow 0.005 to 1,300 litre/s
Gas Flow 1.5 to 30,000 m³/h

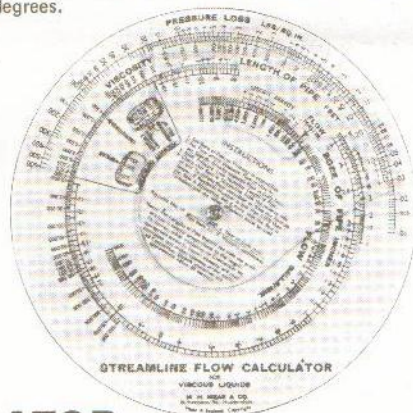
STREAMLINE FLOW CALCULATOR FOR VISCOUS LIQUIDS

This instrument solves the streamline flow formula applicable to the flow of more viscous liquids such as fuel oils, lubricating oils, syrups, etc., through pipe lines and also the flow of liquids of low viscosity in small pipes. The latest design includes viscosity conversion scales for Redwood, Saybolt, Engler and Centistokes.

SCALE RANGES

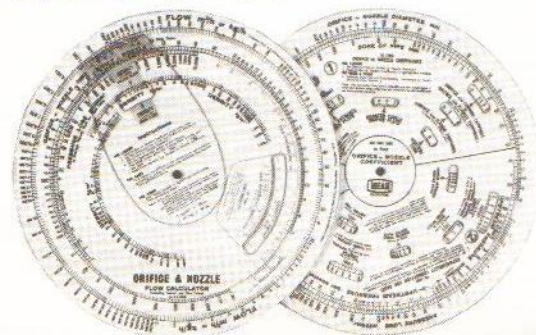
Liquid Flow 0.0001 to 1,000 litre/s
0.0001 to 1,000 kg/s
Pipe Dia. 3 to 300 mm
Length 2 to 1,000 m

SIZE : 5 $\frac{1}{8}$ " dia.
Single sided, 2 colour.
Imperial model
or Metric model
or U.S. model



ORIFICE & NOZZLE FLOW CALCULATOR

Accurate methods for measuring the flow of fluids in pipe lines by means of various types of orifice plates and nozzles are specified by British Standard No.1042. This calculator quickly solves the formulae given in this standard for the whole range of measuring devices, i.e.



ORIFICE PLATES with corner tappings, D and D/2 tappings or flange tappings. QUARTER CIRCLE ORIFICE PLATES, CONICAL ENTRANCE ORIFICE PLATES, PITOT TUBES, VENTURI TUBES, NOZZLES, VENTURI NOZZLES

The front of the calculator gives the flow of liquids, gases or steam in terms of either volume or mass. A separate section gives the gas density for any gas according to pressure, temperature and specific gravity.

The reverse determines the flow coefficients for both gases and liquids for the various orifices and nozzles.

Scale Ranges:- Pipe bores from 40 to 2,000 mm
Orifice Diameter 7 to 1,200 mm

SIZE : 7 $\frac{5}{8}$ " dia. Metric model only

WATER FLOW CALCULATOR

CEMENT, CONCRETE & VITRIFIED PIPES, also OPEN CHANNELS in EARTH, ROCK, CONCRETE, METAL & WOOD

One side of the calculator solves the rational formula for water flow in pipes and ducts of circular section.

The answers have been checked against a large number of well authenticated practical tests on actual pipelines from small metal tubes to long concrete tunnels up to 6 metres dia. and give accuracy appreciably better than the usual Hazen Williams formula.

Flow 0.1 l/s to 100 m³/s Diameter 16 to 6,300 mm

OPEN CHANNELS: The reverse side solves the Manning formula for the flow in open channels.

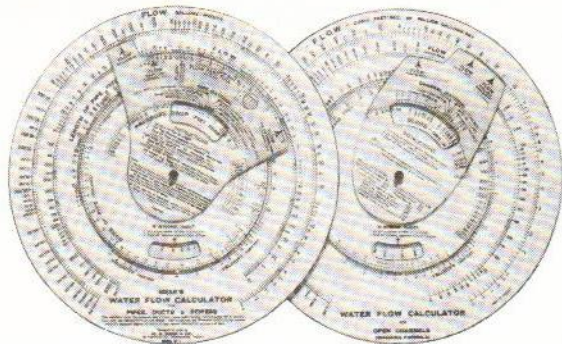
Flow 15 l/s to 1500 m³/s

Channel Area 0.07 to 200 m²

VELOCITY SCALES have been added to both sides of the latest model.

