

Abrasion Testing

Surface Abrasion Testing.

Standardised Abrasion Tester for the Determination of Glazed Ceramic Surface Resistance.

Designed to carry out tests in accordance with the P.E.I. (wet) method of European Norm EN154 and ISO 10545 part 7. The test involves exposing the glazed material to the abrasive action of a charge comprising balls of different diameters with the addition of corundum and distilled water (P.E.I. method). The different abrasion stages are achieved by programming the machine at an increasingly higher number of revs, with fixed instrument speed as required by the standard. Later on, a visual analysis of the test result will classify it in the various abrasion groups envisaged by the method.

The machines are supplied with 3 PEI abrasive charges and 0.5kg of corundum for each rotating head along with 3 sealing gaskets. (Each abrasive charge can be used 10-15 times depending on the average number of revolutions made during the cycle.)

(For 400V, three phase, 50Hz supply).

Product codes.

Model PEI/300/C, with 3 rotating heads (above right)

Model PEI/100/C, with 1 rotating head (right)

Mechanical variable speed unit

PEI complete abrasive charge (0.2kg)

FEPA 80 Corundum (1 kg)

Pack of 10 calibration float glasses 105 x 105 x 6mm



Art. 01CI0104

01CI0104
01CI0103/1
01CI0103/6/1
01CI0101/A
01CI0101/B
01CI0101/1



PEI-BOX Viewing Cabinet

The PEI-BOX cabinet has been especially designed to check the level of abrasion on glazed ceramic tiles in accordance with ISO 10545 part 7 and ASTM C1027-99 (2004).

The inside of the instrument is painted in "neutral grey" as required by the standards. To carry out the test, place the PEI-BOX instrument in a dark room, and place the abraded tile of 100x100mm in the centre surrounded by 8 unabraded tiles of the same dimensions. Write on the marked face the r.p.m. corresponding to the abrasion made.

Observing the tile specimen from a distance of 2 m and a height of 1,65 m it is possible to see the difference between the tile abraded and the other unabraded tiles.

To ensure that the test is true, the witness of at least three observers is required

Overall Dimensions: 700 x 650 x 630mm
LED Illumination with colour temperature of 6000K



Art. 01CI0170/1

Product Code:

PEI-BOX Cabinet

01CI0170/1

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ISO 9001:2008
Certificate 23478

Depth Abrasion Testing.

Standardized Depth Abrasion Tester, Model AP/10.

The AP/10 is an instrument for the depth abrasion determination of unglazed ceramic tiles, to meet the standards of European Norm EN102 and ISO 10545-6. The test consists of exposing the sample to the abrasive action of a steel disk rotating against the surface while corundum is fed from the fixed hopper at a given rate between the disk and the sample surface. At the end of the cycle the trace chord length is measured, and the volume of material removed is calculated, giving the comparison parameter for test classification. The latter will act as the benchmark parameter for test classification.

The instrument can also be used for deep abrasion tests of glazed ceramic tiles (non-standard test). In this case, the machine is programmed to turn at an increasingly higher number of revs, with fixed instrument speed, until the body appears. The benchmark parameter will be the number of revs required to remove the layer of glaze until the body becomes visible.

General characteristics

- Epoxy powder painted sheet metal structure. Vibration-damping feet.
- Drawer for collecting the corundum used during tests. 600 cc corundum container. Corundum fall system operated automatically.
- The steady pressure of the test sample on the abrasion disk is achieved by a system of counterweights, thereby allowing the equipment to be used on a normal laboratory table.



- The test sample is fastened with 2 clamps.
- Automatic test cycle.
- Programming by means of an electronic control panel with LCD display.
- Safety front door with microswitch.

Supplied with 2 kg of FEPA 80 corundum.

230V single-phase 50 Hz.

Overall dimensions: 61 x 65 x 74 cm.

Net weight: 52 kg.

Product Code.

Model AP/10 Depth Abrasion Tester.

Standardised replacement disc, net weight 2.5kg

FEPA 80 corundum 1kg

Calibration tile, (transparent fused silica,
size 100mm x 100mm x 3mm)

01CI0107

01CI0106/A

01CI0101/B

01CI0108

Autoclaves GT series (Craze Testing)

AUTOCLAVE GT series

Autoclave for crazing test of glazed ceramic tiles, maximum sizes 350x365 mm or 550x625mm, according to UNI EN ISO 10545-11, BSI standard.

Laboratory instrument for the cracking test (micro-cracking of glaze) on tiles after water-steam, test by the use of a coloured substance over the glazed surface. The pressurized sample-holder is all made from stainless steel AISI-304 suitably insulated with rock-wool, while the supporting frame from steel, epoxy painted.

Thanks to the programmable microprocessor the unit can carry out a serial of standardized cycles in conformity to UNI EN ISO 10545-11 norm but also custom-wanted cycles as the user may wish to do.

"Crazing" is formed by small cracks appearing in the glazed surface of the test piece. The resistance to crazing is determined by subjecting the test piece to high pressure steam in the tank. Once the cycle is complete a coloured dye is washed over the glazed surface and wiped off. If crazing has occurred, the dye will enter the cracks and will remain after the excess is wiped off.

General features:

- Container made all stainless steel AISI-304
 - Working cycle standard program according to UNI EN ISO 10545-11 norm and personalized cycles.
 - Max working pressure: 10 bar (183.2° C)
 - Electrical heating with minimum inertia
 - Cooling by coil water controlled by a solenoid valve
 - Cover closing by means of hand small wheels and VITON gasket
- Net weight 230 kg.
Supplied tests holding basket in AISI-304.



	GT-350	GT-560
Internal Dimension	350mm diameter x 350mm high (43 ltr)	550mm diameter x 625mmhigh (157 ltr)
Overall Dimensions	800 x 750 x 1250mm	1150 x 1050 x 1500mm
Power supply	400V, 50Hz three phase, 3.1kW	400V, 50Hz three phase, 9kW
Weight	230kg	520kg

Autoclave GT-350

Autoclave GT-560

Replacement heating element (GT-350)

Replacement heating element (GT-560)

Pressure gauge (0-16 bar)

Safety Valve

Product Code

01GT0140

01GT0150

01GT0141

01GT0147

01GT0142

01GT0143

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Laboratory Filter Press (Baroid)

The Low Pressure Filter Press is the most effective means of determining the filtration characteristics of sludge, cement mortars, ceramic slips etc.

The Filter Press assemblies consist of a reservoir mounted in a frame, a pressure source, a filtering medium and a graduated cylinder for receiving and measuring filtrate.

The Filter Press Units are constructed of anodized aluminium, stainless steel and chrome plated brass. The working pressure is 100 psi (7.03 kg/cm²) and the filtering area is 7.1 in² (45.80cm²)

Each kit is made up from a basic unit filter press (30000), 25ml graduated cylinder (CY100-18) and box 100 filter papers 9cm diameter (FB250-28) and the following extra parts:

CO₂ Pressurising Assembly (shown right)
3ft air hose, regulator and bleeder valve

Model 30201
Model 30101

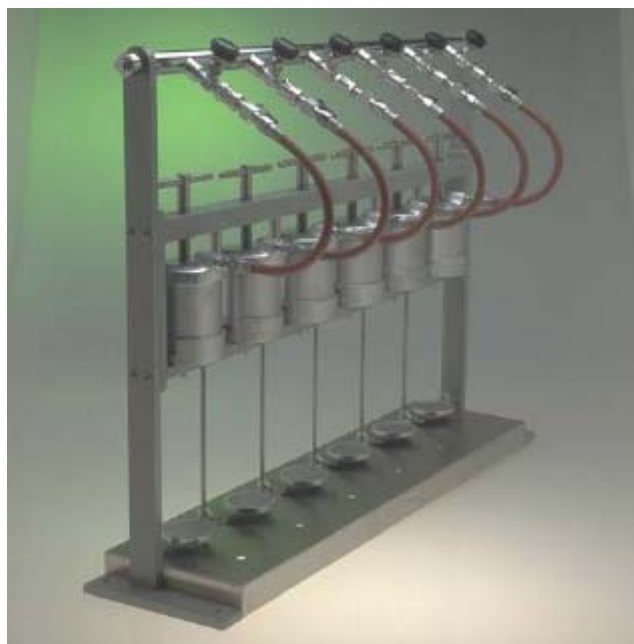
Options: Pack 12 CO₂ cartridges.



Other Models available:

Wall Mounted Unit **Model 30800** (left)

The Wall mounted unit is ideal for situations where bench space is at a premium. This package is the same as 30201, except the standard filter press 30000 is replaced by wall mounted filter press 30600.



Multiple Unit Filter Presses.

Multiple unit filter presses permit simultaneous running of one to six filtration tests. Each of the assemblies consists of a frame with the indicated number of complete filter cells. Manifolds are complete with air hoses, cut-offs and bleeder valves, but do not include pressure regulator hoses, such as No 34265 for connection to compressed air.

Model 31100

Six unit filter press complete with manifold

Model 31300

Four unit manifold complete with manifold.

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Calcium Carbonate Testers (Calcimeters)

CALCIUM CARBONATE TESTERS

Used to determine the percentage of calcium carbonate in the clays used in the ceramic tile and brick industries or in other products such as limestone, marl, soils in general, sands, etc..

They normally comprise of a container in which a reaction takes place between the calcium carbonate and diluted hydrochloric acid (HCl), with the formation of carbon dioxide (CO₂). The carbon dioxide is proportional to the amount of calcium carbonate contained in the sample being tested and, therefore, the determination of its volume allows the percentage of the carbonate in the sample to be established. The carbon dioxide is collected and measured in an appropriate device connected to the above-mentioned container.

Calcium Carbonate Tester - Pizzarelli Design

This Pizzarelli system comprises of a support, a volumetric container (0 -100 ml), breather pipe, upper reagent container, 5 cc test-tube for samples. Overall height: 680 mm. Net weight 0.7 kg

Accessories set for above, comprising of:

1l bottle of distilled water;

2 spare test-tubes;

250 cc plastic graduated beaker;

250 cc and 500 cc wash bottles;

105 mm long stainless steel tweezers;

Tube of silicone grease;

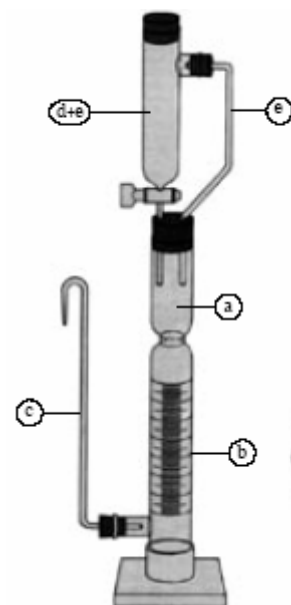
125 cc bottle of green fluorescent liquid for colouring the water in the graduated container.

Hydrochloric acid 37%, 1 litre pack.

Part Number 22CI0650

Part number 22CI0651

Part number 1018H



Calcium Carbonate Tester – Dietrich Frühling Design Part Number 22CI0652

This comprises a support with metal bars, samples bottle, test-tube for reagent, a graduated glass beaker for cooling water, a cooling coil, a volumetric container (0 -200 cc) and a levelling container or returned water collector.

Overall dimensions 400x220x1000 mm. Net weight 12 kg

Set of testing accessories for the above comprising:

1l bottle of distilled water,

2 spare test-tubes,

250 cc plastic graduated beaker,

250 cc and 500 cc wash bottles,

120 mm long stainless steel tweezers,

Tube of silicone grease

125 cc bottle of green fluorescent liquid for colouring the water in the graduated container.

Hydrochloric acid 37%, 1 litre pack.

Part number 1018H

Spare parts for the above:

Test-tube for reagent:

Samples bottle complete with cap and small glass pipe:

Graduated volumetric container:

Returned water collector

Colour Measurement (Spectrophotometer)

CM2600d Spectrophotometer (Spectral Type)

A well proven portable spectrophotometer with unprecedented intuitive and comprehensive user interface combined with many innovative technical features which expand the boundaries for on site colour quality control in production.



The CM-2600d portable spectrophotometer has become the instrument of choice for thousands of users world-wide due to its ergonomic and intuitive design, and unprecedented ease of use. Single handed operation, the exclusive "Navigation wheel", the unique sample observation device and the large data information display, combined with world's "first" technology in simultaneous numerical gloss control and numerical UV control are the main highlight features of this portable spectrophotometer.

Information Centre

Displaying data graphically or numerically, it shows you all the facts about the measured colour at a glance. Whether it is simple Pass/Fail indications, colorimetric data with descriptive colour difference, or L*a*b* colour graph with either box or elliptical tolerances, one is in control at any time. The internal software contains all necessary colorimetric equations and standard light sources to cover different tasks as well as numerous industry and application specific indices. The internal software communicates in six languages (English, German, French, Spanish Italian and Japanese) and thus is prepared for an international colour communication network. Sample observation for precise targeting of small specimens has never been as simple as with the CM-2600d. With one

touch and even on very dark samples, the very bright special illumination LED allows comfortable and true sample viewing.

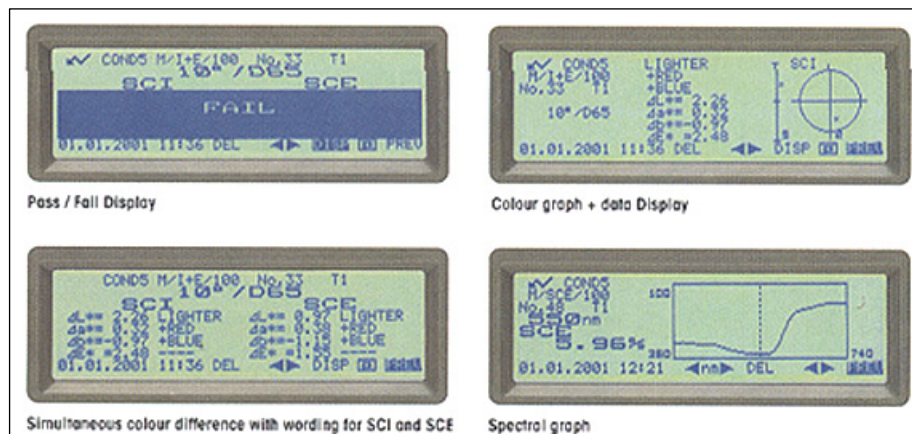
The Exclusive Task Function

Routine instrumental quality checks in production can only work if the process is easy to carry out by everyone. This is why the CM-2600d is equipped with the exclusive "Task-Function". In combination with the optional QC Software SpectraMagic NX, one has access to an unprecedented simple to operate function, to cover repeated routine measurements on the production line.

The operator just executes the Task and follows the instructions appearing on the display, selectable from six different languages.

Simple yet sophisticated

The CM-2600d combines very simple, comfortable and intuitive use with the highly sophisticated and patented Innovative Optical System to meet the highest expectations for colour measurement in Quality Assurance of almost any application. Initially launched with the benchtop spectrophotometer CM-3600d series, this innovative technology, built into a d/8° sphere, includes Numerical Gloss-Control (NGC) and, now available for the first time in a portable instrument, numerical UV-Control (NUVC). Together with the high energy xenon flash illumination and the high resolution monolithic dual beam monochromator, the entire optical system is free from moving parts and therefore guarantees substantial advantages in ruggedness and reliability.



Unequaled: Numerical Gloss Control

The Numerical Gloss Control (NGC) which, for each measurement, provides simultaneous data with specular component included (SCI) and excluded (SCE). Instead of mechanical moving parts, NGC sequentially fires two xenon flashes, for SCI and SCE. At any time, you can show both measurement results in the display of the CM-2600d. The advantages of NGC technology lies in its superior optical results as well as the absence of any moving parts making the CM-2600d rugged enough for portable applications.

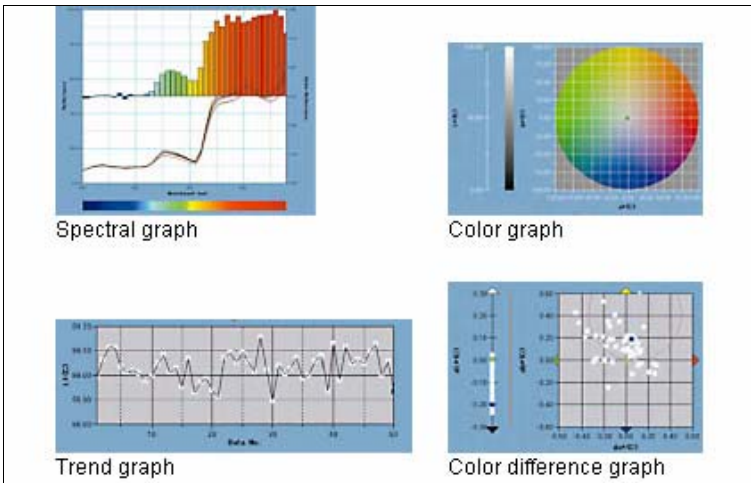
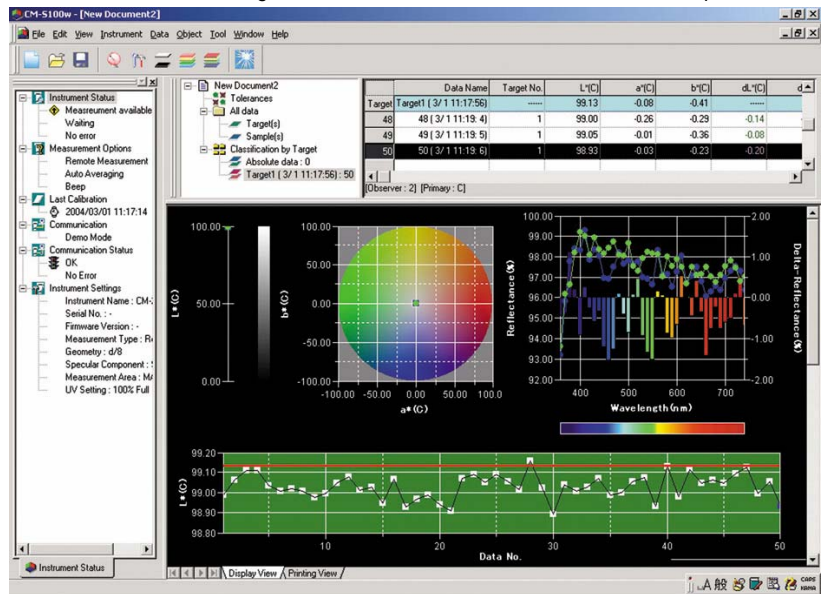
Two measuring apertures to cover all sample sizes

The CM-2600d offers great flexibility of use with two interchangeable measurement apertures with Ø 8 mm (MAV) and Ø 3 mm (SAV). Changing the aperture mask is very easy and quick. The two lens position settings guarantee perfect data correlation with both apertures. These two apertures enable to measure samples of all size and shapes and avoid taking time consuming average measurements on structured surfaces or faulty results on small samples.

SpectraMagic NX QC Software.

Colour measurement and control for all industries, such as, Food, Plastics, Paint & Coatings, Cosmetics, Pharmaceuticals, Textiles, Graphic Arts, Construction, and Transportation. Whether your colour control involves incoming raw materials, in process production or out-bound colour critical goods and materials, SpectraMagic™NX makes it easy to inspect and control colour. Utilize pre-defined screen templates for Pass/Fail assessment, statistical process control, and sophisticated R&D analysis. Or, design your own screen layout based on your particular industry and/or application. Each graph type (colour, spectral, colour difference or trend), as well as the data list, can be scaled to the desired size with total ease. SpectraMagic™NX - lots of options to help you choose just what's right for you.

As a world first", SpectraMagic™NX allows you to insert digital pictures to your measurement data and mark the exact measuring spot, thus opening totally new dimensions to colour communication with customers and suppliers. The Data List View allows you to swiftly export measurement data into Excel using the copy and paste function. Any graph can be copied into a spreadsheet by "drag and drop" method. Reports can be customized to show color data in a format that meets end user requirements. Furthermore, SpectraMagic™NX can share data within a local area network (LAN) and operate under Windows 98, SE, NT4, 2000 Professional and XP Professional.



Comprehensive graphs and color difference assessments
SpectraMagic NX helps you to make color quality control easy and comprehensive at once. You can choose from several graphs together with the latest Pass/Fail color difference assessments equations, such as CIE 1994 or CIE DE2000 and several industry related indices. Tolerances, both in box or elliptical form can be automatically calculated or manually adjusted to approved standards. Furthermore, SpectraMagic NX features a "User Index" function that allows you to configure up to 3 customized color equations to meet industry-specific requirements for color evaluation. Auto Target is an additional feature that makes QC with SpectraMagic NX so easy and fast.