Complete in case with full instructions. 3 colour 7 $\frac{5}{8}$ " dia.

Imperial, Metric or U.S. models.



GAS FLOW CALCULATOR for steel and cast iron pipes

A double-sided instrument for calculations relating to the flow of all gases. It has two pressure loss scales, one dealing with the majority of problems where the terminal pressure is substantially atmospheric and the other for pipes at pressures up to 275 bar.

Handles all fuel gases, air, nitrogen, carbon dioxide, etc., and is widely used for sizing factory compressed air and fuel gas systems, pipelines in chemical works, coke ovens and process plants.

SCALE RANGES: Diameter 10 to 1500 mm

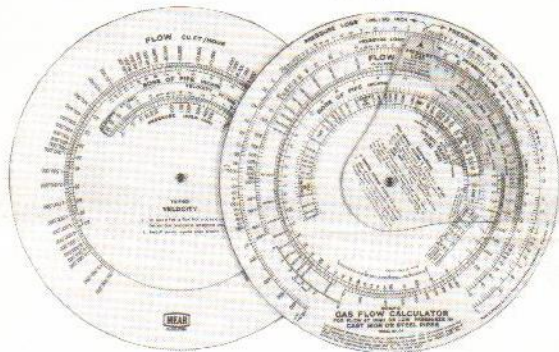
Flow 1.1 to 400,000 m³/h

Length 3 to 1,000,000 m

VELOCITY SCALES for high and low pressure on reverse.

Post free in case. Imperial or Metric Model.

SIZE : 7 $\frac{5}{8}$ " dia.



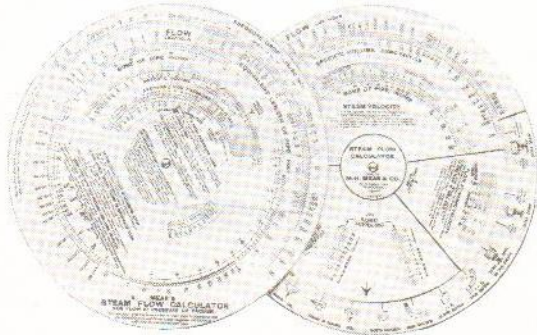
GAS FLOW CALCULATOR for plastic pipes

This calculator is similar to the above giving the pressure loss in plastic pipes for all fuel gases, air, nitrogen, carbon dioxide, oxygen and hydrogen. On the reverse there are velocity scales and scales to determine allowances for fittings.

SCALE RANGES: Dia. 10 to 500 mm. Flow 1 to 60,000 m³/h. Length 3 to 1,000,000 m. Imperial or Metric model.

STEAM FLOW CALCULATOR

Determines the pressure loss of steam flowing in pipe lines under any conditions from high vacuum up to the critical pressure of 220 bar and at all velocities up to and including sonic flow. Valves, bends and fittings contribute considerably to the total pressure loss and a section is included to give the equivalent length of a wide variety of these fittings so that accurate allowances can be made for them.



The design of the calculator is based upon the rational formula, not upon empirical exponential formulae such as the Unwin or Fritzsche which are subject to appreciable errors except within a limited range of sizes and velocities.

It takes account of the deviation of steam from the laws of a perfect gas and for the variation of its viscosity with temperature and pressure.

PIPE SIZES UP TO 1200 mm dia. Engraved in 3 colours. 7 $\frac{5}{8}$ " dia. in case with instruction booklet.

Imperial model or Metric model

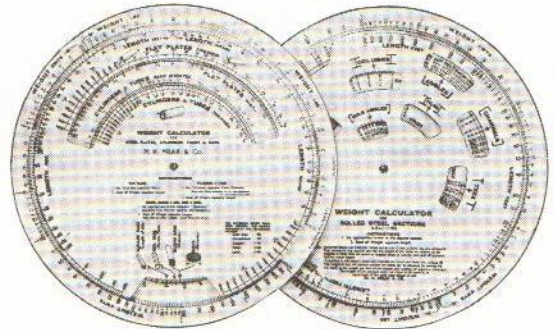
WEIGHT CALCULATOR for STEELWORK

STEEL FABRICATIONS, ROLLED PLATE, SHEET AND SECTIONS

An instrument to determine accurately and in a fraction of the time required when using tables or a slide rule, the weight of almost any piece of fabricated or rolled steelwork—from standard sections to large plates, sheets, discs, tubes and cylinders, from the very small to the extra large.