Specifications	
Illuminating / viewing system	d/8 (diffused illumination, 8-degree viewing angle), equipped with simultaneous measurement of SCI (specular component included) / SCE (specular component excluded). Conforms to DIN 5033 Tei17, JIS Z 8722 Condition C, ISO7724/1, CIE No.15, ASTM 1164
Detector	Silicone photodiode array (dual 40 elements)
Spectral separation device	Diffraction grating
Wavelength range	360nm to 740nm (10nm pitch)
Measurement time	Approximately 1.5 seconds
Light source	3 pulsed xenon lamps (2 xenon lamps for CM-2500d)
Measurement / illumination area	MAV: Ø8mm / Ø11mm, SAV: Ø3mm / Ø6mm (selectable between MAV and SAV).. MAV only for CM-2500d
UV adjustment	Instantaneous adjustment (no mechanical adjustment required). CM-2500d does not have UV adjustment function
Observation	2/10 degrees
Observation light source	A, C, D50, D65, F2, F6, F7, F8, F10, F11, F12 (simultaneous evaluation is possible using two light sources)
Color space / colorimetric data	L*a*b, L*C*h, CMC (1:1), (2:1), CIE94, Hunter Lab, DIN99, Yxy, Munsell, XYZ, MI, WI (ASTM E313), WI/Tint CIE (Ganz/Griesser), YI (ASTM E313/ASTM D1925), ISO Brightness (ISO 2470), Density status A/T
Data Memory	700 (SCI/SCE as a set)
Standard accessories	White calibration plate, Target Mask 8mm Ø, Target Mask 3mm Ø (not CM-2500d), RS-232c cable, AC Adapter, 4 batteries
Optional extras	Hard case, Dust cover set, Dust cover, SpectraMagic QC software, Zero calibration box CM-A32

Product Options

- CM2600d** with two interchangeable measurement apertures with Ø 8 mm (MAV) and Ø 3 mm (SAV).
CM2500d the lower cost option: same simplicity and same performance but without the following features:
 No UV adjustment; 8mm aperture only



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Colour Difference Measurement

CR-10 Colour Difference Reader

The CR-10 is the latest innovation in the field of colour difference measurement.

The CR-10 is designed to compare two colours and to identify where they differ and by how much. In-line colour control and shade sorting becomes very fast and easy with the line operators being capable of routine Q.C. inspections. Unlike other inexpensive colour comparators the CR-10 displays the internationally recognised Lab or Lch colour notation schemes.

Features:

Very compact design, weighs only 360g.
Single handed operation
Colour difference displayed in terms of $D(L^*a^*b^*)$ or $D(L^*C^*h^*)$
Printer output option
Mains powered option
Inter instrument agreement better than 0.3DE (matched instruments are available on request).



Technical Specifications.

Illuminating / viewing geometry	8/d, (8° illumination angle with diffuse viewing)
Measuring area	8mm diameter
Light source	Gas filled tungsten lamp. CIE Standard illuminant C
Display modes	$D(L^*a^*b^*)$ / DE^*ab or $D(L^*C^*h^*)$ / DE^*ab
Target colour memory	1 channel, set by the operator
Measurement range	L^* 10 to 100
Measurement conditions	CIE 10 standard observer
Repeatability	Standard deviation within DE^*ab 0. (average of Readings on a white tile)
Measurement speed	Approximately 1 second
Power source	Four AA- sized batteries
Battery life	Alkaline-manganese type: approx. 2000 readings, Ni-Cd type: approx 600 read.
Display	16 character by 2 row dot matrix LCD
Working temperature range	0 to 40 C, less than 85% RH
Storage temperature range	-20 to +40 C
Dimensions (WxHxD)	59x158x85mm
Weight	360g (not including batteries)
Supplied with	Soft carrying case, protective cap, wrist strap, four AA batteries

Order Codes:

CR-10 colour comparator	CR-10
Mains AC adapter	AC-A12
Printer connection cable	CR-A75

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Whiteness Measurement

CR-14 Whiteness Measuring Instrument.

The Minolta CR-14 Whiteness Index reader checks the whiteness of foods or raw materials, (solids, pastes or powders).

Whether an item's colour is good or bad can influence consumer purchases. Since colour variations of white are especially obvious, it has become increasingly important to control colour from raw materials through the manufacturing process. Furthermore, there is a growing need to quantify what effect storage during transportation has on the whiteness of a product.

Small colour variations of white are especially obvious but difficult to quantify objectively. The Color Reader CR-14 allows you to control the shade of white, near white and yellowish products such as foods and raw materials easy and with precision. To do so, the CR-14 uses the internationally standardised and well known Whiteness and Yellowness Indices from CIE, ASTM and Hunter. Alternatively, you can also display measured values in Y x y (CIE31) colour coordinates.

The CR-14 can handle any products in solid, pasty or even powder form and thus is very flexible. In order to prevent it from dusty environment, the measuring aperture is covered by an optical glass - alternatively you can also use the optional vinyl protection cover. Like all Color Readers, the CR-14 is very simple to use, compact, light-weight and battery-operated

Simple Operation: Only the functions for use are provided. Even first time users operate it easily.

Switch on power

Select the display mode

Perform white calibration

Place on sample and press button

Read measurement result from display.



Compact size and light weight: The compact design fits in the palm of the hand. The CR-14 is also battery operated so that it can be taken almost anywhere.

Functions for convenient measurement: Protective cap allows direct measurement of powders or pastes; serial printer output; either four AA-sized batteries or AC adapter can be used; vinyl cover (optional accessory) protects CR-14 against dust.

Specifications

Illuminating / viewing geometry	8/d (8° illumination angle / diffuse viewing; specular component excluded)
Measuring area	Approximately 8mm diameter
Display modes	Whiteness Index: CIE, Hunter, ASTM E313 Yellowness Index: ASTM E313, ASTM D1925 Yxy (displayable in CIE display mode)
Repeatability	Standard deviation of Whiteness Index: CIE: 0.5, Hunter: 0.1, (Measurement conditions: when measuring white calibration plate)
Min. interval between measurements	Approximately 1 second
Power source	Four AA-sized batteries or optional AC Adapter AC-A12
Battery life	Alkaline manganese: approx 2000 measurements at 10 second intervals Ni-Cd batteries: approx 600 measurements at 10 second intervals
Operating temp. range	0 to 40°C (32 to 104°F) less than 85% relative humidity, no condensation
Storage temperature range	-20 to 40°C (-4 to 104°F) no condensation
Standard accessories	White calibration plate CR-A474, soft case CR-A68, protective cap CR-A79, wrist strap CR-A73, AA-size batteries (4)
Optional accessories	AC Adapter AC-A12; printer cable CR-A75; vinyl cover CR-A80
Weight & dimensions	370g (not including batteries), 59 x 159 x 85mm

Gloss Measurement

Gloss Meters

Increasingly specifications and standards require a physical assessment of gloss. Gloss measurement is necessary to monitor the uniformity, compatibility or possibly the deterioration of any protective gloss finish.

Gloss is measured by directing a constant intensity light beam at an angle to the test surface and monitoring the reflected light. Different surfaces require different reflective angles. Novo-Gloss glossmeters cover the range necessary to measure any surface from high gloss to matt, providing a quantitative value to gloss measurement.

Each Novo-Gloss™ Glossmeter is available in statistical versions, single, dual or triple angle geometry. The 406 is available as single or dual angle models. Each has a memory of up to 200 readings which can be connected to the Novo-Soft™ Software for further analysis and archiving.

Features:

- Gloss readings from matt (non-reflective surfaces) to mirror finish
- Continuous measurements for variable surfaces
- 200 reading memory
- Unique calibration tile condition warning
- Quick, automatic calibration
- Menu driven operation in multiple languages
- LED light source is long lasting and stable
- Full traceability to National Standards, including BAM.



Specifications and Shipping List

Novo-Gloss 406: Glossmeter, Carry Case, Calibration Standard (Gloss Tile), Cleaning Cloth, Qucik Start Guide, Alkaline Batteries, Screwdriver, Novo-Soft™ QA Software, Data cable and BAM traceable Calibration Certificate. Dimensions: 125 x 100x 50mm, weight: 1.1kg

Novo-Gloss 407: Glossmeter, Carry Case, Calibration Standard (Gloss Tile), Cleaning Cloth, Qucik Start Guide, Alkaline Batteries, Screwdriver, Novo-Soft™ QA Software, Data cable and BAM traceable Calibration Certificate. Dimensions: 190 x 100x 65mm, weight: 1.1kg

Measurement Ranges:

60 degree: 0 - 1,000 GU, resolution 0.1 GU, reproducibility ± 0.5 GU
 20 degree: 0 - 2,000 GU, resolution 0.1 GU, reproducibility ± 0.5 GU
 85 degree: 0 - 200 GU, resolution 0.1 GU, reproducibility ± 0.5 GU

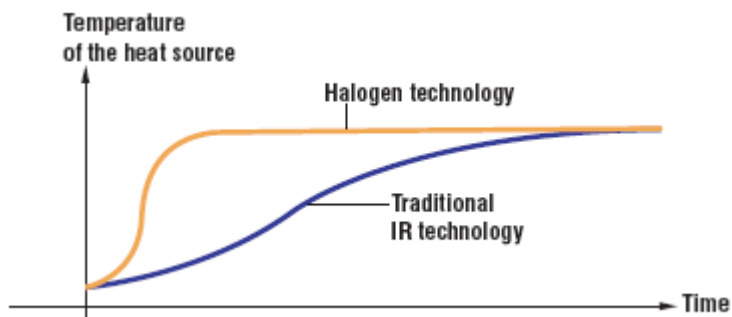
Type	Angle(s)	Example Applications	Operating Standards	Order Code
SINGLE ANGLE	20°	High gloss paint (cars), plastics, varnish, polished metals	ISO 2813 ASTM D523 DIN 67530 JIS Z 8741	J406L-20S
	60°	Universal for paints, metal, anodised Al, plastics & varnish		J406L-60S
	85°	Matt paint and surfaces in aviation, military, furniture and automobile interiors		TAPPI T653 (20° only)
	45°	Anodised Al, ceramics, china & textiles	BS6161 Pt 12 JIS Z 8741 ASTM C346	J406L-45S
	75°	Paper, card & foil	TAPPI T480, JIS Z 8741	J406L-75S
DUAL ANGLE	20° & 60°	Dual & triple angle instruments are suitable for use in each of the applications relevant to the corresponding single angles	Dual & triple angle instruments are supplied conforming to all the standards for the respective angles.	J406L--2060S
TRIPLE ANGLE	20°, 60° & 85°			J407---1

Moisture Determination Balances

Designed to quickly, effectively and affordably measure moisture content, the MB Series Moisture Analysers incorporate state-of-the-art halogen heating with precision weighing technology to give a fast and accurate method for moisture content determination. Perfect for applications in the pharmaceutical, chemical and research industries; versatile and rugged enough for continuous operation in food and beverage, quality control, environmental and many other applications. The MB Series Moisture Analysers feature excellent repeatability properties for consistent accuracy during testing. The MB Series is manufactured to ISO 9001 quality assurance specifications.

Infrared halogen heating technology begins the sample drying process in seconds. The uniquely designed gold reflective interior test area creates uniform distribution of heat to increase performance while decreasing test time.

- Precision Heating – temperature settings are incrementally controlled by the software for test accuracy
- Lighting Startup – test area reaches full temperature in less than 1 minute



Model MB35



Model MB45

The Standard Moisture Analyser MB35

The MB35 is the standard model for moisture determination, leading the industry in performance/value. The MB35 features a maximum sample capacity of 35 g, with a readability of 0.001g and repeatability to 0.03% (10 g sample).

- Intuitive software
- Simple 3 key navigation
- Straightforward one step testing procedure
- LCD display shows % moisture, actual weight, actual temperature and test time

The Advanced Moisture Analyser MB45

For Maximum Value, the MB45 is the standard in high performance moisture content determination.

The MB45 features a sample capacity of 45 g, with a readability of 0.001g and repeatability to 0.015% (using 10 g sample). An integrated database stores up to 50 drying procedures for maximizing productivity, simply recall the test from memory and begin.

- Four selectable automatic drying programs allow for easy one step drying, simply set the temperature and time, and begin
- Four enhanced heating options
- Statistical function for simple tracking and recording of standard deviation over time. The MB45 does all the calculations and provides the end result.
- Operating temperature range from 50° to 200 °C in 1° increments

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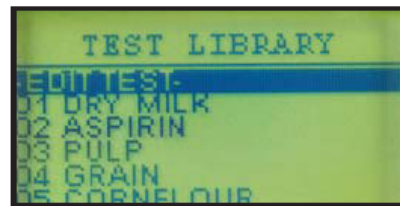
Optimum Performance

Unique Auto Shut-Off Options

- Choice of three preprogrammed end points for automatic test completion.
- Custom design your own test end point criteria.
- Timed tests with audible signal when finished.

Enhanced Heating Options

- Fast – for quickest possible time to temperature.
- Standard – for minimal overshoot while achieving temperatures quickly.
- Ramp – for controlled ramping to temperatures.
- Step – set three temperatures for difficult samples



The Basic Moisture Analysers MB25 & MB23

Speed, Simplicity and Affordability

The new OHAUS MB23 and MB25 Basic Moisture Analyzers combine high quality and durable construction into a sleek, compact design. The MB23 and MB25 offer dependable, accurate, results for a wide variety of applications.

Standard Features Include:

- Flexible Performance –The OHAUS MB23 and MB25 provide accurate results at either 0.1% or 0.05% readability. And with your choice of infrared or halogen heating, they are ideal for textiles, wastewater, ceramics, food and other applications that require IR heating elements and measurements to 0.1% or 0.05%.
- Simple to Operate –Set up and operation is extremely easy. Just press and hold the temperature or time buttons to set drying parameters, add your sample and begin the test process. This makes the MB23 and MB25 ideal for routine tasks performed by operators of all skill levels.
- Compact, Easy-to-Clean Design –The compact footprint (17 x 13 x 28 cm) of the OHAUS MB23 and MB25 is designed to take up less space. Their easy-to-clean heating chamber is ideal for frequent use and inexpensive maintenance.



MODEL	MB45	MB35	MB25	MB23
Capacity	45 grams	35 grams	110 grams	110 grams
Readability	0.01% / 0.001 grams		0.05% / 0.005 grams	0.1% / 0.01grams
Repeatability (standard deviation)	0.05% (3g sample) / 0.015% (10g sample)	0.10% (3g sample) / 0.03% (10g sample)	0.2% (3g sample) / 0.05% (10g sample)	0.3% (3g sample) / 0.2% (10g sample)
Displayed results	% Moisture Content, % Solid content, time, temperature, weight, test ID and drying curve	% Moisture Content, time, temperature, weight		
Moisture range	0.1 to 100% (0.01 to 1000% for regain mode)	0.01 to 100%		
Heater type	Halogen			Infrared Coil
Temperature settings	50 to 200°C (1°C increments)	50 to 160°C (5°C increments)		
Timed mode	1 – 120 minutes (in 10 second increments)	1 – 120 minutes (in 30 second increments up to 60 minutes and 1 minute increments 60 – 120 minutes)	1 – 99 minutes (in 30 second increments up to 60 minutes and 1 minute increments 60 – 99 minutes)	
Output	Bi-directional RS-232			
Operating temperature range	10 to 40°C			
Power requirements	100-120VAC or 220-240VAC, 50/60Hz			
Display type, Size (in/cm)	Graphical 128 x 64 pixel, 2.6x1.3 / 6.6 x 3.3			
Pan size	9cm			
Free height above pan	3cm			
Dimensions (WxHxD)	19 x 15 x 35cm			
Net weight	4.8kg			



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Moisture Testing

Microspear.

If materials are to be used in a process, such as ceramics or concrete manufacture, it is also usually important to know the moisture content before, during and after the process.

The Microspear is used for the fast and accurate water content measurement of bulk materials for industry.

The instrument measures moisture and temperature of minerals and building materials at depths up to six feet (nearly 2 metres) - simply by insertion. The digital readings are shown instantly. It has a built-in computer which gives it the flexibility to handle a wide range of materials and water contents.

Operation

Simply insert and read the display.

The key to the Microspear is the streamlined sensor known for its shape as the warhead. This robust and accurate sensor can penetrate many feet into large loads, which is particularly important as water usually settles in the most inaccessible lower parts of the bulk. The reading is made instantaneously, allowing large quantities of material to be rapidly tested. An 'Averager' facility provides a single reading for the whole of the bulk.



Features

- The ability to rapidly and accurately measure the moisture content of hundreds of tons of material.
- There is no sampling, use of chemicals, balances or ovens.
- Used in any environment where minerals or building materials are being shipped, stored or processed.

With thousands of users in many industries around the world, the simplicity, speed of use and accuracy have made the Microspear the perfect instrument for bulk moisture measurement.



Specification	Moisture	Temperature
Range:	Typically 0—25%	-20 to + 60 °C
Resolution:	± 0.1%	0.1°C
Accuracy:	Better than ± 0.5% of range	Better than 0.5°C
Measurement Technique:	Temperature compensated electric field	BS1904/DIN1751 Platinum resistance detector
Power:	4x1.5V AA batteries (or equivalent)	

Microspear, 1 metre length
Microspear, 2 metre length

Product Code
Product Code

AG001
AG002

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Apparent Density Determination DDA/1

Instrument for determining the apparent density (porosity) of raw ceramic

As the porosity of raw pressed pieces depends on the chemical and physical features of the granulate, its distribution and humidity, as well as the pressing power applied, it is extremely important to know this parameter. This will enable the other variables that contribute towards forming the finished product (i.e. raw and fired mechanical strength, shrinkage etc.) to be determined. Therefore, this method for determining porosity (which allows us to determine the compactness, or the uniformity of compacting, of raw ceramic articles) can be used as alternative, or as a valid support to traditional penetration methods (see Durometer datasheet).

The instrument comprises of a burnished steel base with a mobile aluminium arm and a height adjustable stainless steel system for dipping the sample into a mercury (Hg) bath with fine adjustment.

It is supplied complete 3kg of bi-distilled mercury and a 80mm diameter glass crystallisation basin.

(N.B. An electronic balance with readability of 0.1 grams is also required).



Product Code 01CI4545

Spare Parts & Accessories

3kg Mercury 1440K
Crystallising basin 80mm diameter BF505-15

Electronic Balance (below) SPU4001.

Featuring easy-to-use two-button operation, a high-contrast LCD display, multiple weighing units, four application modes, and the option of either RS232 or USB connectivity,

- **Easy to Clean** – Removable stainless steel weighing platform, sealed front panel and moulded spill ring.
- **Battery or AC Power** – Uses 4 "AA" batteries with auto shut-off feature for 40 hours of operation, or included AC powerpack.
- **Multiple Weighing Units** – Including grams, kilograms, pounds, ounces, a combined pound:ounce display, troy ounces and pennyweights
- **Integral Weigh-Below Hook** – Critical for density or specific gravity determination

Maximum capacity:: 4,000 grams

Readability: 0.1 grams

Weighing platform size: 165 x 142mm



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Durometers

DM/34 Series Durometers

DM/34 SERIES DUROMETERS (Penetrometers)

New stainless steel version. Used to determine the depth of penetration of a flat headed pin into pressed raw ceramic tiles. Indispensable for producers of floor and wall ceramic tiles, especially with single firing processes. A calibrated spring system, with a special reading comparator reset process that needs to be carried out only occasionally, ensures that the relative tile measurements are taken in a few seconds.

The DM/34 penetrometer therefore makes it much easier to carry out daily checks on pressing uniformity. The large stainless steel base makes it easy to perform tests in the centre of the sample, up to a size of 40x40 cm.

The main body and various supports are fabricated from stainless steel with accurate finishes.

Complete with various accessories for use and maintenance, 5 flat head pins with areas of 0.75-1.00-1.50-1.75-2.00 mm², that, together with an additional 3 kg calibrated spring and a special supporting head, allow the instrument to be used on a wide range of pressed materials, from the softest to the hardest.

The DM/34 is supplied with the 1.50 mm² pin and the 4 kg calibrated spring already mounted on the device.

Supplied complete with a wooden container, dimensions 36x48x58 cm. Gross weight: 41 kg.



01CI1830: DM/34-40 fitted with stainless steel centesimal comparator \varnothing 120 mm.

01CI1830/1: DM/34-70, as above but for size up to 70x70 cm.

01CI1832: DM/34-40/E fitted with digital LCD centesimal comparator (pictured above)

01CI1832/1: DM/34-70/E as above but for size up to 70x70 cm.

DM/34-P DUROMETER

As per the previous model, but portable. The instrument is placed on the sample material while a wide base support keeps it balanced. A simple manual lever system is used to apply and remove the pressure of the spring on the test product in order to carry out the penetration test. The instrument is suitable for occasional tests or for checks between different departments or factories. Totally built from rustproof materials such as stainless steel and brass. Supplied complete with 5 flat head pins with areas of 0.75 - 1.00 - 1.50 - 1.75 - 2.00 mm², one 4 kg calibrated spring and one 3 kg calibrated spring for particularly soft bodies. The 1.50 mm² pin and the 4 kg spring are already installed on the instrument.

The instrument is also supplied with various accessories and an elegant wooden case.

Case dimensions: 490x210x100 mm. Gross weight: 7.5 kg.

01CI1831: Model fitted with stainless steel centesimal comparator \varnothing 120 mm (pictured right)

01CI1833: Model fitted with digital LCD centesimal comparator, model PC-440/D.



SPARE PARTS

01CI1830/A:	Pin - area of 0.75 mm ²	01CI1830/D:	Pin - area of 1.75 mm ²	01CI1830/G:	Spring 3kg
01CI1830/B:	Pin - area of 1.00 mm ²	01CI1830/E:	Pin - area of 2.00 mm ²	01CI1830/H:	Analogue scale
01CI1830/C:	Pin - area of 1.50 mm ²	01CI1830/F:	Spring 4kg	01CI1832/A:	Digital scale

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Plasticity / Clay Hardness Testing

CLAY HARDNESS EVALUATION

CLAY HARDNESS TESTER.

The "Payne" Clay Hardness Tester (or Pigsticker) is designed to give an arbitrary value of hardness of clay pugs or pressed clay. Available as two different models, the standard model is used for tableware and general clays. Fitted with a "regular spring" this is the unit that has been supplied for many years. The new CHT005 has been especially developed for use in the heavy clay industries (eg. insulators). This unit has a spring offering up to 2.6 times more compression.



"Standard" Clay Hardness Tester
"Heavy Duty" Clay Hardness Tester

CHT001
CHT005

PFEFFERKORN PLASTICITY MEASUREMENT TESTER

The Pfefferkorn Plasticity Tester is an instrument for evaluating the workability of ceramic materials.

The measurement is based on the falling of a calibrated plate on to an underlying test body, which has previously been shaped using the special forming tool provided with the instrument.

The plasticity tester has two reading scales:
One measures the deformation in mm.

The other determines deformation of the test body according to the Pfefferkorn tests.

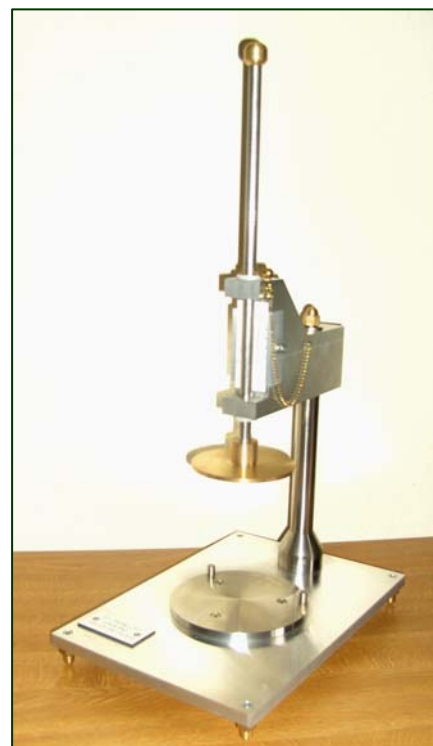
Overall dimensions: 26 x 38 x 54cm

Net weight: 19kg

PFEFF001: Pfefferkorn Plasticity Tester (as described above)

Spare parts:

PFEFF002 Replacement test body shaping tool.



DUROMETER - MODEL DM/34.



Instrument devised for determining the penetration depth of a flat headed point on green and pressed ceramic tiles. The basic device is for the production of floor and wall ceramic tiles, with particular reference to single firing.

The use of the DM/34 makes daily testing considerably easier.

The large stainless steel base allows for central testing of samples up to 400mm x 400mm.

Complete with various accessories (5 flat head points of 0.75, 1.00, 1.50, 1.75 and 2.50mm², a 3kg calibrated spring and a special supporting head) which allow testing on a wide range of materials from very hard to very soft.

The unit is supplied with a 1.50mm² point and a 4kg calibrated spring fitted as standard.

Fitted with dial gauge Comparator (pictured right)

01C1830

Fitted with an LCD digital Comparator

01C1832

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Impact Testing

Impact / edge test hammers have been designed to measure the resistance of ceramic tableware items to the effects of impact applied to the samples.

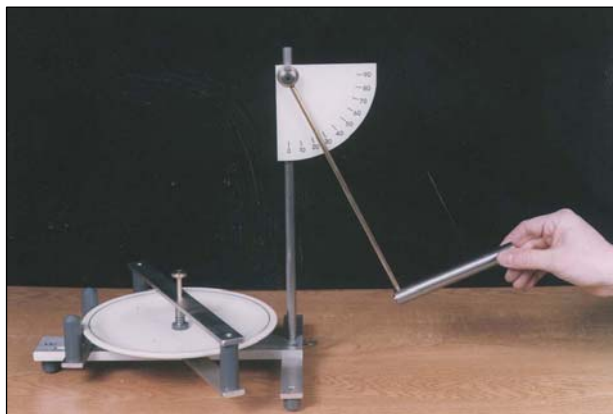
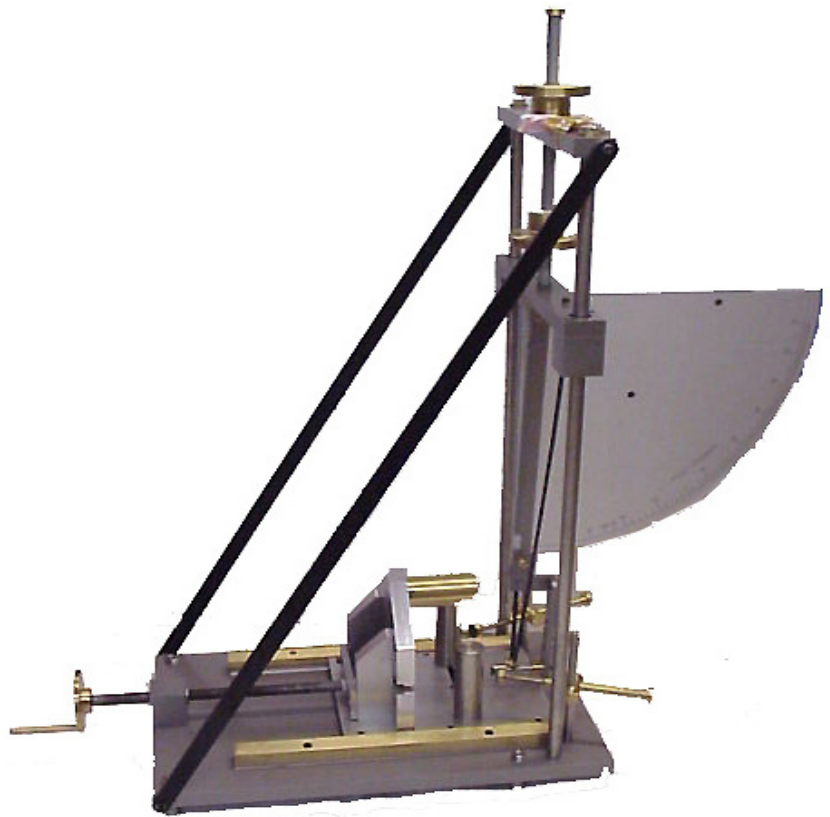
Impact Test Hammers.

One dual scale machine is now available for carrying out impact tests according to A.S.T.M. test method C 368, the lower scale for bone china domestic tableware, and the heavier for carrying out tests on more robust ware (e.g hotelware).

The impact tests are carried out on either glazed or unglazed samples at the centre of both flatware and hollow ware, at the rim of hollow ware, and edge chipping tests at the rim of flatware.

The tests at the centre of the specimen are carried out to determine: (a) the magnitude of a blow that will be required to produce an initial fracture and (b) the amount of energy necessary to produce complete failure.

The impact test at the rim of hollow ware is similar to a chipping test, and the type of failure that is obtained is useful in evaluating the effect of the shape of the object.



Edge Chipping Testers.

The Payne Edge Chipping Tester has been developed as a low cost "in-house" test instrument to give a reproducible indication of edge chipping resistance.

The hammer head is fitted to the end of a pendulum arm, which is manually withdrawn to a pre-designated point against the scale, and then released.

Any damage which occurs should be visually measured and recorded against other samples.

IMPACT TEST

Instrument for the determination of the resistance to the impact of the ceramic tiles according to **UNI EN ISO 10545-5** standard.

Determination of the coefficient of restitution by dropping a steel ball from a fixed height onto the test specimen and measuring the height of rebound.



Technical specifications:

- .Construction all stainless steel AISI-304
- .Chrome steel ball $\varnothing 19 \pm 0,05$ mm
- .Microphone to measuring the rebound
- .Supply: 240 V—50/60 Hz single phase

Equipment:

n° 5 blocks for instrument calibration

Accessories / Spare parts:

- GT0807 n° 5 blocks for instrument calibration
- GT0984 Kit for test accordingly ASTM standard
- GT0808 Kit for test accordingly UNI EDL 294 standard

Code	Model	Overall dimensions	Power	Weight
GT0806	Impact Test	600 x 600 x 1700mm	55W	50kg

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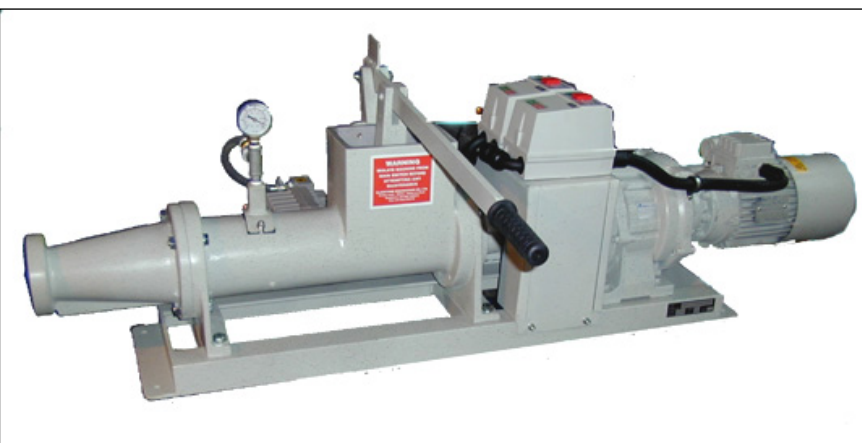
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Pugmills (Extruders)

G-SERIES PUGMILLS

All G-Series Pugmills are constructed on the same principle, aluminium bodies which are detachable for easy cleaning, non-rusting individually adjustable blades are fitted as standard to the pug shaft which in turn runs in two taper roller bearings (on some models). These bearings which are protected from the clay by an oil seal and retaining plate which must make G-Series pugmills the best engineered on the market. Safety is another important feature of G-Series pugmills and it is our policy to provide maximum safety without compromising the performance of the machine. All G-Series pugmills are fitted with thermal overload protected starters and safety limit switches which control the motor, when the loading hopper is raised or lowered making them very easy to use, some models are fitted with fixed finger guards in the hopper for protection . Key operated



lockout switches can be supplied as an optional extra if required. Another important feature for convenience of the operator is that the handle assembly on the 50mm and 75mm outlet pugmills is in line with the pugmill body thereby avoiding the handle sticking out into the workshop



gangway and also making it impossible to tilt the pugmill over when pressure is applied to the handle.

The vertical pugmill G53 has been developed from the G52 to enable it to operate in the vertical plane. The hopper system has been designed for maximum safety and simplicity of operation. The G53 vertical pugmill is entirely self supporting being located on strong box section girders and securely mounted onto a wide steel platform which only has a 600 mm x 600 mm foot print saving valuable space in the workshop or studio.

De-Airing Pugmills

Through continuous research and development and the use of only high quality materials we are able to offer a machine that can give continuous production of a well de-aired plastic body with the minimum of maintenance.

All G-Series de-airing pugmills incorporate alloy bodies and blades and are fitted with high quality vacuum pumps and drive units, safety limit switches and overload protected switchgear.

A unique feature of G-Series de-airing pugmills is that they all incorporate a anti-feedback tube system within the de-air chamber, this prevents the clay being pushed back and blocking the vacuum chamber and also because of its unique design G-Series is also able to offer a vertical de-airing pugmill which gives all the features of a de-airing pugmill with the space saving advantages of a vertical pugmill and the ability to produce unheard of quality in hollow extrusions.

Ref No.	Description	Length (mm)	Width (mm)	Height (mm)	Weight (kg)	Output (Kg/h)
G48	50mm de-air, horizontal	1260	310	460	65	220
G51	50mm, horizontal	1260	230	460	55	260
G52	3", horizontal	1300	230	460	71	360
G53	3", vertical	711	609	1960	123	360
G76	3" de-air, horizontal	1600	230	460	145	320
G77	3" de-air, vertical	610	610	2150	185	360
G54	4" de-air, horizontal	1800	320	670	220	500
G55	4", vertical	760	210	2300	200	700
G57	4", horizontal	1800	320	670	200	700

GE SERIES PUGMILLS

The GE range of pugmills has been specifically designed for the studio and classroom environment. All GE-series Pugmills are constructed on the same principle, aluminium bodies which are detachable for easy cleaning, non-rusting individually adjustable blades are fitted as standard to the pug shaft which in turn runs in two taper roller bearings (on some models). These bearings which are protected from the clay by an oil seal and retaining plate. All GE-series pugmills are fitted with thermal overload protected starters and safety limit switches which control the motor, when the loading hopper is raised or lowered making them very easy to use. Some models are fitted with fixed finger guards in the hopper for protection. Key operated lockout switches can be supplied as an optional extra if required. Another important feature for convenience of the operator is that the handle assembly on the 50mm and 75mm outlet pugmills is in line with the pugmill body thereby avoiding the handle sticking out into the workshop gangway and also making it impossible to tilt the pugmill over when pressure is applied to the handle.

G49/51E: These machines being both compact and lightweight make them easily transportable. The G49E is fitted with a hopper safety grid and thermal overload safety switch as standard. The G51E is the same model as a G49E but is fitted with a interlocked hopper safety switch. This switch together with its high torque motor makes the pug mill extremely easy to load as there is no safety grid in the hopper to impede the flow of clay. When the loading handle is raised the machine switches off and then on again when the loading handle is lowered

G50/52E: The G50E is the same compact design as the G49E but has a larger 150 mm barrel with a 75mm outlet. The G50E has a greater output and due to its larger hopper is easier to use than its smaller cousin, the pug mill is supplied as standard with a thermal overload switch. The G52E is the larger version of the G51E and has the same easy loading hopper fitted with the unique safety interlocked switch.



Ref No.	Description	Length (mm)	Width (mm)	Height (mm)	Weight (kg)	Output (Kg/h)
G49E	50mm horizontal	800	280	470	36.5	190
G51E	50mm horizontal c/w interlock	800	280	470	36.5	190
G50E	75mm horizontal	800	280	500	78	300
G52E	75mm horizontal c/w interlock	800	280	500	78	300

Specialised Pugmills

Tile Extruder G70

The G70 tile extruder is a very versatile machine. Besides extruding tiles, mouldings, coils etc. can be extruded with the use of the optional die plates. With the standard 100 mm diameter nose cone supplied with the machine other shapes such as hollow forms can be extruded with the use of optional die plates. To obtain optimum performance with the G70 tile extruder, one must be willing to experiment, keeping in mind the variables that are present when working in clay, the importance of moisture content, die balance, shapes etc.

TECHNICAL DATA

Dimensions approx: - 1905mm long x 609mm wide x 1040mm high

Weight approx: - 270 kilos

Motor gearbox unit: - 2.2KW (3Hp) single or three phase

Vacuum pump: - High pressure rotary vane oil immersed -28" (-1 Bar)

Construction: - All aluminium alloy construction with split body to facilitate easy cleaning, individual aluminium alloy blades mounted on a hexagonal shaft. Supplied with all switch gear and an interlocked hopper safety switch.

Bearings: - 2 adjustable taper roller bearings, oil seal and retaining plate

Output: - 60 -80 sq ft/ hour approximately output depends on clay body moisture content, tile dimension, number of operators etc. With standard nose cone fitted output is rated at 500 Kilos per hour

Standard accessories: - 1- 150mm x 5mm die plate



Power Feed Pugmill G74

The G74 Power Feed Pugmill has been developed from our existing range of de-airing pugmills and incorporates all the latest developments within the range. The machine has been designed to provide excellent service and reliability with ease of maintenance and cleaning. The pugmill consists of a vertically split high grade aluminium alloy barrel 200mm internal diameter with a 100mm outlet nose cone, this nose cone can be interchanged with an optional tile nose cone for the production of different size tiles, power is derived from a high torque helical inline motor and gearbox, this drives a stainless steel hexagonal shaft via a flexible coupling on which there are mounted individual blades which can be altered to change the configuration of the auger itself. The pugmill is fed by a power feed chamber which is driven via a gearbox off the main drive shaft. The power feed chamber consists of two specially designed rollers which draw the clay into the main chamber of the pugmill. The chamber is protected by a safety hopper to prevent contact with the rollers by the operator.

TECHNICAL DATA

Dimensions: 1905mm long x 609mm wide x 1800mm high approximately.

Weight 350 kg approximately.

Motor/ Gearbox - 3kw (5 Hp) inline helical reduction drive Vacuum pump - 28" (-1 Bar) Oil immersed rotary vane

Output: 1200kg per hour approximately.

Outlet size 100mm approximately.

Optional Accessories - Tile Nose Cone, Stainless steel auger, Variable speed drive.



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Disc Mill

DM200 Disc Grinding Mill

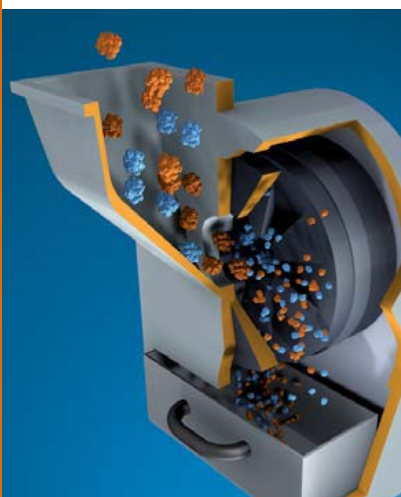
The Disc Mill DM 200 is used for batchwise or continuous preliminary and fine comminution of medium-hard to hard-brittle solids (up to 8 Mohs).

Thanks to its robust design, it can be used under rough conditions in laboratories and pilot plants, as well as online for the quality control of raw materials. The following products and raw materials indicate the main fields of application of the DM 200: ores, coal, coke, slag; dental ceramics, steatite, sintered ceramics, electrotechnical porcelain, chamotte; bauxite, quartz, clinker, gypsum, chalk; frits, glazes; dried soil samples, sewage sludge, drilling cores.

A particular advantage is the large sample feed size, with an edge length of up to 20 mm. The achievable final fineness of up to 100 µm depends on the set grinding disc gap width and the fracturing properties of the particular sample. In order to achieve such a final fineness the powerful DM 200 usually requires only a few minutes. Thanks to the exact gap width setting via a scale (accurate to 0.1 mm), the grinding results are reproducible. The Disc Mill DM 200 is very

simple to

operate. When the grinding process is finished the hinged grinding chamber housing can be simply lifted up for time-saving cleaning.



The feed material enters the dustproof chamber from the filling hopper and is fed centrally between two vertical grinding discs. A moving grinding disc rotates against a fixed one and draws in the feed material. The necessary comminution effects are generated by pressure and frictional forces. The progressively arranged grinding disc meshing first subjects the sample to preliminary crushing; centrifugal force then moves it to the outer regions of the grinding discs where fine comminution takes place. The processed sample exits through the grinding gap and is collected in a receiver. The gap width between the grinding discs is continuously adjustable and can be adjusted during operation in the range between 0.1 and 5 mm; an additional observation window is provided for checking the gap setting.

Grinding discs

A set of grinding discs for the DM 200 consists of a fixed and a rotating grinding disc. The material should be selected so that contamination of the sample and unwanted abrasion are avoided. 4 different materials are available.

For standard comminution, e.g. minerals with Mohs hardness 3 – 6; grinding disc set made from hardened steel or manganese steel

For extreme comminution, e.g. minerals with Mohs hardness >6, grinding disc set made from tungsten carbide (WC)

For heavy-metal-free comminution e.g. dental ceramics, grinding disc set made from zirconium oxide

Performance Data	DM200
Application	Preliminary & fine comminution
Feed material	Medium-hard, hard, brittle
Feed size*	< 20mm
Final fineness	Up to 100µm
Hopper volume / throughput	2.5 ltr / up to 150kg / hr
Gap width setting	Continuous 0.1 – 5mm
Grinding disc speed @ 50Hz	440 min ⁻¹
Grinding disc speed @ 60Hz	528 min ⁻¹
Technical Data	
Drive	3-phase geared motor
Drive performance	2850W
B x H x D	440 x 400 x 870mm
Weight	Approx 140kg
Noise Values (noise measuring according to DIN 45635-31-01)	
Emission value with regard to workplace	L _{pAeq} 69.4 dB (A)
Sound power level	L _{WA} 81 dB (A)
* depending on feed material	

ORDER DATA	
20.740.0001	DM200 Disk Mill. For 400 volt, three phase & neutral supply, 50/60Hz, 2kW
22.456.0001	Grinding set made of hardened steel
22.456.0002	Grinding set made of manganese steel
22.456.0003	Grinding set made of tungsten carbide
22.456.0004	Grinding set made of zirconium oxide.

Jar Mills (Roller Mills, Pot mills, Ball mills)

G90 SERIES

G series Jar Mills are used to grind ceramic (and other) materials in grinding jars of varying capacity.

Technical data.