Precision construction, ample size and the use of extended scales ensure high accuracy.

A single setting of one dial is sufficient to obtain the weight of any item. One side deals with flat plates, sheets, rolled up cylinders, tubes, round, square and hexagon bars, whilst the other handles beams, joists, columns, angles, tees, bulb angles and flats.



2 colour. 7 $\frac{3}{8}$ " dia.

CAPACITY RANGE		
Plates & Flats $\frac{1}{4}$ " to 20 ft. wide, 20 g to 6" thick	Cylinders & Tubes $\frac{1}{4}$ " to 20 ft. dia. 20 g to 6" thick	Lengths up to 300 ft.
Discs & Round Bars $\frac{3}{8}$ " to 17 ft. dia.		
Square & Hex. Bars $\frac{3}{8}$ " x $\frac{3}{8}$ " to 17 ft. x 17 ft.		
Beams, Columns, Channels, Joists, Angles & Tees, etc.	All British Standard Sections to B.S.4	Lengths up to 1,000 ft.

Thicknesses are calibrated in fractions of an inch for plates and in B.G. for sheet.

Lengths are calibrated in feet, inches and fractions of an inch.

- Imperial model in cwts., qrs. and lbs.
- or Imperial model in lbs. only
- or Metric model in mm., m., and kg. with British Standard sections
- or U.S. model with U.S. sections.
- or European Metric model with Din and Euronorm sections

Steelwork Weight Calculator - Imperial/Metric Model

At the request of many users we have produced this special model which is identical to our standard Imperial model except that the weights are given in kilogrammes instead of cwts, qrs, & lbs. This design enables the user to continue to work entirely in feet and inches for measurements but to obtain the weight directly in kg thus saving time spent on conversions of cwts, qrs, & lbs to kg.

Identical in appearance to illustration above
Complete in case

Metals Weight Calculator - Metric Model

A single sided calculator which gives the weight of practically any commercial metal

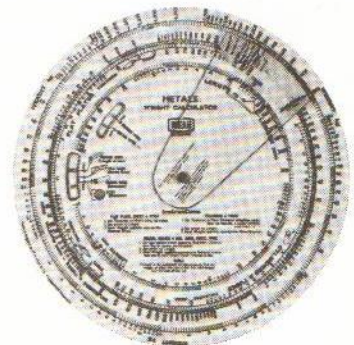
Flat Plates & Sheets	0.3 to 200 mm thick	6 to 500 mm wide
Rolled up Cylinders, Tubes & Coils	0.3 to 80 mm thick	6 to 400 mm dia.
Round, Square & Hex. bar & discs	6 to 5000 mm dia.	
Wire, round or square	0.2 mm dia. upwards	

Materials: STEEL C.I. BRASS COPPER ALUMINIUM LEAD ZINC TIN MOLYBDENUM MANGANESE ANTIMONY BRONZE NICKEL CUPRO-NICKEL

LENGTHS: .3 mm to 100 m
WEIGHTS: .01 to 10,000 kg

The various sections are colour keyed for easy use.

Complete in an attractive plastic case
Engraved in 3 colours.



Universal Metals Weight Calculator - Metric Model - U.S. Model

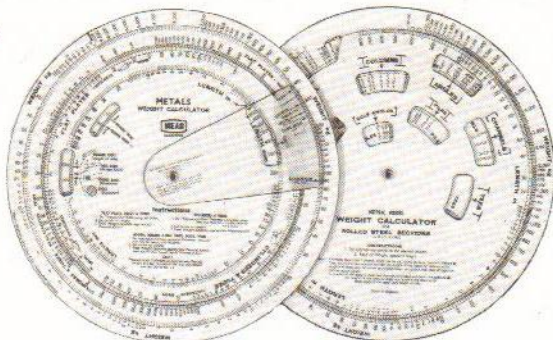
For STEEL C.I. COPPER ALUMINIUM LEAD ZINC TIN
NICKEL CUPRO-NICKEL MOLYBDENUM MANGANESE
ANTIMONY BRONZE

This calculator will give the weight of almost any size or shape of commercial metal including steel and rolled steel sections.

The front handles flat plates, cylinders, tubes, bars, discs, and wire (round or square) and is identical to the METALS WEIGHT CALCULATOR described on the opposite page.

The reverse deals with beams, columns, joists, channels, angles, tees, bulb angles and flats to B.S.4 in any lengths up to 800 metres.

Engraved in three colours, 7 $\frac{3}{4}$ " dia., post free in case.



ELECTRIC LIGHTING CALCULATOR FOR COMMERCIAL AND INDUSTRIAL INSTALLATIONS

This calculator has been designed to give quickly and accurately the number and size of luminaires for any installation by the lumen method. It indicates a logical and easily followed design sequence with each step dealt with by an individual section of the instrument.

NUMBER AND SIZE OF LUMINAIRE

On the front of the calculator simply set two dials to length of room, width of room, required illumination and coefficient of utilisation and the size of each luminaire can be read immediately opposite the chosen number of luminaires or vice-versa.

ROOM INDEX

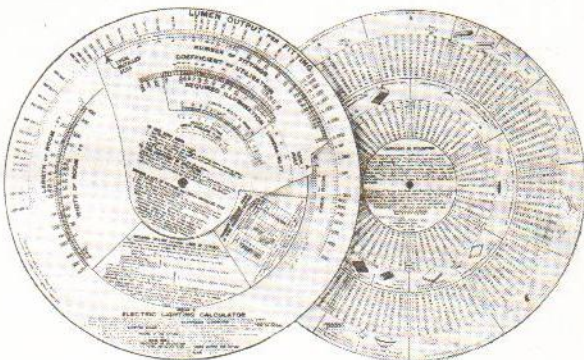
To find the coefficient of utilisation for any luminaire it is necessary to know the Room Index and scales are provided on the front of the calculator to rapidly determine this index for any size of room and height of luminaire.

COEFFICIENT OF UTILISATION

On the reverse side of the instrument are engraved for easy reference, by kind permission of the Lighting Industry Federation and The Electricity Council, the Coefficients of Utilisation for a wide range of standard lighting luminaires.

Complete in case with full instructions.

SIZE: 7 $\frac{3}{8}$ " dia. 3 colours.



Imperial model
or Metric model

ELECTRIC WIRING CALCULATOR

A double sided instrument to rapidly determine the voltage drop in cables and to give the required cable size to meet specified maximum losses.

The length of circuit is simply set to the current and the cable size read opposite the allowable voltage drop.

A separate section finds the current for either single or three phase from the kw required and the supply voltage.

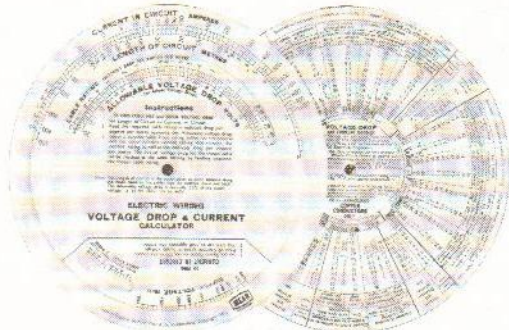
I.E.E. VOLTAGE AND CURRENT DROP RATINGS

The reverse side of the calculator tabulates current ratings and millivolts drop per ampere per metre for a wide range of non-armoured copper conductors reproduced by kind permission of the Institute of Electrical Engineers.

Metric model only,

Complete in case

Size 5 $\frac{3}{4}$ " dia. 3 colour.



TIMBER CALCULATOR FOR ESTIMATING TIMBER QUANTITIES AND PRICES

Setting the dials to width, thickness and length gives the volume in cubic metres and at the same setting the total cost is obtained opposite the price per cu. metre.

In addition it gives the price per metre run and the metre run per cubic metre.

Scale Ranges:—Width 13—400 mm., Thickness 5—300 mm., Length 0.5 to 3000 m.