Single Jar Mill G90

Overall size: Width 450mm approx., Length 650mm approx., and Height 330mm approx.

Powered by a 1/3 HP electric motor which drives a rubber covered roller with one idler roller.

Maximum capacity: Will accommodate 1 x 9 litre or 4.5 litres, 2 x 2.25 litre, 3 x 1.125 litre or 0.5 litre jars

The rollers are mounted on self-aligning bearings, which can be easily adjusted to accommodate different size jars.

Electrical supply: 220/240V single phase or 380/440V three phase.

Motor IP55 Sealed motor complete with thermal overload protection. The standard models are supplied as fixed speed units with a push button On/Off control. Variable speed controllers can be fitted as an optional extra.

Another feature that can be added is a timer unit.

Single Jar Mill G94

As above except fitted with an electrically interlocked guard.

Double Jar Mill G91

Overall size: Width 450mm approx., Length 1075mm approx., Height 330mm approx. Powered by a 1/2 HP electric motor that drives a rubber-covered roller with one idler roller (*pictured above left*) roller length

Double Jar Mill G95

As G91 except fitted with an electrically interlocked guard (*pictured right*).

Multi-tier Jar Mills.

The G series Jar Mills are also available as multi tier mills, and are all capable of using a wide combination of jars. All are fitted with adjustable rollers running on heavy duty ball bearings with fully adjustable jar steadies fitted to each tier and are effective for the full length of the jar regardless of jar combinations. All the machines are solidly constructed from fabricated steel with individual drive and control to each tier

Specifications:

Drive: three independent 380/415V 3 phase 50Hz 1HP gear motors driving through flexible couplings, one to each tier.

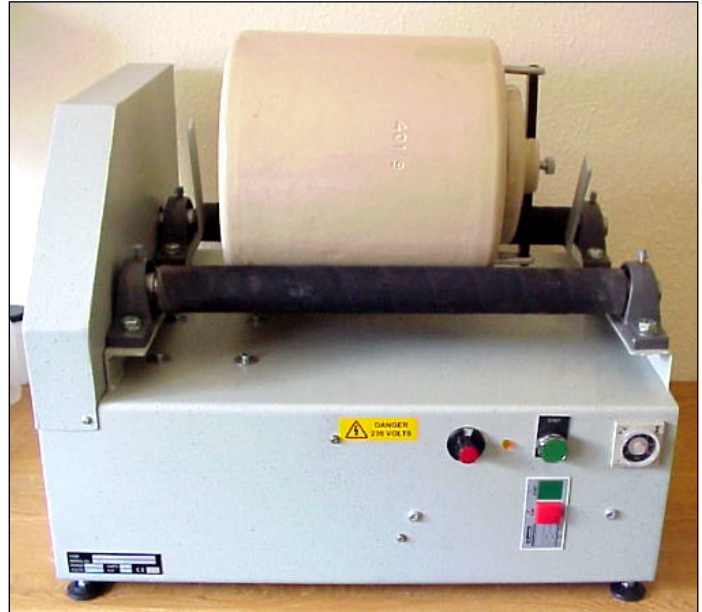
Controls: An independent stop/start switch with overload protection is provided to each tier with drive indicator neon. An operator safety key operated locking switch is included in the control panel to ensure only authorised operation. The machine is also fitted with an emergency lock/off stop button situated for easy reach by the operative.

Effective roller length: 59" (1498mm)

Roller diameter: 6cm

Roller speed: 230rpm

Dimensions: 204 x 70 x 153cm (LxWxD)



G90 Jar Mill with optional timer and variable speed motor.
(and 9 litre porcelain grinding jar).



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GR Series Jar Mills.

The GR range of Roller Jar Mills are machines designed for use with porcelain / stoneware jars, capacities ranging from 1.5 litres to 15 litres. They are suitable for carrying out grinding tests or simple wet process mixing tests on ceramic glazes and colouring agents, paints and other products. They can also be used for dry process grinding of solid substances such as clays and various other minerals. They can be used for small production runs as well as laboratory tests.

Features common to all models:

- Adjustable distance vulcanised rubber-coated rollers.
- Accurate finishing
- Epoxy powder painted shaped sheet steel structure
- Drive transmitted for the motor to the rollers by means of an adjustable stretch V-belt for the floor models (with safety guard), and gear motor for the bench model.
- Adjustable height vibration damping feet at the base.

Single layer roller jar mill, Model GR/1

Suitable for a maximum of 2 jars.
 Supplied complete with a 0.33HP motor and start/stop push button panel
 Mains power supply 230/400V, three phase, 50Hz
 Overall dimensions: 110 x 65 x 62cm
 Net weight: 85kg.
 Order Code **01CI0970**
 As above but supplied with a wall mounted control panel, including a 0-60 hour timer.
01CI0970/1



MODEL GR/1

Double layer roller jar mill, Model GR/2

Suitable for a maximum of 4 jars.
 Supplied complete with a 0.33HP motor and start/stop push button panel
 Mains power supply 230/400V, three phase, 50Hz
 Overall dimensions: 116 x 65 x 102cm
 Net weight: 114kg.
 Order Code **01CI0972**
 As above but supplied with a wall mounted control panel, including a 0-60 hour timer.
01CI0972



MODEL GR/2 with safety protection cover

Optional Extras:

- 01CI0973/5** Safety protection cover for Model GR/1, with switch to prevent use unless cover is fully closed
- 01CI0973/6** Safety protection cover for Model GR/2, with switch to prevent use unless cover is fully closed



Porcelain Grinding Jars

1.5 litres capacity 150mm diameter x 210mm high, 4.2kg weight	01CI0983
3.0 litres capacity 200mm diameter x 240mm high, 6.6kg weight	01CI0984
5.0 litres capacity 225mm diameter x 280mm high, 9.7kg weight	01CI0985
10 litres capacity 285mm diameter x 320mm high, 15.8kg weight	01CI0986
15 litres capacity 335mm diameter x 360mm high, 20.8kg weight	01CI0987

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Fast Mills SD series (Planetary grinding)

SD Series laboratory fast mills.

S-Series Fast Mills are a modular concept in laboratory mills. They are extremely sturdy and well-balanced machines, made with oversized mechanical components that can work without maintenance for years in the hardest conditions. They are indispensable in colour factories and the ceramics industry (for glaze preparing and research labs), but can also be used in numerous other industrial sectors (pharmaceutical, food, cosmetics, etc.), as well as schools, research labs, artistic ceramics, etc. This range of machines comes with up to four independently controlled milling stations, which will accept either 1000ml or 300ml porcelain jars. (1000ml models can carry 300ml jars with the addition of a counterweight.)

General Features:

- Self-supporting structure, safety covers, safety guard under rotating parts and plinth in sheet metal and steel profiles coated with electrostatic paint.

- Jar holder unit in galvanised steel.

- Rotating parts and counterweights in burnished steel.

- Extremely rapid and safe jar housing and fixing system.

- Mechanical noise: almost silent.

- Operating noise: within limits required by current standards.

- Electrical components totally protected by the structures.



Each Unit is supplied complete with:

- Main switch.

- Control board with keyboard and LCD display for test cycle setting and checking. 0-240 minute timer, for automatic test cycles, with memory (if the test is interrupted, it will start again and finish when the remaining time has elapsed)

- Safety covers with handle.

- Soundproofing.

- Safety micro-switch (if the cover is open, the rotating unit will stop)

- Safety guard for rotating parts located under the unit (to prevent accidental contact with the drive components and rotating parts).

For 400V, three phase, 50Hz supply.

Supplied with the relevant number of white porcelain jars and alumina pebbles as fits the machine.

Model SD/1-1000, 1 station capacity 1000ml

01CI3110

Model SD/2-1000, 2 stations capacity 1000ml

01CI3111

Model SD/3-1000, 3 stations capacity 1000ml

01CI3112

Model SD/4-1000, 4 stations capacity 1000ml

01CI3113

Accessories

Counterweight to use a 300ml jar on 1000ml station

01CI3165

Porcelain jar 300ml capacity (brown colour)

01CI3170/3

Porcelain jar 300ml capacity (white colour)

01CI3170/6

Charge of alumina pebbles for 300ml jar

01CI3171

Porcelain jar 1000ml capacity (brown colour)

01CI3172/3

Porcelain jar 1000ml capacity (white colour)

01CI3172/6

Charge of alumina pebbles for 1000ml jar

01CI3173



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Triple Roll Mills

Basic Models

We offer a wide range of products for processing the most difficult materials in development, laboratories and production. In just one working cycle it is possible to disperse and homogenize substances, to reduce the particle size and to break up agglomerates. The result is a homogenous paste forming the perfect basis for further processing.

The roller gap is adjustable. Gap adjustment is performed using one hand wheel per gap. This ensures perfect roller parallelism - regardless of the gap width. A spring tensioned scraper socket ensures a constant contact pressure of the scraper knife without the need for readjustment during operation.

The minimum gap between the rollers is 3 to 5 μm . Thus, a large number of different roller materials can be used. The choice of roller and scraper materials - from hard-chromium-plated steel to aluminum oxide, silicon carbide or zirconium oxide - meets all requirements. The EXAKT safety devices on the three roller mill guarantee maximum safety for the operator. The machines can be cleaned easily and extremely rapidly.

Areas of application:

The three-roll mills are used for intensive fine grinding, dispersion and homogenization of pasty masses to free-flowing materials

- Ceramics and glass colors
- Printing inks
- Electronics
- Cosmetics
- Food
- Dental fillings, dental impression masses
- Greases
- Ceramic masses
- Ointments



The EXAKT Three-Roll Mills are available in four different model series:

The Basic models EXAKT 50, EXAKT 80 and EXAKT 120 achieve a product fineness of about 20 μm .

The Superfine models (S models) EXAKT 80S, EXAKT 120S, EXAKT 120S-450 achieve the highest product fineness in the range of 1 to 9 μm .

The High-performance models (H/HF models) EXAKT 120H/ HF, EXAKT 120H/ HF-450 achieve a product fineness which can be compared to that of the S models, i.e. 1 to 9 μm . The variable friction system (HF High Friction) allows highly viscous and extremely tough products to be processed and the volume throughput to be increased during production.

The Electronic model (E-model) EXAKT 80E is a feature-rich three roll mill that combines the flexible technologies of production mills with state-of-the-art control and programming.

Advantages at a glance:

- Large variety of roller materials
- Large variety of scraper materials
- Constant contact pressure of the scraper knife
- Fully ceramic system
- Easy gap adjustment
- Parallel roller gap
- Speed control (option)
- Water cooling (option)
- Service opening for roller adjustment (as of EXAKT 80S)
- High level of operating safety
- Easy cleaning



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ISO 9001:2000
Certificate No: 23478

Basic Models EXAKT 50, EXAKT 80.

For product fineness requirements ~ 20 µm

All machines are designed as space-saving tabletop models. They offer the highest levels of flexibility in terms of their installation sites. All machines are available with steel rollers, hard-chromium-plated rollers or aluminum oxide rollers. All models (optional on EXAKT 50) are equipped with the practical EXAKT universal scraper system. This system allows a cost effective and rapid exchange of scraper knives. The steel, plastic and aluminum scraper knives offered by EXAKT can thus be perfectly adapted to the product to be processed. All models (optional on EXAKT 50) are fully equipped with the following components: Stainless steel hopper; Universal scraper system; Splash tray (EXAKT 50: splash plate) to facilitate cleaning; Felt base pad; Dust cover.

	EXAKT 50	EXAKT 80
Roller diameter	50mm	80mm
Roller length	150mm	250mm
Maximum capacity (l/h)	7	20
OPTIONS:		
Universal scraper system	X	standard
Speed control system	X	-
2 speeds	-	X
Cooling and temperature control system	-	X (only steel rollers)
Explosion protection	-	X
Solvent dispenser	-	X

X = Optional

Two speeds

The basic model EXAKT 80 is available with one or two speeds. The version with two speeds allows the production speed to be adapted to the product viscosity to a certain extent.

Roller cooling and temperature control system

All EXAKT 80 models with steel rollers can be equipped with an unpressurized internal circulation system for roller temperature control or cooling. The temperature of the rollers can be controlled without any problems up to 80°C (up to 100°C upon request). If there is no temperature control or cooling medium source available, we can offer the necessary ancillary equipment.

Solvent dispenser

Some products tend to dry out in the guide areas due to a high heat of friction. The solvent dispenser can be used to prevent this. It adds solvent to the product in the guide areas to achieve uniform product fineness and to prevent the product from drying out.

Explosion protection

The EXAKT Three-Roll Mills are available in explosion-proof designs.

Electronic Models (E Models)

Extraordinarily precise particle size reduction and dispersing as well as remarkable reproducibility are the distinguishing features of the EXAKT electronic models..

These compact three roll mills with state-of-the-art operating functions and the greatest flexibility are used in product development, pre-production, and limited production. Their new characteristics ensure not only a more flexible use of the machines, they also set standards when it comes to reliability and reproducibility.

All operating parameters are indicated on the display, which simplifies the transfer of the production-specific processing conditions from development to production.



SOLVENT DISPENSER



Triple Roll Mills

In addition to the already-familiar high-quality results of the conventional EXAKT three roll mills, the electronic models offer new possibilities for control, reproducibility, automation, and last but not least, the greatest fineness of the product.

	EXAKT 80E	EXAKT 120E-250	EXAKT 120EH-250	EXAKT 120EH-450
Roller diameter	80mm	120mm	120mm	120mm
Roller length	200mm	250mm	250mm	450mm
Maximum capacity (l/h)	20	30	30	60
OPTIONS:				
Dimensions	720 x 550 x 550	820 x 650 x 740	870 x 950 x 1320	1070 x 950 x 1320
2 speeds	N/A	N/A	N/A	N/A
Rollers that can be cooled / heated up to 60°C	Standard	Standard	Standard	Standard
Solvent dispenser	Standard	Standard	Standard	Standard



Superfine Models (S Models)

For product fineness requirements of 1 to 9 µm



The unique EXAKT roller pre-tensioning system guarantees a constant gap between the rollers during operation. This leads to the highest possible levels of product fineness and uniform particle sizes. All machines are designed as space-saving tabletop models. They offer the highest levels of flexibility in terms of their installation sites.

All machines are available with steel rollers / hard-chromium-plated rollers, with aluminum oxide rollers, zirconium oxide rollers or silicon carbide rollers (only roller length 250 mm).

All models are equipped with the practical EXAKT universal scraper system. This system allows a cost-effective and rapid exchange of scraper knives. The steel, plastic and aluminum scraper knives offered by EXAKT can thus be perfectly adapted to the product to be processed.

	EXAKT 80S	EXAKT 120S	EXAKT 120S-450
Roller diameter	80mm	120mm	120mm
Roller length	200mm	250mm	450mm
Maximum capacity (l/h)	20	30	60
OPTIONS:			
Speed control	X	X	X
2 speeds	X	X	X
Cooling and temperature control system	X	X	X
Explosion protection	X	X	X
Solvent dispenser	X	X	X



Speed control

The superfine models are available with one or two speeds. Optimum performance can be achieved when speed control is realized by means of a frequency inverter. The constant torque over the entire speed range allows optimum processing of various viscous and/or temperature-sensitive products.

The maximum machine speed with speed control is 50% higher than that of a one-speed machine.

High-Performance Models (H Models)

For product fineness requirements of 1 to 9 μm

H/HF model characteristics: (HF = High Friction)

Unlike all other EXAKT three-roll mills, which have a constant speed ratio between the rollers, the H model has a variable speed ratio between the middle roller and the front one. These machines are equipped with two variable drive units. Thus, the shearing forces between the middle roller and the front roller can be adapted to the product to be processed. The unique EXAKT roller pre-tensioning system guarantees a constant gap between the rollers during operation. This leads to the highest possible levels of product fineness and uniform particle sizes.

All machines are free standing models. To facilitate installation and later transport to other installation sites all machines are equipped with castors. All machines are available with steel rollers / hard-chromium-plated rollers, with aluminium oxide rollers, zirconium oxide rollers or silicon carbide rollers (only roller length 250 mm). All models are equipped with the practical EXAKT universal scraper system. This system allows a cost-effective and rapid exchange of scraper knives. The steel, plastic and aluminium scraper knives offered by EXAKT can thus be perfectly adapted to the product to be processed.



	EXAKT 120H/HF	EXAKT 120H/HF-450
Roller diameter	120mm	120mm
Roller length	250mm	450mm
Maximum capacity (l/h)	60	100
Cooling and temperature control system	X	X
Speed control	X	X
OPTIONS:		
Explosion protection	X	X
Solvent dispenser	X	X



(Temperature Control Unit – to be used in conjunction with a control system)

Temperature control unit: As an alternative to using the local water supply, the EXAKT temperature control unit can be used for unregulated temperature control of the rollers. This unit heats and circulates the temperature control medium. The electronically controlled cooling and temperature control system can be used either in cooling or temperature control mode. The operating temperature lies between -30°C and $+100^{\circ}\text{C}$ maximum.

Laboratory Mixers (Overhead stirrer)

RW20 Digital stirrer.

E.J.Payne Ltd has for many years supplied the IKA RW20 overhead stirrer as a standard Laboratory stirrer. This instrument has been a best seller for years, and is still the best value for money stirrer in its range.

Built in a sturdy, slim casing the RW20 Digital is suitable for stirring jobs up to 20 litres (H₂O) with a constant power drive. The motor has two speed ranges for universal use from 60 to 2000 rpm, and it is fitted with a hollow chuck to allow stirring shafts of 1-10mm diameter to be used.

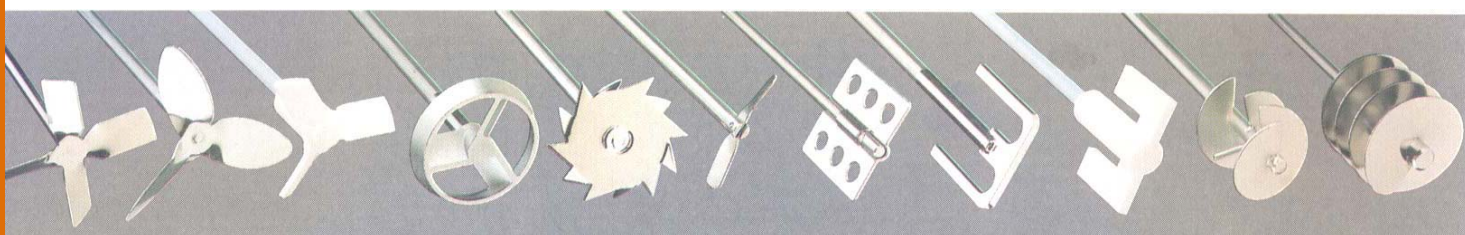
The new RW20 digital (pictured right) is fitted with an LED speed display for greater accuracy and reproducibility, integrated into the housing.



Specifications	RW20 digital
Viscosity range	< 10,000
Speed Range I	60 - 500
Speed Range II	240 - 2,000
Speed display	LED
Max torque at stirring shaft -Ncm	150
Max torque at stirring shaft at 60 1/min (overload) - Ncm	300
Permissible ON time (%)	100
Chuck range (mm)	1 - 10
Hollow shaft internal Ø	10.5
Motor Power (W) input / output	70 / 35
IP Protection Class	IP20
Dimensions (WxHxD), mm	88 x 294 x 212
Weight (kg)	3.1
Protection Class	IP 20
Power supply	220/240V, 50/60Hz

Ordering Information

Stirrer Motor RW20 digital	3593000
Plate stand R1822 (800mm upright)	MT468-20
Bosshead R182	SR753-09
Propellor blade 70x70mm R1375	SR753-14
Propellor 4-blade 100mm R1345	SR753-17
Dissolving rotor 80mm dia. R1301	SR753-20



R1342 1345 R2302, 2035	R1381 – R1388	R1389 (PTFE)	R1311- R1313	R1300- R1303	R1352- R1355	R1373- 1376 R22311	R1330- R1333	R1332 (PTFE)	R1335- R1336	R1393
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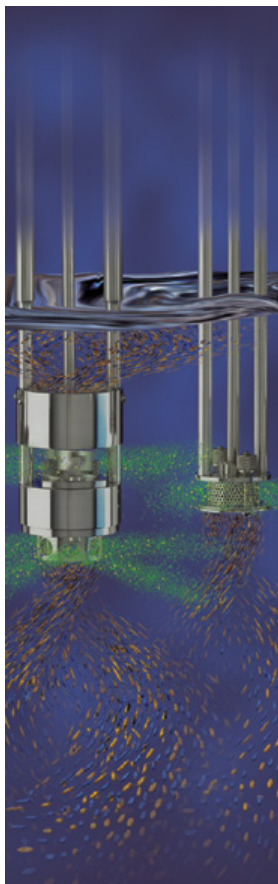
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HIGH SHEAR MIXERS

High Shear Laboratory Mixers.

The Silverson L5 series of laboratory mixers are ideal for routine laboratory work, reassert & development, Quality Assurance checking and small-scale production in all industries.



The L5 series is suitable for the widest range of applications - mixing, emulsifying, homogenising, disintegrating, dissolving - with an efficiency and flexibility unmatched by other machines. With capacities from 1ml up to 12 litres and the ability to mix inline with flow rates up to 20 litres per minute, it offers excellent reproducibility when scaling up to full scale production and provides an accurate and easy means of forecasting the performance of larger Silverson machines under full scale working conditions.

Motor Unit - Robust two piece casing designed for cool, quiet and continuous operation.

Motor - 250W (0.33hp) 220 volt single phase (110 volt optional), 50/60Hz. Nominal maximum speed 8000rpm (6000rpm under full load).

Speed control - Infinitely variable electronic speed control with integral on/off switch.

Electric rise and fall bench stand - The mixing unit may be effortlessly raised and lowered using the push button control on the motor unit.

Construction - All wetted parts are in grade 316 stainless steel with the exception of the bush which may be bronze alloy or PTFE.

The L5 series is finished in a tough, easy to clean, non-chip white nylon coating . The flat base is covered by a non-slip mat which is resistant to most solvents.



L5 Series options:

The multifunctional **L5M Model** (pictured above) features touch screen control with digital tachometer, programmable integral timer and amperage display, all accessed via the Mode button.

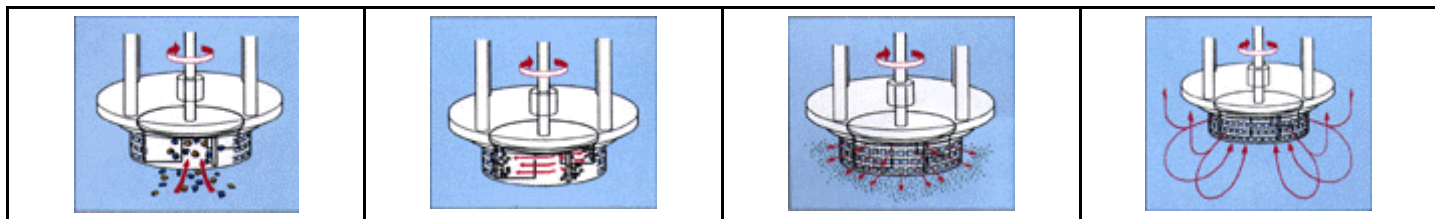
L5T Mixer Identical to the model L5M but supplied with tachometer only.

L5R Mixer Identical to the model L5M but supplied without the tachometer, amperage display or integral timer.

Model L2/AIR (Compressed Air)

An efficient, lightweight machine powered by an intrinsically safe air motor suitable for use in Flameproof areas. The L2/Air Motor Unit is powered by a 0.25hp, 6000 rpm variable speed motor, which requires 60psi (4.2 kg/cm²) compressed-air supply and consumes 8 cfm (226 litres) at full speed.

Fitted with speed regulator and muffler. Complete with air regulator and gauge, water filter and lubricator. Supplied with manually adjustable bench stand.



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Laboratory Press

Bench Mounted Laboratory Presses.

Built with quality materials and accurate finishing these are suitable instruments for producing laboratory samples, specifically for the ceramics industry, but also for different industrial sectors. The mould is interchangeable, and the required size should be stated at the time of order from the list of sizes below. The control board is fitted with a general switch and pilot light, double handed control for the pressing procedure, and a push button for the specimen extraction. The specimen extraction is hydraulic.

Model MIGNON/S.

The pressing power can be adjusted up to a maximum of 19,000kg
Pressing piston bore - 150mm diameter
Stroke of the hydraulic ejector: 30mm
Maximum continuous operating pressure - 120 bar
Installed power - 1.5HP
Overall dimensions: 360 x 470 x 810mm
Weight - 168 kg
Product Code: 01CI1840



Model MIGNON/SS

The pressing power can be adjusted up to a maximum of 38,000kg
Pressing piston bore - 150mm diameter
Working stroke of piston - 130mm diameter
Stroke of the hydraulic ejector: 30mm
Maximum continuous operating pressure - 220 bar
Installed power - 3HP
Overall dimensions: 510 x 710 x 840mm
Weight - 240 kg
Product Code: 01CI1845



Model MIGNON/SS-E.

As Mignon/SS, but fitted with digital pressure, indicator, electronic pressure control, electronic control of the thickness of the sample.

Product Code: 01CI1846

Model MIGNON/SS-EA.

With electronic regulation of two different layers of powder.

Product Code: 01CI1846/5

Moulds (in cemented steel)

Standard 50mm diameter

Rectangular 50 x 110mm

Rectangular 100x100mm (Mignon/SS only)

10/12/18/20/40mm diameter (to be specified).

01CI1840/1

01CI1840/2

01CI1840/3

01CI1840/R

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Certificate 23478

Floor Standing Presses

Built into a compact and elegant structure made of steel, treated with epoxy paint, stove enamelled at 180°, these presses are hydraulically operated and entirely automatic, with the exception of the powder charging operation, which is manually effected.



The presses feature:-

A hydraulic ejector;

Electronic control panel, permitting a completely automatic operation of the press (except for the loading of the powder to be pressed).

By means of the electronic control panel, 5 different working cycles can be memorized. For each of these working cycles, the following parameters can be set:

Working pressure

Three layers of powders; this means that it is possible to press three different types of powders simultaneously and electronically control the thickness of the layer in the mould.

De-aeration pressure

De-aeration time

Residence time at the required working pressure

Automatic start of the pressing cycle

The working pressure is indicated on the display

Operating mode.

Set the pressure at which the press will work.

Set the thickness (in mm) of the first layer of powder that will be put into the mould

Set the thickness (in mm) of the second layer of powder that will be put into the mould

Set the time (in seconds) for which the press will maintain its operating pressure.

After the two layers of powder have been put inside the mould, it is sufficient to press the two START buttons (two handed control) to enable the press to perform the programmed cycle.

The press performs the de-aeration cycle automatically.

Model P800/RM

Technical Specifications:

Pressing force: 80 Ton

Overall dimensions: 950 x 1000 x 1780mm (WxDxH)

Weight - 980 kg

Maximum operating pressure: 230 bar

Diameter of the cylinder: 230mm

Installed power: 3kW

Working stroke of the piston: 130mm

Stroke of the hydraulic ejector: 50mm

Power supply: 400V, three phase.

Product Code: 01C1849

Model P1000/RM

Technical Specifications:

Pressing force: 110 Ton

Overall dimensions: 1050 x 1000 x 1840mm (WxDxH)

Weight – 1,070kg

Maximum operating pressure: 230 bar

Diameter of the cylinder: 240mm

Installed power: 3kw

Working stroke of the piston: 130mm

Stroke of the hydraulic ejector: 50mm

Power supply: 400V, three phase

Product Code: 01C1850

Moulds (in cemented steel)

10cm x 10cm

15cm x 15cm

10cm x 20cm

10/12/18/20/40mm diameter

01C1847/1

01C1847/2

01C1847/3

01C1840/R (to be specified).

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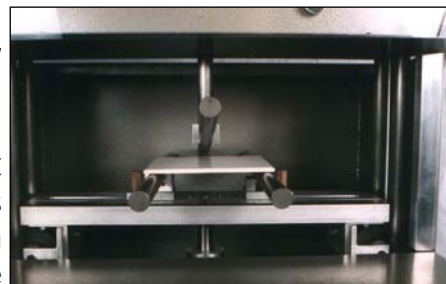
Modulus of Rupture (Bending Strength)

Modulus of Rupture Machines measure the flexural breaking load (Bending Strength) of sample bars / ceramic tiles up to 700mm square by applying a three point load to the test piece. The range of Bending Strength machines available cover uses in tableware, sanitaryware, porcelain and ceramic tile manufacturing plants.



Principle of Operation.

The sample piece is placed centrally across the two lower adjustable tension rods set a known distance apart. A third fixed tension rod, set exactly at the centre of the lower tension rods then is driven either up or down (depending on the model) against the sample. The test piece is subject to a three point strain. At the optimum point the test piece will snap, and the maximum finger on the dial gauge will remain at the maximum point. The Modulus of Rupture is then calculated using



the standard formula $M = \frac{3PL}{2bd^2}$, where P is the breaking load on the scale, L is the distance between the lower tension rods on which the sample of breadth (b) and depth(d) is supported. The Modulus of Rupture should be calculated by taking an average result from 10 test samples.

Mechanical Modulus of Rupture Machines. (left)

The rise and fall platform is driven by an electric motor, which delivers a constant speed of elevation to the lower platform. The dial gauge on the spring balance is fitted with a maximum finger which indicates the breaking point in kilograms.

This range of machines is suitable for tiles up to 40cm x 40cm

Specifications.

Powered by a 0.18kW motor, for 220/240V single phase supplies.

Product Code.

10 kg scale (x 50g)	MOR/10	25kg scale (x 100g)	MOR/25
50kg scale (x 200g)	MOR/50	100kg scale (x 500g)	MOR/100

Hydraulic Modulus of Rupture. (right)

The MOR/1-M/E is a manually operated hydraulic system, suitable for carrying out tests on samples with widths ranging from 40 to 300mm, and with a maximum thickness of 20 / 25mm.

Other characteristics:

Strain gauge cells

Digital reading with LED display, 5 digits, digit height 12.5mm. membrane keyboard

Peak value storage (breaking load)

Acoustic signal when full scale value is reached.

Power supply: 230V, single phase, 50/60Hz.

Overall dimensions: 45 x 45 x 70cm, Net weight: 82kg

Options / Catalogue numbers.

Scale 0 – 50kg, reading 10g	01CI4556/B
Scale 0 – 500kg, reading 100g	01CI4557/B
Scale 0 – 1,000kg, reading 100g	01CI4558/B



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ISO 9001:2000
Certificate No: 23478

Modulus of Rupture (Bending Strength)

Machines for Flexural Tests

Indispensable for producers of ceramic floor and wall tiles when checking production processes and finished products. Can also be used by producers of sanitaryware, tableware and technical porcelain; in research labs, in Technical and University labs, and wherever it is necessary to determine the flexural breaking load of a large number of different raw materials, broken down into sizes that can be positioned on the machines.

MOR/5-TS Series Electronic models

Standardized devices for determining the flexural breaking load and modulus of green, or dried, or fired ceramic tiles.

In accordance to the UNI EN ISO 10545-4 norm.

Minimum tile size 10x10 cm.

General features:

- Breaking blade operated by an electro-mechanical system
- System for detecting applied load, by means of highly reliable strain gage cells
- Automatic testing cycle
- Automatic taring
- Digital reading with wide touch screen display, in 5 languages (- I - GB - F - D - E -)
- Selectable measuring unit in Kg or Newton
- Automatic determination of the modulus of rupture in Kg/cm², or Newton/mm² and the breaking effort in Kg. or N.
- 30 reference sizes that can be stored
- Storage of the last 29 tests carried out.
- Descent velocity of the breaking blade adjustable by the control panel, with the possibility of automatically setting up the standardized increase load in accordance to the UNI EN ISO 10545-4 standard, and with display graphic indication.
- Fast approach and fast end-of-test return.
- Methacrylate frontal protection with safety microswitch
- Output: serial RS 232 C for connection to PC or printer
- Auxiliary output 230V max 4A
- Electric supply: 230V single-phase 50/60Hz
- Scale: 0,5—800 Kg with a reading of 0,01 Kg (10 g) across the full range. (Minimum breaking load that can be obtained, 0,5 Kg)



- 01CI1513 **MOR/5-TS/65 model** Suitable to make tests up to the size of 65x65 cm, Supplied with 65cm breaking blade and tile supports
The instrument is standardized up to the size of 65x65 cm. Overall dimensions: 108x85x78 cm, Net weight: 113 Kg
- 01CI1514/2 **MOR/5-TS/95 model** Suitable to make tests up to the size of 95x95 cm, Supplied with 60cm breaking blade and tile supports.
The instrument is standardized up to the size of 95x95 cm. Overall dimensions: 142x116x78 cm, Net weight: 183 Kg
- 01CI1515/2 **MOR/5-TS/10 model** Suitable to make tests up to the size of 105x125 cm, Supplied with 105cm breaking blade and tile supports.
The instrument is standardized up to the size of 105x125 cm. Overall dimensions: 172x126x78 cm, Net weight: 260 Kg

BLM SERIES (Breaking Load Machine)

The BLM series models are simplified versions of the MOR/5-TS with the following features removed

- Digital reading with wide touch screen display, in 5 languages (- I - GB - F - D - E -)
- Automatic determination of the modulus of rupture in Kg/cm², or Newton/mm² and the breaking effort in Kg. or N.
- Descent velocity of the breaking blade adjustable by the control panel, with display graphic indication.
- 30 reference sizes that can be stored
- Storage of the last 29 tests carried out.

- 01CI1530 **BLM/650 model** Suitable to make tests up to the size of 65x65 cm, Overall dimensions: 102x85x78 cm, Net weight: 113 Kg
- 01CI1532 **BLM/950 model** Suitable to make tests up to the size of 95x95 cm, Overall dimensions: 116x136x78 cm, Net weight: 195 Kg



Dimensional Characteristics of Tiles (Universal Gauges)

CEN/10 Series Gauges

These instruments are suitable for determining the flatness, rectilinearity and squareness of ceramic tiles.

Built according to UNI EN ISO 10545-2 norm. One single instrument can make all the above three measurements, as provided by the standard. The fixing system of the comparators lets them be positioned in just a few seconds, depending on the tile size to be tested. The same system is used for the surface and lateral supporting feet.

General features:

Aluminium Ergal hard anodized and ground working plane.

Ground and burnished steel half-squares. Stainless steel supporting structure. Centesimal comparators, 60 mm.

Stainless steel surface and lateral supports.

All models, are supplied complete with 5 centesimal comparators, 8 spare stainless steel supports, for tiles of thickness 8-10 mm and 5 stainless steel feet for tiles thickness 6-8mm All models (except CEN/96-OR/40) are supplied complete with two keys, 5 spare stainless steel supports and 5 centesimal gauges.



ANALOGUE Gauges

Model CEN/10/A-400 instrument preset for sizes: 10x10cm to 40x40cm. Overall dimensions: 50x50x38cm. Net weight: 35kg **01CI2885**

Model CEN/10/A-600 instrument preset for sizes: 10x10cm, to 50x50cm tiles, Overall dimensions: 60x60x38cm. Net weight: 44kg. **01CI2886**

Optional slider for measurement of the length of the side **01CI2885/1**

DIGITAL Gauges

Model CEN/10/E-400 instrument preset for sizes: 10x10cm to 40x40cm. Overall dimensions: 50x50x38cm. Net weight: 35kg **01CI2888**

Model CEN/10/A-600 instrument preset for sizes: 10x10cm, to 50x50cm tiles, Overall dimensions: 60x60x38cm. Net weight: 44kg. **01CI2889**

Optional slider for measurement of the length of the side **01CI2888/1**



CEN/04 Series Universal Gauges for acquiring and managing data.

These instruments are suitable for determining the flatness, rectilinearity squareness and length of the side of ceramic tiles. Built according to UNI EN ISO 10545-2 norm. One single instrument can make all the above four measurements, as required by the standard. The fixing system of the comparators lets them be positioned in just a few seconds, depending on the tile size to be tested. The same system is used for the surface and lateral supporting feet. Power supply: 220V single-phase 50/60Hz

Equipped with six digital comparators and serial cable, interface for connection to a computer complete with serial cable, data CEN/04 software with USB key for data acquiring and management, 8 stainless steel feet for tiles thickness 8-10 mm, 5 stainless steel feet for tiles thickness 6-8mm, and 2 keys.

Model CEN/04D-400 is suitable for the following sizes: 10x10 / 10x20 / 15x15 / 15x20 / 15x30 / 20x20 / 20x25 / 20x30 / 20x40 / 25x25 / 30x30 / 30x40 / 33x33 / 40x40cm

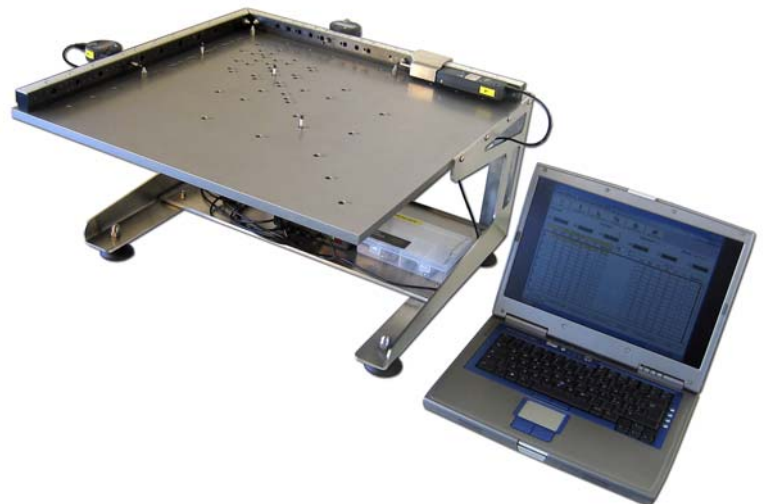
Overall dimensions: 50x50x38 cm, Net weight 37 kg **01CI2883**

Model CEN/04D-600 is suitable for the following sizes: 10x10 / 10x20 / 15x15 / 15x20 / 15x30 / 20x20 / 20x25 / 20x30 / 20x40 / 25x25 / 30x30 / 30x40 / 33x33 / 40x40 / 45x45 / 50x50 / 30x60 / 60x60cm

Overall dimensions: 70x70x38 cm, Net weight 47 kg **01CI2884**

Model CEN/04D-1000 floor standing unit is suitable for the following sizes: 10x10 / 10x20 / 15x15 / 15x20 / 15x30 / 20x20 / 20x25 / 20x30 / 20x40 / 25x25 / 30x30 / 30x40 / 33x33 / 40x40 / 45x45 / 50x50 / 30x60 / 60x60 / 30x50 / 30x45 / 20x50 / 33x60 / 45x90 / 60x80 / 50x100 / 70x70 / 75x75 / 80x80 / 85x85 / 90x90 / 100x100cm

Overall dimensions: 118x118x88 cm, Net weight 90kg **01CI2885/5**



Description of the data CEN/04 software

Software in a Windows environment with guided installation instructions, offering the possibility to customize company information and logos in order to automatically create test reports complying with standards.



- Comparator resetting function, making reference to a sample plate and simultaneous acquiring of 6 measurements with just one click. Possibility to create, display and print charts of all measurements made.
- Attractive and intuitive graphics to make usage easy.
- Window with 6 virtual displays for reading comparator information in real time.
- Automatic progressive numbering of tests, which can be customized with alphanumeric characters.
- Filing and cataloguing of tests performed.

DataDimension Models for tiles greater than 60 x 60cm

Model DSQ-650:	For tiles sizes 80 x 80mm up to 650 x 650mm	Overall dimensions: 100 x 90 x 29cm, weight 85kg
Model DSQ-850:	For tiles sizes 80 x 80mm up to 850 x 850mm	Overall dimensions: 120 x 110 x 25cm, weight 100kg
Model DSQ-1300:	For tiles sizes 80 x 80mm up to 1300 x 1300mm	Overall dimensions: 190 x 160 x 75cm, weight 195kg
Model DSQ-1600:	For tiles sizes 80 x 80mm up to 1600 x 1600mm	Overall dimensions: 195 x 190 x 75cm, weight 300kg

Portable Gauges: Flatness (see picture right) or Diagonal linearity (see pictures below)

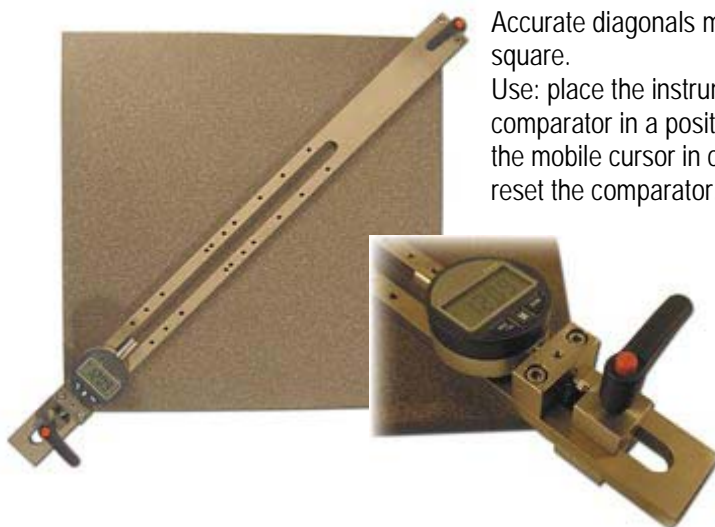
These gauges are suitable for the fast determination of flatness or diagonal differences of ceramic tiles, measured across the diagonal dimension. It comprises of a steel bar with two calibrated feet which can be set at varying distances apart, a spherical bubble and a 60mm diameter dial gauge, marked in 1/100mm increments. Each unit is supplied with a ground calibration plate, all in a wooden box

P/96-A, for tiles ranging from 15x15cm to 30x30cm

P/96-B, for tiles ranging from 15x15cm to 40x40cm,

P/96-C, for tiles ranging from 15x15cm to 50x50cm

P/96-D, for tiles ranging from 15x15cm to 60x60cm



Accurate diagonals mean that the tile is perfectly square.