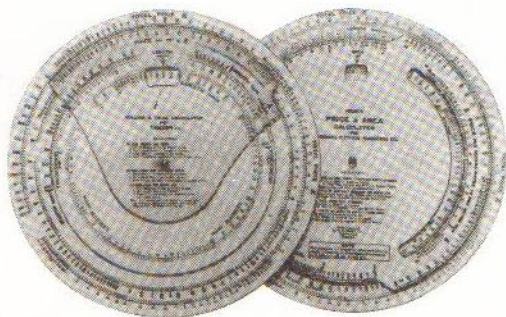
FLOORBOARDS, PLYWOOD, HARDBOARD, etc.

The reverse side handles materials normally measured by area. Setting length to Width gives the area and the total cost is read against the price per square metre.

Scale Ranges:—Width 100 mm. to 20 m.
Length 0.5 to 3,000 m.

Metric model only

Size $7\frac{5}{8}$ " dia. 2 colour.



PROBABILITY & STATISTICAL QUALITY CONTROL CALCULATOR

This instrument solves quickly and accurately the statistical calculations involved in setting up schemes for the control of Quality of goods received and Quality in batch and mass production. It is divided into seven sections dealing with Poisson Probabilities, Acceptance Sampling Schemes, Outgoing Quality, Quality Control Charts, Sampling by attributes, Sampling by Variables and Normal Probabilities. The Poisson Probability section can be used for a wide range of other statistical calculations besides those involved in quality control.

POISSON MULTI-EVENT PROBABILITIES

If an event is known to happen on say 3% of all occasions it will be expected to happen $1\frac{1}{2}$ times in 50. Actually it can only occur 0, 1, 2, 3 or 4, etc. times and Poisson probabilities show the probability of it occurring 0, 1, 2, 3 or 4 etc. times for any particular expectation (in this case the expectation is $1\frac{1}{2}$).

This very comprehensive section of the calculator gives the Poisson Cumulative Probabilities for up to 20 occurrences by simply setting the arrow to the Expectation. The answers are read off much more conveniently, accurately and quicker than with conventional charts.

ACCEPTANCE SAMPLING SCHEMES provide a scientific basis for accepting or rejecting a product by checking samples instead of the whole batch and the Poisson Probability section enables the SIZE of SAMPLE and the acceptable number of Defectives in the sample to be determined together with the CONSUMER RISK of accepting below average quality. In addition it gives the PRODUCER RISK of rejecting good material and enables the OPERATING CHARACTERISTIC CURVE to be plotted.

THE MOST ECONOMICAL SCHEME requiring the least amount of inspection is found from section 2 and the AVERAGE OUTGOING QUALITY of the finished product from section 3.

CONTROL CHARTS for Production Sampling Schemes

The other side of the instrument rapidly calculates the Control Chart Limits for the three types of chart used. Statistical Control Charts are used to ensure that the product from a manufacturing process is kept within acceptable specified limits, and again are based on Poisson Probabilities.

SAMPLING BY ATTRIBUTES — Upper Action and Warning Limits are given for the Number of Defectives in the sample.

SAMPLING BY VARIABLES — Upper and Lower Action and Warning Limits given for both AVERAGE and RANGE charts.

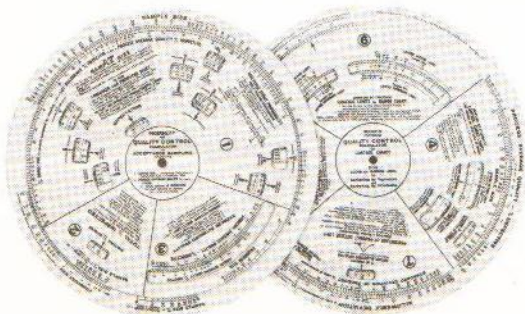
During production, the number of defectives in a sample or the sample average size and range are plotted and the production methods checked whenever the control limits are reached.

PER CENT OF PRODUCT OUTSIDE LIMITS

This section gives areas under the Normal Probability Curve so that knowing the standard deviation of the product from the sampling sections, the percentage falling outside any set limits can be found. It can be used for many probability calculations where the Normal Distribution is applicable.

Complete in case with full instructions.

Size $7\frac{5}{8}$ " dia. engraved in 3 colours.



SPRING CALCULATORS

RECOMMENDED BY THE SPRING RESEARCH & MANUFACTURERS' ASSOCIATION

HELICAL SPRING CALCULATOR

This calculator designs helical compression and extension springs in accordance with the relevant British Standard No.1726. It is double sided, one side dealing with the stress calculation and the other with the Rate and Extension.