Use: place the instrument on the tile diagonal, with the comparator in a position suiting the size examined. Put the mobile cursor in contact with the tile corner and reset the comparator. Repeat this operation on the other

diagonal but do not reset the comparator; instead take note of any differences.

Model D/01-A: for tiles 15x15cm, 15x20cm, 15x30cm, 20x20cm, 20x25cm, 25x25cm and 30x30cm.

Model D/01-B: for tiles as above and 33x33cm, 30x40cm and 40x40cm.

Model D/01-C: for tiles as above and 45x45cm and 50x50cm.

Model D/01-D: for tiles as above and 60x60cm

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Calibration Plates for Universal Gauges

CALIBRATION PLATES

Manufactured from aluminium alloy, anodized, and ground on all the surfaces. Thickness 15 mm.
Supplied complete with a control certificate and a wooden case.

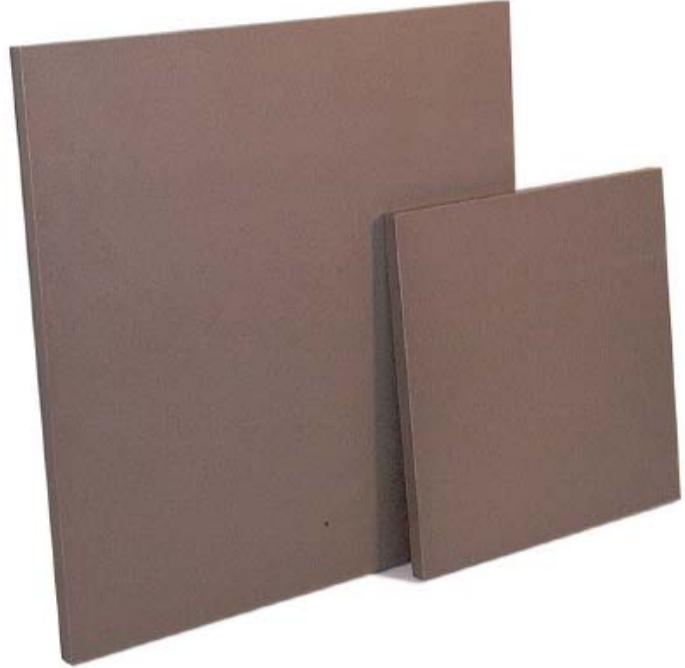
Tolerances (at 20 °C.):

1) Dimensionals:

- a) On the thickness, ± 0.1 mm.
- b) On the dimensions, ± 0.1 mm.

2) On the shape:

- a) On the flatness 0.15 mm.
- b) On parallelism and squareness, 0.1 mm.



THICKNESS OF ALL TILES: 15mm

Code	Dimensions (mm)	Net Weight (Kg)	Code	Dimensions (mm)	Net Weight (Kg)
2890/010	100 x 100	0.4	2890/190	250 x 330	3.3
2890/020	100 x 150	0.6	2890/200	250 x 450	4.0
2890/030	100 x 200	0.8	2890/210	250 x 500	5.0
2890/040	100 x 300	1.2	2890/220	300 x 300	3.6
2890/050	100 x 400	1.6	2890/230	300 x 400	4.8
2890/060	100 x 500	2.0	2890/240	300 x 450	5.4
2890/070	100 x 600	2.4	2890/250	300 x 500	6.0
2890/080	150 x 150	0.9	2890/260	300 x 600	7.3
2890/090	150 x 200	1.2	2890/270	330 x 330	4.4
2890/100	150 x 300	1.8	2890/280	330 x 500	6.6
2890/110	150 x 600	3.6	2890/290	330 x 660	8.8
2890/120	200 x 200	1.6	2890/300	400 x 400	6.4
2890/130	200 x 250	2.0	2890/310	450 x 450	8.2
2890/140	200 x 300	2.4	2890/320	500 x 500	10.1
2890/150	200 x 330	2.7	2890/330	500 x 1000	20.2
2890/160	200 x 400	3.2	2890/340	600 x 600	14.5
2890/170	200 x 500	4.0	2890/350	600 x 1200	29.1
2890/180	250 x 250	2.5	2890/R	Other sizes	On request

Glaze Thickness Measurement

GLAZE THICKNESS MEASUREMENT.

Glaze thickness measurement is an important factor in all areas of the Ceramics Industry. E.J.Payne Ltd offer a range of portable instruments for carrying out tests on both fired and un-

UNFIRED GLAZE THICKNESS

DIGITAL PENETROMETERS.

Dual scale: Metric (0.001mm) and Imperial (1/1000" [thou]) measuring digital penetrometers are available for testing glaze thickness on unfired ware. These hand held units are extremely easy to use, and have the facility of switching from imperial to metric measurements; changing the positive direction of reading, and zeroing by the touch of a switch.

Supplied with a fine needle, or with a round ball bearing foot,

Fine needle penetrometer

GTP005

Replacement needle

GTP002

Test dial Indicator

CL1



HARROW DEPTH GAUGES

Harrow depth gauges are designed to measure the thickness of glaze within a known range on unfired ware. The harrow consists of a wheel with two outer guide tracks, and three inner wheels of known differing diameters reducing by 1/1000 inch. As the harrow is drawn across the test piece, the number of grooves created will indicate the glaze thickness.

Harrow depth gauge

HAR001



DIGITAL COATING THICKNESS GAUGES

The 456 range of coating thickness gauges is Technical Superiority in the palm of your hand. Whilst easy to use, it is packed with features, making it possible the best coating thickness gauge in the world.

The recently introduced 456 is probably the most advanced coating thickness gauge on the market. Available in integral (internal probe) or separate probe format to suit your application need. Integral probes are ideal for flat or uneven surfaces; separate probes allow the user to access tight areas or measure coatings on small components. Separate probe versions are ideal for measurement on almost any metal substrate irrespective of form and offers greater access in confined spaces. With a wide range of probes available, including the new Plug-In Integral Probes (PINIP) which transforms a separate probe back into an Integral for single handed operation, The A456 offers the widest choice on coatings thickness.

A456 FEATURES

DESCRIPTION	456 Basic	456 Standard	456 Top
Menu driven display	•	•	•
On screen calibration instructions	•	•	•
Menus in over 25 languages	•	•	•
Backlight for measurement in dark areas	•	•	•
Infrared data output	•	•	•
Cable data output to PC		•	•
Metric to Imperial units (switchable).	•	•	•
Calibration options (stated): - smooth	•	•	•
- 2 point	•	•	•
- rough surfaces	•	•	•
- special substrate	•	•	•
- zero offset (subtracts a fixed value from a reading)	•	•	•
Calibration options (predefined): - ISO			•
- SSPC			•
- Swedish			•
- Australian			•
Statistics (from single readings or within batches)			
- Number of readings, mean, standard deviation, Coefficient of variation, highest/lowest readings	•	•	•
Readings memory		250 in one batch	40,000 in up to 999 batches
- Individual reading review		•	•
- Individual batch calibrations			•
Reading limits (high and low warnings)		•	•
Date and time stamp on print outs			•
Immediate data output	•	•	•
Batch data output		•	•
Free PC software and download cable		•	•
Clock and Alarm – prompt to take next reading			•

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The A456 can be used where glaze is sprayed onto the ware to be measured (subject to viscosity). A piece of aluminium foil is attached to the sample prior to the glaze being applied. The measurement is then taken at this point, so measuring the thickness of the glaze on the aluminium foil. The A456 is not suitable for use where glaze is applied by dipping or "waterfall" systems.

Ambient operating temperature: 0 to 50°C
 Measurement Speed: Greater than 60 readings / minute
 Measurement Options: Ferrous (F), Non-ferrous (N) or Dual (FNF)
 Display: STN graphics (LCD) 128x64 pix.
 Battery type: 2 x AAA/LR03
 Battery life (alkaline): 30-40 hours use (20,000 readings)
 Weight (including batteries) 130g (4.58 oz)
 Dimensions: 128mm x 68mm x 28mm
 Minimum substrate thickness: 300µm

Scale	Range		Resolution		Accuracy		
	Metric	Imperial	Metric	Imperial	%	Metric	Imperial
F1	0 - 1500µm	0 - 60 mils	0.1µm to 100µm 1µm 100-1500µm	0.01mil up to 5mil 0.1mil 1 - 60 mils	± 1 - 3%	± 2.5µm	± 0.1 mil
F2	0 - 5mm	0 - 200 mils	1µm up to 1mm 10µm 1mm-5mm	0.1mil up to 50mils 1mil 50 -200mils	± 1 - 3%	± 0.02mm	± 1.0 mil
F12	0 - 5mm	0 - 2000 mils					
F1 Mode:	0 - 1500µm	0 - 60 mils	As F1	As F1	± 1-3%	± 2.5µm	0.1mil
F2 Mode:	0 - 5mm	0 - 200 mils	As F2	As F2	± 1-3%	± 0.02mm	1.0 mil
F3	0 - 13mm	0 - 5000 mils	1µm up to 2mm 10µm 2 - 13mm	0.1mil up to 100mil 1mil 100-500mils	± 1 - 3%	± 0.03mm	± 1.5 mils
N1	0 - 1500µm	0 - 60 mils	0.1µm to 100µm 1µm 100-1500µm	0.01mil up to 5mils 0.1mil 5 - 60 mils	± 1 - 3%	± 2.5µm	± 0.1 mil
FNF1	0 - 1500µm	0 - 60 mils	0.1µm to 100µm 1µm 100-1500µm	0.01mil up to 5mils 0.1mil 5 - 60 mils	± 1 - 3%	± 2.5 µm	± 0.1 mil

FIRED GLAZE THICKNESS

POCKET (PEN) MICROSCOPE.

The pocket microscope is ideal for measuring glaze thickness values on both fired and unfired pieces of ware.

The internal graticule measures in 1/50mm.

Magnification X50

Field of View: 2.0mm

Measuring range: 1.6mm

The microscope is focussed by holding it so that the notch at the tip of the acrylic cylinder of the microscope faces towards you, placing the centre of the object lens above the specimen and while tilting the cylinder forward and backward with your eye on the eye-piece lens, fix the cylinder and adjust to the best angle which can give the sharpest image.



Pocket Microscope

Product Code: MIC050

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Pyknometers (Density Cans)

The range of specific gravity weighing cans available from E.J.Payne Ltd covers a variety of sizes and materials. From traditional "British" Pint Weight Cans to stainless steel metric pyknometers and glass density bottles.

Weighing cans.

The traditional copper "pint weight can" has been used in the pottery industry for many years. As times have changed and metrication has been introduced in the industry, E.J.Payne Ltd have moved with the requirements of modern methods to produce cans of different volumes. However the demise of the conical style can has meant the launch of straight sided "Pyknometer".

Pyknometers.

A Pyknometer is a straight sided stainless steel vessel with a close fitting lid. It is considerable stronger than the old style conical can, and the margin for operator error is greatly reduced, therefore providing greater consistency.

The pyknometer lid has a fine hole drilled in the centre to expel any excess material. The volume of the pyknometer with the lid in place is stamped on the lid, and each lid and body are stamped with an individual serial number to ensure that the correct lid is applied to each vessel.

Each pyknometer is checked prior to despatch, and is supplied with a individual certificate of calibration.




Product codes:

100ml Pyknometer	PYK100
250ml Pyknometer	PYK250
300ml Pyknometer	PYK300
500ml Pyknometer	PYK500
1,000ml Pyknometer	PYK001

1 Pint Pyknometer

PYKIMP

 E. J. Payne Ltd. <small>1 Belgrave Road, Longton, Stoke-on-Trent, Staffs. S11 4PR Telephone: 01782 312534 Fax: 01782 599868 Email: ejpayne@ejpayne.com</small>		Registered in England Reg No: 2275962 Reg. Office address as printed Director: E. J. Payne V. A. Payne A. G. Payne A. G. Allen								
CERTIFICATE OF CALIBRATION										
CERTIFICATE No. EJP/DW/P-035										
DATE OF ISSUE: January 20, 2000										
LOCAL STANDARDS USED: Atmospheric pressure assumed as 1 atm										
WORKING STANDARDS USED: Density of water as per table below										
Density of Water: Kg/m ³ Pure Air-free water under a pressure of 1 Atmosphere										
Temp °C	0	2	4	6	8	10	12	14	16	18
°C	0	999.84	999.98	999.97	999.84	999.65	999.30	998.80	998.14	997.33
20	996.51	995.97	995.70	995.60	995.64	995.81	996.11	996.54	997.09	997.87
40	998.22	998.44	998.81	999.31	999.93	1000.68	1001.57	1002.59	1003.74	1005.02
60	998.20	998.16	981.10	980.81	979.50	977.27	974.02	970.74	967.44	964.12
80	971.82	970.54	968.21	965.81	963.34	960.82	958.26	955.66	953.02	950.34
100	928.16									
OTHER TEST EQUIPMENT USED: Oertling OCS1 balance (serial number: BA003727) KMA50 digital thermometer c/w IC23M (serial number: 472644) Deionised water										
TEMPERATURE OF TEST WATER: 20°C										
EQUIPMENT DESCRIPTION: PYKNOMETER 500ml Stainless Steel										
IDENTIFICATION: P-035										
WEIGHT: 500.7g										
Signed: <i>[Signature]</i>										
Date: 20 Jan 2000										
ISO 9001 ISO 9002 ISO 9003 ISO 9004 ISO 9005 ISO 9006 ISO 9007 ISO 9008 ISO 9009 ISO 9010 ISO 9011 ISO 9012 ISO 9013 ISO 9014 ISO 9015 ISO 9016 ISO 9017 ISO 9018 ISO 9019 ISO 9020 ISO 9021 ISO 9022 ISO 9023 ISO 9024 ISO 9025 ISO 9026 ISO 9027 ISO 9028 ISO 9029 ISO 9030 ISO 9031 ISO 9032 ISO 9033 ISO 9034 ISO 9035 ISO 9036 ISO 9037 ISO 9038 ISO 9039 ISO 9040 ISO 9041 ISO 9042 ISO 9043 ISO 9044 ISO 9045 ISO 9046 ISO 9047 ISO 9048 ISO 9049 ISO 9050 ISO 9051 ISO 9052 ISO 9053 ISO 9054 ISO 9055 ISO 9056 ISO 9057 ISO 9058 ISO 9059 ISO 9060 ISO 9061 ISO 9062 ISO 9063 ISO 9064 ISO 9065 ISO 9066 ISO 9067 ISO 9068 ISO 9069 ISO 9070 ISO 9071 ISO 9072 ISO 9073 ISO 9074 ISO 9075 ISO 9076 ISO 9077 ISO 9078 ISO 9079 ISO 9080 ISO 9081 ISO 9082 ISO 9083 ISO 9084 ISO 9085 ISO 9086 ISO 9087 ISO 9088 ISO 9089 ISO 9090 ISO 9091 ISO 9092 ISO 9093 ISO 9094 ISO 9095 ISO 9096 ISO 9097 ISO 9098 ISO 9099 ISO 9100 ISO 9101 ISO 9102 ISO 9103 ISO 9104 ISO 9105 ISO 9106 ISO 9107 ISO 9108 ISO 9109 ISO 9110 ISO 9111 ISO 9112 ISO 9113 ISO 9114 ISO 9115 ISO 9116 ISO 9117 ISO 9118 ISO 9119 ISO 9120 ISO 9121 ISO 9122 ISO 9123 ISO 9124 ISO 9125 ISO 9126 ISO 9127 ISO 9128 ISO 9129 ISO 9130 ISO 9131 ISO 9132 ISO 9133 ISO 9134 ISO 9135 ISO 9136 ISO 9137 ISO 9138 ISO 9139 ISO 9140 ISO 9141 ISO 9142 ISO 9143 ISO 9144 ISO 9145 ISO 9146 ISO 9147 ISO 9148 ISO 9149 ISO 9150 ISO 9151 ISO 9152 ISO 9153 ISO 9154 ISO 9155 ISO 9156 ISO 9157 ISO 9158 ISO 9159 ISO 9160 ISO 9161 ISO 9162 ISO 9163 ISO 9164 ISO 9165 ISO 9166 ISO 9167 ISO 9168 ISO 9169 ISO 9170 ISO 9171 ISO 9172 ISO 9173 ISO 9174 ISO 9175 ISO 9176 ISO 9177 ISO 9178 ISO 9179 ISO 9180 ISO 9181 ISO 9182 ISO 9183 ISO 9184 ISO 9185 ISO 9186 ISO 9187 ISO 9188 ISO 9189 ISO 9190 ISO 9191 ISO 9192 ISO 9193 ISO 9194 ISO 9195 ISO 9196 ISO 9197 ISO 9198 ISO 9199 ISO 9200										



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Particle Size Analysis—(Mastersizer)

Laser Particle Size Analysers..

The state of the art technology incorporated by Malvern into the Mastersizer range delivers speed of measurement, exceptional reproducibility and an ability to compare the results to other techniques.

Particles within a wide size range from sub-micron to a few millimetres are measured accurately and non-destructively, allowing you to recover your sample if it is expensive or in short supply.

The Mastersizer range offers:-

Wide dynamic range - from 0.02 μ m to 2000 μ m with the Mastersizer 2000.

Rapid analysis - less than 30 seconds for a measurement means rapid feedback in QC and production situations.

Flexibility - dry powders, liquid suspensions, aerosols, and emulsions can all be analysed.

Non-destructive - recover your sample for further testing.

Optimised detector - designed to exploit Mie theory to the full.

When the first laser diffraction instruments were launched, the constraints of most commonly available computers meant that the instruments used an approximation of Mie light scattering theory known as the Fraunhofer approximation to produce particle size analyses. However there is now no good technical reason why the full rigor of the solution of the light scattering of spheres as predicted by Gustav Mie should not be applied as a standard feature to avoid the shortcomings of the Fraunhofer approximation.

These shortcomings are particularly acute with transparent submicron particles in liquid suspension. Consequently *the Mastersizer uses the full Mie theory as standard* with the Fraunhofer approximation as a reference route to the past.

All Mastersizer systems are configured from a series of optimised components:



Light Source: Every Mastersizer has a He-Ne laser providing light with a wavelength of 0.633nm. This offers exceptional temperature stability and provides a level of signal to noise not equalled by the current generation of laser diodes.

Sample Dispersion Detector: The key to quality particle size measurement is the ability to present a well dispersed homogenous sample to the laser beam at an appropriate concentration with a minimum of bias. Malvern's series of sampling accessories is designed to meet this requirement to the full.

Detector: Light scattered by the sample is focused on to a photosensitive silicon detector which is made up of a large number of discreet elements. The optical system is optimised to ensure that the signal from each element is directly proportional to the amount of light on it.

Data collection and analysis: Hundreds of thousands of particles will pass through the laser beam every second. The light falling on to the detectors is measured and integrated 500 times each second. This enables a statistically significant scattering pattern of the widest distributions to be acquired within a few seconds. Malvern pioneered the use of Windows™ based software to give the users the now widely accepted benefits of enhanced ease to "talk" to spreadsheets and other utilities.

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The **Mastersizer 2000 particle size analyzer** has been developed to meet industry's growing need for global comparability of results, traceability, regulatory compliance, and efficiency in the laboratory. In introducing the Mastersizer 2000 particle size analyzer, Malvern has advanced particle size analysis to the point where it is now a simple, straightforward and routine task. The Mastersizer 2000 is a modular instrument designed for the measurement of the particle size distribution of wet and dry samples. It has a wide range of sample dispersion units including an Autosampler. Fully automated, it delivers results based on standardized procedures designed to eliminate user-to-user variability.

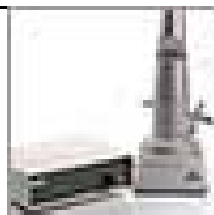
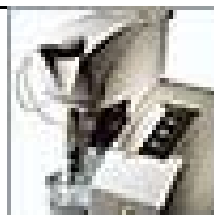


The **Mastersizer 2000E particle size analyzer** is the entry-level particle analysis solution for the Mastersizer family. Based on the award-winning Mastersizer 2000, it provides a cost-effective solution for those users who do not immediately require the full Mastersizer 2000 specification, but who would like the option to upgrade as their needs develop.