It enables spring sizes to be determined very rapidly as the Rate and the Stress for a particular spring can be read off in a few seconds by setting the dials to the appropriate values.

A scale is provided for the Spring Index and where neither wire diameter nor coil diameter are specified initially, design can proceed rapidly on the basis of the appropriate index figure.

The stress correction factor for curvature of the wire is automatically indicated and taken into account in the calculations.

SCALE RANGES

Wire dia. .006" to 1.2" Number of Coils 1 to 300
Coil dia. .03" to 12" Stress 4,000 to 300,000 lbs./sq.in
Load .05 to 40,000 lbs. Deflection .01" to 15"

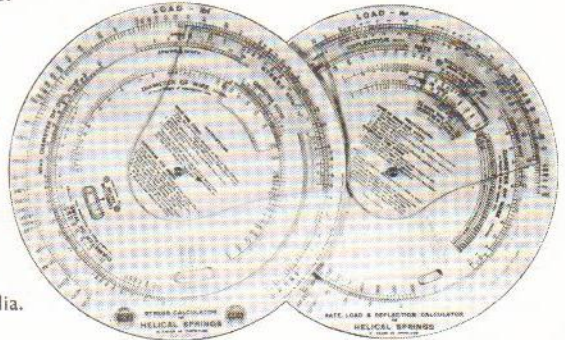
RECTANGULAR AND SQUARE WIRE SPRINGS

The calculator will also handle springs made from rectangular or square wire as well as the normal round wire springs, additional scales being provided for this purpose.

Imperial model
or Metric model

4 colour
SIZE : 7 $\frac{3}{8}$ " dia.

Post Free in case with instruction booklet.



Also **Spring Weight Calculator** for helical springs.

Gives the weight and cost of the material needed for the manufacture of quantities of helical coil springs in steel or bronze and in round or square wire.

Wire dia. 0.2 to 25mm Coil dia. 1 to 300mm Quantity 1 to 10,000

METRIC MODEL ONLY 7 $\frac{3}{8}$ " dia.
Complete in case.

TORSION SPRING CALCULATOR FOR RATE, MOMENT, STRESS OR DEFLECTION

This single sided calculator quickly solves the stress and deflection formulae for torsion spring design. It will handle round, square and rectangular springs without difficulty and in addition it gives, quite simply, the reduction in coil diameter for any deflection.

SCALE RANGES

Wire Dia. 0.1 to 12.5 mm. calibrated in standard wire sizes
Coil Dia. 0.5 to 300 mm.
No. of coils 1 to 200
Stress 15 to 3,000 N/mm²
Torque 0.1 to 200,000 Nmm
Deflection 1 to 1,000°

METRIC MODEL ONLY

7 $\frac{3}{8}$ " dia.
Complete in case.

BRICK, BLOCKWORK and CONCRETE CALCULATOR

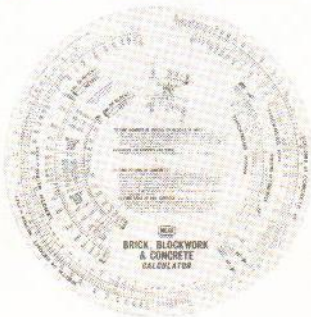
Designed to give simply and quickly:

- * Number of bricks or blocks needed to build any wall.
- * Volumes of concrete for various slab thicknesses.
- * Area of any surface e.g. paving, glazing, roof, wall.

Brick and block sizes are given in mm co-ordinating sizes only, but dual scaling elsewhere permits the use of both imperial and metric dimensions.

SIZE — 5 $\frac{3}{4}$ " dia.

Single sided, 2 colour.
Complete in an attractive plastic case



METRIC CONVERSION CALCULATORS

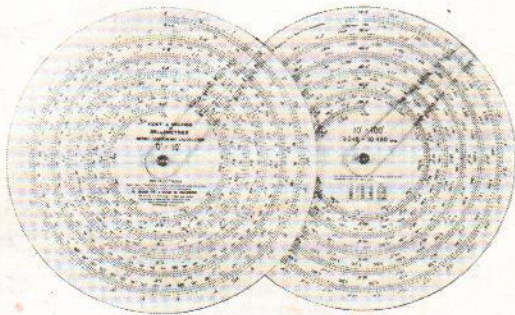
Feet & Inches to Millimetres Model M.2

Range 0" to 100 ft. scaled in fractions of an inch

This is a handy pocket-sized instrument designed for converting dimensions measured in feet, inches and fractions of an inch instantaneously to millimetres, and vice-versa.

The scaling gives a high degree of accuracy and is varied to suit practical requirements, being more open at the lower end so that small dimensions are easily read to $\frac{1}{16}$ " whilst larger ones near 100 ft. are read to $\frac{1}{4}$ ". Thus such figures as $4\frac{3}{16}$ " or $85'-3\frac{3}{4}"$ are readily converted by direct reading to 110.7 mm and 25.99 metres respectively.

Size $5\frac{3}{4}$ " dia. in attractive case.



Weight Conversion Model M.4

AVOIRDUPOIS to METRIC

This is similar to Model M2 but converts weight in tons, cwts, quarters, pounds and ounces to kilogrammes and tonnes, and vice-versa.

The scaling is such that a weight of say 2 cwt 1 qr $10\frac{1}{2}$ lbs can easily be converted by direct reading to 119.1 kg. The construction gives high accuracy quite simply by setting the cursor to the known weight and reading opposite it the metric equivalent. This degree of accuracy amply meets most commercial and industrial needs and the calculator is easily used by unskilled personnel.

The instrument is double-sided, handling 0 ounces to 5 cwt on one side and 5 cwt to 50 tons on the other.

Size $5\frac{3}{4}$ " dia.

COMBUSTION EFFICIENCY CALCULATOR

The efficiency of a boiler is determined largely by the heat lost to any excess air supplied and the loss in high temperature flue gases.

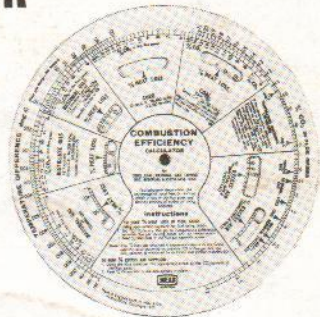
This calculator determines this efficiency from the CO_2 content of the flue gas and the flue gas temperature. At the same time it also indicates the percentage of excess air being supplied.

NOTE: The calculator is based on Gross Calorific Values.

Gives answers for coal, coke, Towns gas, natural gas, fuel oils — residual and distillate.

Metric model only

Size $5\frac{3}{4}$ " dia. single sided, complete in plastic case.



M. H. MEAR & CO. LTD.

CALCULATOR PRICE LIST

DECEMBER 12th, 1988

Catalogue Page No.		Prices not including V.A.T.
Page 3	Domestic Central Heating Calculator Warm Air Heating Calculator	£19.80 £18.40
Page 4	Industrial Heating Calculator Ducting Calculator	£21.10 £18.40
Page 5	Packaged Air Conditioning Calculator Psychrometric Calculator	£29.30 £20.90
Page 6	Pipe Flow Calculator Streamline Flow Calculator Orifice & Nozzle Flow Calculator	£19.80 £10.60 £21.10
Page 7	Water Flow Calculator Gas Flow Calculator for Cast Iron & Steel Pipes Gas Flow Calculator for Plastic Pipes Steam Flow Calculator	£20.80 £16.70 £17.00 £20.50
Page 8	Steelwork Weight Calculator Metals Weight Calculator	£16.30 £15.40
Page 9	Universal Metals Weight Calculator Electric Lighting Calculator Electric Wiring Calculator	£19.80 £15.40 £ 8.50
Page 10	Probability & Statistical Calculator Timber Calculator	£20.80 £18.40
Page 11	Helical Spring Calculator Spring Weight Calculator Torsion Spring Calculator Brick, Blockwork & Concrete Calculator	£22.80 £17.00 £17.80 £ 7.80
Page 12	Feet & Inches to Millimetres Calculator M2 Weight Conversion Model M4 Avoirdupois/Metric Combustion Efficiency Calculator	£ 5.80 £ 5.80 £ 8.50

PLEASE ADD V.A.T. TO THE ABOVE PRICES WHEN SENDING CASH WITH ORDER
PLEASE STATE WHETHER IMPERIAL OR METRIC MODELS ARE REQUIRED