Specification	Mastersizer 2000	Mastersizer 2000E
Size range	0.02 to 2000 microns	0.1 to 1000 microns
Measuring Principle	Mie Scattering	
Detection Systems	Red light: Forward scattering, side scattering and back scattering. Blue light: Wide angle forward and back scattering.	Forward scattering, side scattering and back scattering.
Light Sources	Red light: Helium neon laser. Blue light: Solid state light source.	Helium neon laser.
Optical Alignment System	Automatic rapid align system with dark field optical reticle and multi-element alignment detector.	
Sample dispersion unit interchange system	Sample dispersion units automatically recognized, configured and enabled on insertion of measurement cell cassettes into optical unit.	
Power	110/240V, 50/60 Hz, 60 VA.	
Dimensions (LxDxH), weight	1293 x 255 x 375mm, 31kg (excluding dispersion units)	

SAMPLE DISPERSION UNITS

	HYDRO S	HYDRO G	HYDRO MU	HYDRO SM	SCIROCCO
Dispersion type	small volume general-purpose automated sample dispersion unit	large volume general-purpose automated sample dispersion unit designed for the measurement of larger, denser material	large volume manual sample dispersion unit using standard laboratory beakers as the sample container	manual small volume sample dispersion unit	dry powder feeder enabling the automatic measurement of dry powders
Capacity	50—120ml	800 ml	600—1,000ml	50—120ml	Dry
Operation	All functions controlled by the system software. Fully automatic operation via SOPs, manual operation via on-screen operating dialogues. Compatible with Autosample		All functions manually controllable via built-in splash proof membrane keypad.	Pump/stir manually controlled by stand-alone tacho control unit with digital read-back.	Automatic via SOPs Manual via computer on-screen dialogues.
Dims, weight	352 x332x355mm, 11kg	344 x330x352mm, 13.7kg	320x335x375mm, 18.5kg	225x80x180,mm 1.5kg 140x390x170mm, 6.75kg	352x332x355mm, 11.7kg



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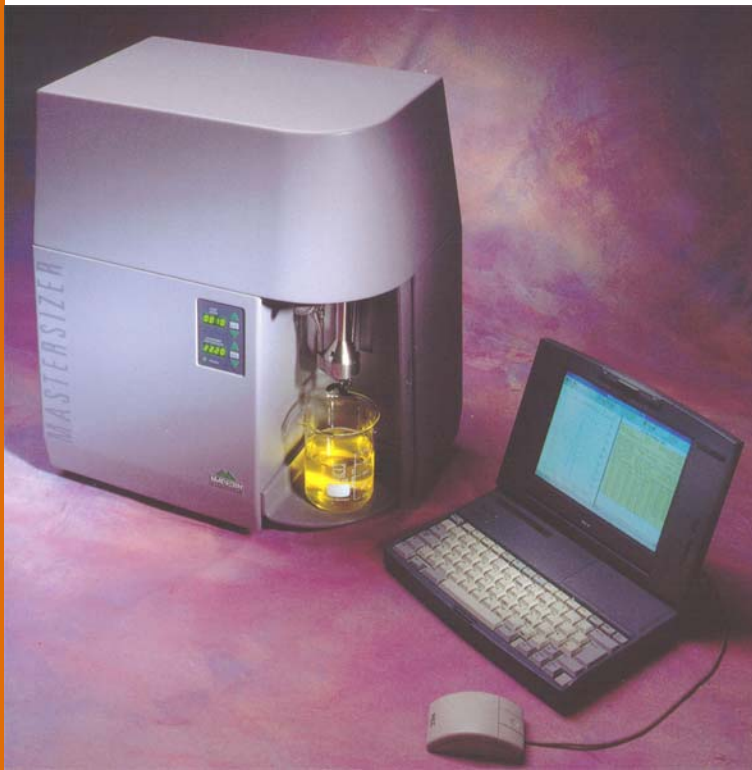
Tel: +44 (0) 1782 312534 Fax: +44 (0) 1782 599868 Email: sales@ejpayne.com



ISO 9001:2008
Certificate 23478

Mastersizer Micro System.

Extensive market research and customer opinions directed the development of the Mastersizer Micro systems. The result is a small footprint instrument, low cost instrument system that takes laser diffraction out of the specialist laboratory and into the hands of particle technologists everywhere.



Mastersizer Micro performs like a research machine and operates like a QC tool, yet has a price comparable to other non-laser diffraction techniques.

The Micro was made possible by combining the skills of Malvern's team of optical experts with the latest software operating systems. It is a truly remarkable system, which combines single lens laser diffraction with real ease of use. In situations close to the production line, the Micro offers results compatible with those gained in the R&D or method development laboratory. Single button operation means that even inexperienced users can perform repetitive measurements easily and reproducibly. The stable single lens optics minimises set up and maintenance routines.

The Micro systems utilise all of Malvern's software experience - full Mie scattering theory algorithms are included together with the Fraunhofer approximation, if required.

Simplicity of Handling.

A unique "dip-in" probe provides sample agitation, sonication and circulation through the measuring system as well as allowing the use of a standard 600ml beaker as the sample holder.

For the measurement of solvent-based systems, the small volume dispersion unit can be used and for the measurement of very small amounts of suspensions or emulsions, a direct injection accessory is available.

Feature	Specification
Measurement Principle	Laser diffraction using Fraunhofer or Mie scattering theory.
Optics	Unique fixed folded lens system for compactness and totally enclosed for low maintenance.
Particle size range: Micro (ref: MAF5000)	0.3 - 300µm
Sample	Liquid suspension of a sample in a standard beaker (600mls) Compatible with Small Volume dispersion Unit (50 - 80mls) Emulsions can be injected by syringe for analysis (5mls)
Dispersion	Mechanical and timed ultrasonic probe for thorough sample dispersion
Measurements control	Complete instrument operation with simple press button actions shown on a computer screen. Single key operation for sample measurement. Full range of analysis and data manipulation facilities. Operator alarms of incorrect conditions. Layered access providing security of operation
Computer options	Micro can be used with standard Windows™ compatible PC and notebooks
Weight	32 Kg
Footprint	500mm x 325mm (front to back)

Sieve Shaking Machines

The AS200 Sieve shakers are designed to carry out exact, reproducible results according to DIN EN ISO 9000 ff. The AS200 is available with three different control systems, and options on clamping devices to suit the customer's requirements and budgets. The AS200 has a capacity of 8 full height or 16 half height sieves of 100/150/200/203mm (8").

AS200 Control The AS 200 control complies with the highest requirements in quality assurance. One particular characteristic makes this RETSCH product stand out from others: Instead of the vibration height, the sieve acceleration, which is independent of the power frequency, can be set. Thus, the AS 200 control ensures comparable and reproducible sieving results worldwide.

It can be calibrated to ensure 100% reproducibility of sieving results, not only in one device, but among all AS 200 control units! Thus, the requirement for the test materials monitoring according to DIN EN ISO 9000 ff is met. Its microprocessor-controlled measuring and control unit ensures a constant vibration height. With regard to operational convenience, the AS 200 control meets and exceeds all standards of a modern laboratory. All sieving parameters – vibration height, time, interval – are set, displayed and monitored digitally. Up to 9 parameter combinations can be stored for routine analyses.

Through the integrated interface the instrument can be connected to a PC and controlled with the evaluation software EasySieve®. This program enables you to control the whole sieving process and the subsequent documentation with convenience and accuracy.



AS200 Digit, the standard model of the AS 200 series is recommended whenever digital time display, interval operation and analogue adjustment along with optical monitoring of the vibration height are required



AS200 Basic The economical alternative of the series with familiar quality and reliability. With analogue adjustment of vibration height and sieving time.



Technology of AS 200, AS 300

All sieve shakers of the series AS 200 and AS 300 work with an electromagnetic drive that is patented by RETSCH (EP 0642844).

This drive produces a 3D throwing motion that moves the product to be sieved equally over the whole sieving surface. The advantage: high load capacity, extremely smooth operation and short sieving times with high separation efficiency.

Product Codes (for 230V, 50Hz supply - other voltages on request)

AS200 Control (100-240V, 50/60Hz)	30.018.0001	Clamping device "deluxe"	32.662.0001	Universal Clamping deluxe	32.662.0004
AS200 Digit	30.015.0001	Clamping device "standard"	32.662.0002	Universal Clamping standard	32.662.0005
AS200 Basic	31.016.0001	Clamping device "economy"	32.662.0003	EasySieve software (English)	32.645.0026



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EasySieve® Standard or EasySieve® Comfort

Two different versions of EasySieve® are available: Standard and Comfort. EasySieve® Comfort offers enhanced possibilities for data transfer to LIMS systems, for graphical display of trend analyses as well as for the determination of special characteristics. Available in German and in English



Benefits at a glance

- Automatic registration, evaluation and administration of measurement data
 - Measurement protocol in accordance with standards
 - Complex transformation into charts and tables
 - Data link of different measurement instruments
 - Automatic detection and configuration of common analytical scales
 - Comprehensive data export
- Comprehensive help text, detailed manual

Simple, fast, and reliable

EasySieve, the software for particle size analyses, is able to automatically control the necessary measurement and weighing procedures – from the registration of the weight of the sieve up to the evaluation of the data.

Due to the logical design of the software the user can easily get started with the program. He is lead through the process step by step.

System requirements

Pentium PC

for automatic control:

- PC with free serial * interfaces
 - scale with serial * interface
 - sieve shaker with serial * interface
- (e.g. AS 200 control, AS 300 control, AS 400 control, AS 200 tap)

*A RS232-USB Adapter is available

Feature	COMFORT	STANDARD
Windows user interface	Windows 98/98/ME/NT/2000/XP	Windows 98/98/ME/NT/2000/XP
ASTM & Tyler Mesh	X	-
Password Protection	X	-
Serial No for Sieves	X	-
Sieve analysis with:		
Nominal mesh size	X	X
Actual mesh size	X	-
GENERAL INFORMATION		
Automatic simultaneous data transfer	X	-
Administration of measurement data	Unlimited	Unlimited
Data import & export	X	X
CD manual / online help	X	X
Measurement protocol (according to DIN 66 165)	X	X
TABLES		
Throughput value, Q3 (x)	X	X
Residual values, 1-Q3 (x)	X	X
Fraction, p3	X	X
Fraction, Δm (proportional masses)	X	X
Distribution Density, q3 (x)	X	X
Log distribution density, q3* (x)	X	X
Actual mesh size	X	-
DIAGRAM		
combined representation of several analyses	X	
Curve representation	X	X
Distribution density		
• x-axis	lin, log	lin, log
• Y-axis	lin, log, RSSB	lin, log, RSSB
Windowing (Zoom)	X	X
Cumulative curve (throughput) Q3 (x)	X	X
Residual curve (1-Q3 (x))	X	X
Fraction p3/histogram	X	X
Lin. Division density q3(x)	X	X
Log. Division density q3*(x)	X	X
Trend analysis	X	-
Limit value graph with specifications limits	X	X
2 representation possibilities (including right y-axis)	X	X
Reference particles (registration of external particle size division)	X	X
PARAMETERS		
Fineness parameters, 3 values Q3 (x)	X	X
Quantile particle size, 3 values x (Q3)	X	X
RRSN parameters	X	X
Sauter mean diameter X St	X	-
Splinter value	X	X
Specific interface		
• volume related Sv	X	-
• mass related Sm	X	-
Unequal grade of granularity	X	X
AFS particle fineness No.	X	-

Test Sieves

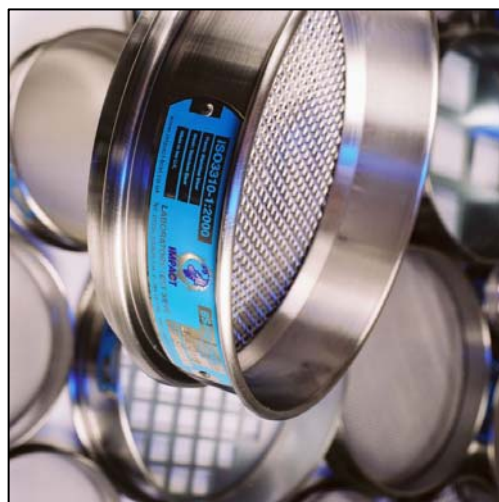
Test Sieves.

Test sieves are manufactured to the highest quality and are available to every National and International Specification. The sieves are certified, each sieve is supplied with a Certificate of Conformity and is individually numbered to provide full traceability.



Diameters range from 100mm or 3inch up to 450mm or 18inch, with the frame materials being manufactured from Brass, Stainless steel or Plated steel.

The "screen" is made from either woven wire mesh or alternatively perforated plate with apertures from 125mm to 20 micron (1mm for perforated plate sieves). See below for sieve chart



Mesh / hole width	DIN 4188	ASTM E11-70	TYLER®	BS410		Mesh / hole width	DIN 4188	ASTM E11-70	TYLER®	BS410
µm	mm	No.	Mesh	Mesh		µm	mm	No.	Mesh	Mesh
5	0.005		2500	2500		315	0.315			
10	0.010		1250	1250		355	0.355	45	42	44
15	0.015		800	800		400	0.400			
20	0.020		625	625		425		40	35	36
22	0.022					450	0.450			
25	0.025		500	500		500	0.500	35	32	30
28	0.028					560	0.560			
32	0.032		425	425		600		30	28	25
36	0.036					630	0.630			
38		400	400	400		710	0.710	25	24	22
40	0.040					800	0.800			
45	0.045	325	325	350		850	0.850	20	20	18
50	0.050					900	0.900			
53		270	270	270		mm	mm	No.	Mesh	Mesh
56	0.056					1.00	1.00	18	16	16
63	0.063	230	250	240		1.12	1.12			
71	0.071					1.18		16	14	14
75		200	200	200		1.25	1.25			
80	0.080					1.40	1.40	14	12	12
90	0.090	170	170	170		1.60	1.60			
100	0.100					1.70		12	10	10
106		140	150	150		1.80	1.80			
112	0.112					2.00	2.00	10	9	9
125	0.125	120	115	120		2.24	2.24			
140	0.140					2.36		8	8	7
150		100	100	100		2.50	2.50			
160	0.160					2.80	2.80	7	7	6
180	0.180	80	80	85		3.15	3.15			
200	0.200					3.35		6	6	5
212		70	65	72		3.55	3.55			
224	0.224	65	62	66		4.00	4.00	5	5	4
250	0.250	60	60	60		4.50	4.50			
280	0.280					4.75		4	4	3½
300		50	48	52		5.00	5.00			

Laboratory Drying Ovens

General-purpose laboratory ovens, with a temperature range of 40 – 250°C.

Design: The exterior is constructed from sheet steel finished in easy clean powder coated paint. The interior chamber is made from mild steel coated with aluminium (CLAD) with a stainless steel chamber available as an option. Fitted with fixed shelf runners and removable chrome plated wire grid shelves. The top vent is fitted with a clip to hold a mercury in glass thermometer. The vertical style units are fitted with the controls below the door and the horizontal style units with the controls fitted on the side are available from 75 litres upwards.

Heating: Heated by incoloy sheathed elements; positioned below the chamber floor for natural convection units and fitted around the fan on the back or side wall of the chamber for mechanical convection units.

Controls: The control systems comprise of a direct reading thermostat and over-heat thermostat both with calibrated scales and tamper proof locks. They also include mains switch with indicator and heat and overheat indicators. Options include a microprocessor digital controller with LED display of temperature or an independent LED display for showing temperature on the thermostatically controlled units. All units supplied with digital controller must have fan circulation.



50 litre oven—MINO/50

Specifications			Vertical Style				
Cat No.	Capacity (Litres)	Internal dims (HxWxD) (cm)	External dims Without fan	External dims. With fan	No. shelves	Shelf positions	Nett weight (kg)
MINO/6	6	15 x 23 x 18	39 x 32 x 32	N/A	1	1	7
MINO/18	18	26 x 26 x 27	50 x 36 x 40	N/A	2	2	14
MINO/30	30	24 x 36 x 35	49 x 45 x 47	49 x 45 x 59	2	2	20
MINO/40	40	32 x 36 x 35	57 x 45 x 47	57 x 45 x 59	2	3	23
MINO/50	50	33 x 49 x 33	58 x 61 x 45	58 x 61 x 57	2	3	26
MINO/75	75	33 x 49 x 46	58 x 61 x 58	58 x 61 x 70	2	3	34
			Horizontal Style				
Cat No.	Capacity (Litres)	Internal dims without fan	Internal dims With fan	External dims. (HxWxD)	No. shelves	Shelf positions	Nett weight (kg)
OV/50	50	42 x 41 x 35	45 x 37 x 34	57 x 73 x 47	2	3	31
OV/75	75	42 x 53 x 35	45 x 49 x 35	55 x 85 x 46	2	3	39
OV/100	100	42 x 53 x 46	45 x 49 x 46	55 x 85 x 57	3	4	48
OV/125	125	52 x 53 x 46	55 x 49 x 46	65 x 85 x 57	3	5	57
OV/150	150	52 x 53 x 54	55 x 49 x 54	65 x 85 x 65	3	5	66
OV/200	200	72 x 53 x 54	75 x 49 x 54	85 x 85 x 65	4	7	85

General-purpose fan assisted laboratory ovens, with a temperature range of 40 – 300°C.

Design: The exterior is constructed from sheet steel finished in an easy clean powder coated paint. The interior chamber is made from stainless steel chamber with rounded corners on MAX units. Fitted with fixed shelf runners and removable chrome plated wire grid shelves. The top vent is fitted with a clip to hold a mercury in glass thermometer. These horizontal style units are fitted with the controls on the side.

Heating: Heated by incoloy sheathed elements; positioned around the fan on the back or side wall of the chamber for mechanical convection units.

Sizes	Volume (litres)	Shelves supplied / (positions)	Dimensions in cm	
			Internal	External Overall
Model			Height x Width x Depth	Height x Width x Depth
MAXO 53	53	2 / 3	33 x 49 x 33	52 x 85 x 51
MAXO 75	75	2 / 3	33 x 49 x 46	52 x 85 x 64
MAXO 95	95	2 / 3	45 x 49 x 43	62 x 87 x 63
MAXO 130	130	3 / 4	61 x 49 x 43	78 x 87 x 63
MAXO 160	160	3 / 4	61 x 49 x 54	78 x 87 x 74
MAXO 190	190	4 / 6	71 x 49 x 54	88 x 87 x 74

Controls: The MAXO units have an electronic controller with a calibrated scale. They also include mains switch with indicator and heat and overheat indicators. Options include a microprocessor digital controller with LED display of temperature or an independent LED display for showing temperature on the thermostatically controlled units.

Large Capacity Ovens.

Of the same design as the smaller units these ovens offer a much larger capacity.

The vertical style units have a single door, the horizontal style units are fitted with twin doors. The heating element in these ovens is placed in the base fan duct for sizes up to 500 litres, and in the side fan duct for sizes 650 litres and upwards.

All units have as standard a PID Microprocessor controller, with dual displays of set point and actual temperature that are auto-tuned to each individual unit to optimise the heat up, overshoot and control of temperature.



Model LCO/42H/DIG

Specifications			Vertical Style			
Cat No.	Capacity (Litres)	Internal dimensions (HxWxD) (cm)	External dimensions (HxWxD) (cm)	No. of shelves	No. of shelf positions	Nett weight (kg)
LCO/9V	250	91 x 51 x 52	127 x 69 x 69	5	7	85
LCO/12V	350	91 x 61 x 62	127 x 79 x 79	5	7	110
LCO/15V	425	91 x 61 x 77	127 x 79 x 94	5	7	140
LCO/18V	500	114 x 61 x 77	150 x 79 x 94	5	9	155
LCO/22V/DIG	650	114 x 77 x 77	150 x 142 x 95	5	9	170
LCO/27V/DIG	750	128 x 77 x 77	164 x 142 x 95	5	10	190
LCO/30V/DIG	850	142 x 77 x 77	178 x 142 x 95	5	11	210
LCO/35V/DIG	1000	142 x 77 x 92	178 x 142 x 110	5	11	230
			Horizontal style			
LCO/9H	250	54 x 92 x 44	94 x 109 x 57	3	4	80
LCO/12H	350	54 x 92 x 64	94 x 109 x 77	3	4	120
LCO/15H	425	76 x 92 x 64	112 x 109 x 77	4	5	150
LCO/18H	500	91 x 92 x 64	127 x 109 x 77	5	7	165
LCO/22H/DIG	650	91 x 92 x 77	127 x 157 x 95	5	7	180
LCO/27H/DIG	750	106 x 92 x 77	142 x 157 x 95	5	8	200
LCO/30H/DIG	850	122 x 92 x 77	158 x 157 x 95	5	9	220
LCO/35H/DIG	1000	142 x 92 x 77	178 x 157 x 95	5	11	240
LCO/42H/DIG	1250	142 x 122 x 74	178 x 187 x 92	5	11	275



Model LCO/12V/DIG



Model OV/50/DIG

Temperature Gradient Kilns

Temperature Gradient Kilns.

The range of Temperature Gradient Kilns available from E.J.Payne Ltd is manufactured in Stoke-on-Trent and has become an essential part of the Ceramic Laboratory. Traditional kilns have incorporated single chambers with 9 measuring points in a single muffle. However modern demands have led to the introduction of multi-chamber gradient kilns, so that each individual chamber can be independently programmed.

Single chamber (Fixed Gradient) kilns – TG.9F

On the left is the TG.9F. The purpose of this gradient kiln is to obtain a series of temperature readings from samples during a single firing cycle. The style of kiln is ideal for trials of ceramic glazes, colours and clay bodies, insulators and sanitaryware etc. In this style of kiln a fixed gradient of approximately 20/25°C would be apparent between each of the nine measuring point. Overall there is an approximate gradient of 180°C across the nine thermocouples between the "hot" and "cold" ends.

As standard the TG.9F kilns incorporate a TCS1 microprocessor controller, able to store 99 programs with up to 99 segments per programme, offering total flexibility in the firing curve.

A chart recorder can be fitted as an optional extra (as shown)



TG9 F

Kiln Type	Muffle width	Muffle depth	Muffle height	Max. temperature	Power rating
TG9F	65mm	460mm	50mm	1,300°C	3kW
TG.9F Mk.II	200 mm	460 mm	50 mm	1,300°C	5.5kW

Multi Chamber (Variable Gradient) Kilns – TG.3 / TG.6 XL / TG.9 Mk.III

The new range of individual chamber temperature gradient kilns, The TG.3, TG.6 XL and the TG.9 Mk.III (pictured below) are unique in design as they offer the user the ability to set the top temperature to be achieved in each chamber. Hence the user is no longer constrained to a fixed gradient, as was the case with the traditional gradient kilns. Each chamber has its

own thermocouple and electrical contactor that is linked back to the TC.S1 / TC.M2 microprocessor controller. This allows the user to program the firing cycle for one of the chambers (this will be the hottest chamber). The temperatures in the remaining chambers will then be set as differences in temperature.

The TC.S1 / TC.M2 controller will allow up to able to store 99 programs with up to 99 segments per programme, and can simultaneously display the temperatures in three adjacent chambers.



Kiln Type	Individual chamber width	Individual chamber depth	Individual chamber height	Maximum temperature	Number of chambers
TG.3	115mm	150mm	115mm	1,300°C or 1,400°C	3
TG.6 XL	200mm	200mm	150mm	1300°C or 1400°C	6
TG.9 Mk.III	80mm	150mm	75mm	1300°C or 1400°C	9

TG10 Temperature Gradient Kiln

- 10 chambers enabling 10 trials to be fired simultaneously
- Chamber dimensions each 80 mm wide x 150 mm deep x 75 mm high
- TCM2 microprocessor fitted as standard
- Chamber configuration 2 chambers wide x 5 chambers high
- 2 maximum design temperatures 1300°C and 1400°C
- Power rating 19 kw

Kiln Type	Individual chamber width	Individual chamber depth	Individual chamber height	Maximum temperature	Number of chambers
TG.10	80mm	150mm	75mm	1,300°C or 1,400°C	10

TG.6 Mk III

Specifically designed for **frit trial firing**, the TG6 Mk III is available in two maximum design temperatures, 1300°C and 1400°C. Both kilns incorporate the following features essential for frit trials.

6 individual chambers

Individual thermocouple and relay to each chamber
 Programmable flexible gradient between individual chambers

Spiral wound kanthal elements

TCM2 microprocessor controller managing the firing process

Thermocouple automatically lowered into crucible containing sample frit on closure of the door

Optional Equipment

Stand

Chart recorder

Software/hardware for data logging to PC (Windows XP)



Kiln Type	Individual chamber width	Individual chamber depth	Individual chamber height	Maximum temperature	Number of chambers
TG.6 Mk.III	115mm	150mm	115mm	1,300°C or 1,400°C	6

Laboratory Kilns

The Falcon range of electrically operated Front Loading style kilns is reliable in performance and efficient in terms of power-input requirements and energy saving capabilities.

The updated versions of these kilns now include the following standard features on all models:

- Chamber capacities from 50 to 1250 litres (1.8 to 46 ft³)
- Choice of Efficient Low Thermal Mass Linings for firing to 1,300° C (FL range) or 1,350° C (FS range)
- Choice of plug in temperature controllers from the Microtech range of Microprocessor Temperature Controllers.
- Over temperature protection
- Spiral wound Heating Elements using High Grade Kanthal wire
- Electromechanical door safety interlock
- Sturdy pressed steel cabinet
- Two doors clamps for positive door sealing
- High gloss enamel finish

Additional standard features on 680, 1000 and 1250 litre models

- Additional heating elements fitted to rear wall and door
- Two zone temperature control for excellent temperature distribution
- Automatic exhaust / cooling damper
- Fully programmable Temperature Controller TCS1 controlling both firing curve and Exhaust cooling damper.

Kiln furniture sets can be supplied as standard sets, or as specialist sets to the customer's requirement.



Falcon 190

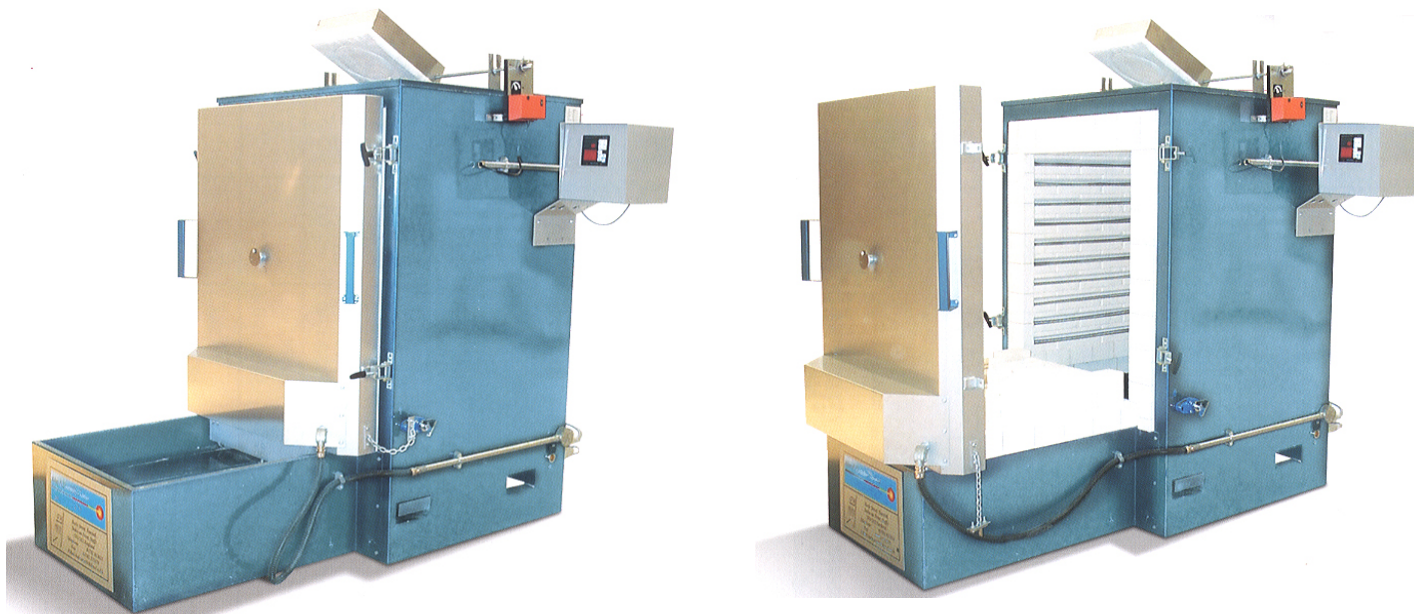
Model (*)	Capacity Litres / Ft ³	Firing chamber (WxDxH)	Overall dimensions (WxDxH)	Weight (kg)	Power (kW)	220/240 Volts	380/415 Volts	Power (kW)	380/415 Volts
					1,300° C Maximum (FL3 range)			1,350° C Max. (FS range)	
FL3.50	53 / 1.87	380 x 300 x 460	636 x 864 x 1245	177	4.5	25 amps	N/A	6.25	20 amps
FL3.65	66 / 2.34	380 x 380 x 460	636 x 864 x 1245	178	4.80	32 amps	16 amps	6.80	20 amps
FL3.80	79 / 2.81	380 x 460 x 460	620 x 864 x 1245	185	6.25	30 amps	20 amps	8.26	25 amps
FL3.120	122 / 4.32	460 x 460 x 580	715 x 1016 x 1372	245	8.50	40 amps	25 amps	10.50	25 amps
FL3.160	163 / 5.75	460 x 610 x 580	715 x 1016 x 1372	260	9.78	50 amps	25 amps	12.00	32 amps
FL3.171	171 / 6.1	460 x 550 x 680	715 x 1016 x 1372	177	10.0	50 amps	20 amps	10.00	
FL3.190	191 / 6.75	460 x 610 x 680	715 x 1016 x 1372	245	11.38	50 amps	25 amps	13.50	32 amps
FL3.215	215 / 7.5	460 x 510 x 910	715 x 1016 x 1600	306	12.75	63 amps	25 amps	15.00	
FL3.230	226 / 8.00	610 x 610 x 610	965 x 1066 x 1346	310	12.75	60 amps	32 amps	15.00	32 amps
FL3.250	256 / 9.00	460 x 610 x 910	715 x 1016 x 1600	310	14.08	62 amps	32 amps	16.50	40 amps
FL.280	283 / 10.00	610 x 610 x 760	965 x 1193 x 1676	456	15.75	80 amps	32 amps	17.25	40 amps
FL.340	340 / 12.00	610 x 610 x 910	965 x 1193 x 1676	495	18.00	N/A	40 amps	20.00	40 amps
FL.350	354 / 12.50	610 x 760 x 760	965 x 1193 x 1676	480	18.50	N/A	40 amps	20.50	40 amps
FL.420	424 / 15.00	610 x 760 x 910	965 x 1193 x 1676	535	22.00	N/A	40 amps	24.00	50 amps
FL.500	510 / 18.00	610 x 910 x 910	965 x 1346 x 1676	590	24.50	N/A	50 amps	34.00	63 amps
FL.680	680 / 24.00	610 x 910 x 1220	965 x 1346 x 1981	900	32.00	N/A	63 amps	34.00	63 amps
FL.1000	1000 / 35.0	800 x 1000 x 1250	1150 x 1473 x 2032	1100	45.00	N/A	80 amps	50.00	100 amps
FL.1250	1250 / 45.5	1000 x 1000 x 1250	1350 x 1510 x 2032	1500	55.00	N/A	100 amps		

The Falcon Easi-Load range of kilns has been developed from the standard models, with a roll-out hearth for easy loading / unloading of the chambers.

Standard features on all models

- Chamber capacities from 190 to 1000 litres (6.7 to 35.3 ft³)
- Falcon "Easi-Load Silver" for firing to 1,300°C
- Falcon "Easi-Load Gold" for firing to 1,350°C
- Choice of plug in temperature controllers from the Microtech range of Microprocessor Temperature Controllers.
- Over temperature protection
- Spiral wound Heating Elements using High Grade Kanthal wire
- Electromechanical door safety interlock
- Sturdy pressed steel cabinet
- Four doors clamps for positive door sealing
- High gloss enamel finish
- Automatic exhaust / cooling damper
- Fully programmable Temperature Controller TCS1 controlling both firing curve and Exhaust / Cooling damper.

Kiln furniture sets can be supplied as standard sets, or as specialist sets to the customer's requirement.



Model (*)	Capacity Litres / Ft ³	Firing chamber (WxDxH)	Overall dimensions (WxDxH)	Power (kW)	220/240 Volts	380/415 Volts	Power (kW)	220/240 Volts	380/415 Volts
				1,300° C Maximum (Silver range)			1,350° C Maximum (Gold range)		
SEL/GEL 120	122 / 4.31	460 x 460 x 580	715 x 1570 x 1375	8.5	50 amps	25 amps	10.50	63 amps	25 amps
SEL/GEL 160	163 / 5.75	460 x 610 x 580	715 x 1710 x 1375	9.78	63 amps	25 amps	12.00	80 amps	32 amps
SEL/GEL 190	191 / 6.75	460 x 610 x 680	715 x 2160 x 1372	11.38	63 amps	25 amps	13.50	80 amps	
SEL/GEL 230	226 / 8.00	610 x 610 x 610	965 x 2290 x 1346	12.75	80 amps	32 amps	15.00	80 amps	
SEL/GEL 250	256 / 9.00	460 x 610 x 910	715 x 2160 x 1600	14.23	80 amps	32 amps	16.50	80 amps	
SEL/GEL 280	283 / 10.00	610 x 610 x 760	965 x 2290 x 1473	15.75	80 amps	32 amps	17.25		40 amps
SEL/GEL 340	340 / 12.00	610 x 610 x 910	965 x 2290 x 1625	18.00		40 amps	20.00		40 amps
SEL/GEL 350	354 / 12.50	610 x 760 x 760	965 x 2440 x 1473	18.50		40 amps	20.50		40 amps
SEL/GEL 420	424 / 15.00	610 x 760 x 910	965 x 2446 x 1625	22.00		40 amps	24.00		50 amps
SEL/GEL 500	510 / 18.00	610 x 910 x 910	965 x 2550 x 1625	24.50		50 amps	26.50		63 amps
SEL/GEL 680	680 / 24.00	610 x 910 x 1220	965 x 2900 x 1625	32.00		63 amps	54.00		125 amps
SEL/GEL 840	848 / 32.00	610 x 1524 x 910	965 x 3200 x 1625	48.00		100 amps	66.00		160 amps
SEL/GEL 1000	1000 / 35.0	610 x 1830 x 910	965 x 3555 x 1620	56.00		125 amps	79.00		160 amps



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Top Loading Kilns

HAWK KILNS

All models feature:

- 1300°C design temperature
- High grade spiral wound elements
- Lid electrical safety system
- Vent cooling plugs
- Stainless steel cladding

Castor wheels for ease of moving

Hawk 25

Power rating 3kw

240v I PH 13amp domestic supply

3 pin plug and cable fitted (UK only)

Hawk 40

Power rating 4kw

240v I PH 20amp domestic supply



Kiln Details					Electrical Details	
Type	Capacity (litres)	Firing chamber Diameter x height	Overall dimensions Width x depth x height	Weight	Power (kW)	Supply, 220/230V
HAWK25	25	330 x 312mm	485 x 665 x 535mm	45kg	3	13A
HAWK40	40	330 x 457mm	485 x 665 x 680mm	50kg	4	20A

HARRIER KILNS

- Chamber capacities from 75 to 448 litres
- 1300°C design temperature
- High grade spiral wound elements
- Lid electrical safety system
- Choice of "Plug In" temperature controllers from the Microtech range
- Vent cooling ports and base batt
- Stainless steel cladding
- Castor wheels for ease of mobility



Kiln Details					Electrical Details			
Type	Capacity (litres / cu.ft)	Firing chamber Diameter x height	Overall dimensions Width x depth x height	Weight	Power (kW)	Supply, 220V	230 V	380/400 V
SHTL75	75 / 2.6	457 x 457mm	610 x 800 x 750mm	50kg	5.5	30A	30A	16A
SHTL115	115 / 4.0	457 x 686mm	610 x 800 x 965mm	64kg	7.0	40A	30A	20A
SHTL150	151 / 5.25	648 x 457mm	795 x 1030 x 750mm	78kg	9.0	50A	50A	25A
SHTL233	223 / 7.9	648 x 686mm	795 x 1030 x 965mm	92kg	11.25	60A	60A	25A
SHTL460	448. / 15.8	Oval 1155 x 648 x 686mm	1410 x 965 x 927mm	170kg	18.25	-	-	40A

Laboratory Chamber Furnaces

1100°C Drop down door laboratory chamber furnaces (ELF)

Maximum operating temperature of 1100°C, with a chamber capacity of 6 or 14 litres. Heat is provided by a powerful free radiating coiled wire elements on both sides of the chamber ensure good temperature uniformity, and construction is with rigidised low thermal mass insulation for rapid heating allowing the chamber to heat up to operating temperature in a quarter of the time of traditional "slab" designs

Hard ceramic hearth provides robust base, which can be replaced in the event of spillage

The drop down door can be used as shelf for loading/unloading, and a positive break door safety switch isolates chamber from power supply, when the door is opened

A double skinned construction allows convection air flow to cool the outer case, to conform to EN61010 safety standard

Ideal for light duty applications requiring good thermal response

Applications in general industry include, ferrous metal heat treatments; annealing, hardening and tempering

Applications in quality control include, testing of component materials or finished products

Applications in coatings manufacturing include, testing coatings for resistance to fire, and longevity testing of finished coatings

These models are not designed for ashing/burn-off purposes, please see separate data sheet.



Model	ELF 11/6	ELF11/14	ELF11/23
Maximum Temperature (°C)	1100	1100	1100
Maximum continuous temperature (°C)	1000	1000	1100
Internal dimensions (mm – H x W x D)	165 x 180 x 210	210 x 220 x 310	235 x 255 x 400
External dimensions (mm – H x W x D – excluding chimney)	580 x 410 x 410	630 x 450 x 520	715 x 505 x 660
Maximum power (w)	2000	2600	5000
Holding power (w)	900	1300	1500
Nominal heat up time (minutes to 1000°C)	35	40	29
Uniform envelope $\pm 5^\circ\text{C}$ @ 1000°C (mm – H x W x D)	115 x 130 x 130	130 x 140 x 220	195 x 215 x 360
Temperature Sensor	Type K Thermocouple		
Net weight (kg)	24	31	52

1100°C, 1200°C & 1300°C Laboratory chamber furnaces (CWF)

The CWF range has maximum operating temperatures of 1100°C, 1200°C or 1300°C, with chamber capacities of 5, 13 or 23 litres. Heat is provided by powerful free radiating coiled wire elements on both sides of the chamber ensure good thermal uniformity, which

allows the furnace to heat up to operating temperature in half of the time of traditional "slab" designs

Hard wearing refractory insulation inside chamber and around the entrance provides good resistance to abrasion and a hard ceramic hearth provides a robust base, and can be replaced in the event of spillage

A vertical counter-balanced door keeps the hot door insulation away from operator, coupled with a positive break door safety switch which isolates the chamber from power supply, when the door is opened

A double skinned construction allows convection air flow to cool the outer case, thus conforming to EN61010 safety standard

The furnaces can be fitted with a choice of a PID controller or programmers (see end of data sheet)

Applications in general industry include, ferrous metal heat treatments; annealing, hardening, tempering, stress relieving, and simulation of a larger industrial process, on a laboratory scale

Applications in quality control include, testing of component materials or finished products

Applications in tool making and maintenance include, heat treatment of metal tools and tool steels



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Model: CWF	5 litre	13 litre	23 litre
Maximum Temperature (°C)	1100 / 1200 / 1300	1100 / 1200 / 1300	1100 / 1200 / 1300
Internal dimensions (mm – H x W x D)	135 x 140 x 250	200 x 200 x 325	235 x 240 x 400
External dimensions (mm – H x W x D)	585 x 375 x 485	655 x 435 x 610	705 x 505 x 675
Maximum power (w)	2400	3100	7250
Holding power (w) 1100°C / 1200°C / 1300°C model	700 / 850 / 1000	1300 / 1550 / 1800	1900 / 2250 / 2500
Nominal heat up time (minutes) 1100°C / 1200°C / 1300°C model	30 / 35 / 40	55 / 65 / 80	40 / 45 / 55
Uniform envelope ±5°C @ 1000°C (mm – H x W x D)			
1100°C model	80 x 90 x 110	120 x 120 x 185	155 x 165 x 285
1200°C model	80 x 90 x 125	120 x 120 x 200	155 x 165 x 325
1300°C model	80 x 90 x 150	120 x 120 x 225	155 x 165 x 340
Temperature Sensor 1100°C model 1200°C model & 1300°C model	Type K thermocouple Type R thermocouple		
Net weight (kg)	30	47	68

1100°C & 1200°C Rapid heating laboratory chamber furnaces (RWF)

The RWF range are very similar to the CWF range with maximum operating temperatures of 1100°C or 1200°C with chamber capacities of 5, 13 or 23 litres. They also incorporate extra powerful free radiating in the ceiling of the chamber ensuring good thermal uniformity

Ideal for light to medium duty applications requiring good thermal response

Applications in general industry include, ferrous metal heat treatments; annealing, hardening, tempering, stress relieving, and simulation of a larger industrial process, on a laboratory scale

Applications in quality control include, testing of component materials or finished products

Applications in tool making and maintenance include, heat treatment of metal tools and tool steels

Applications in coatings manufacturing include, testing coatings for resistance to fire, and longevity testing of finished coatings



Model: RWF	5 litre	13 litre	23 litre
Maximum Temperature (°C)	1100 1200	1100 1200	1100 1200
Internal dimensions (mm – H x W x D)	130 x 160 x 250	195 x 210 x 325	220 x 260 x 400
External dimensions (mm – H x W x D)	585 x 375 x 485	655 x 435 x 610	705 x 505 x 675
Maximum power (w)	2750	5000	9100
Holding power (w) 1100°C model / 1200°C model	680 / 820	1200 / 1450	1800 / 2100
Nominal heat up time (minutes - 100°C below max.) 1100°C model / 1200°C model	10 / 12	11 / 13	13 / 15
Uniform envelope ±5°C @ 1000°C (mm – H x W x D)			
1100°C model	80 x 110 x 150	115 x 130 x 225	140 x 180 x 275
1200°C model	80 x 110 x 175	115 x 130 x 235	140 x 180 x 300
Temperature Sensor 1100°C model 1200°C model	Type K thermocouple Type R thermocouple		
Net weight (kg)	28	45	65

Controller Options All furnace products feature three term (PID) control for accurate, stable temperature response and have the option of a choice of programmers.

C301 This three term (PID) microprocessor based temperature controller includes an adjustable ramp rate to setpoint, either up or down, and a process timer button for either a controlled process duration or a delayed start. It is a high precision instrument where the measured temperature is displayed by large LED's in a wipe clean membrane panel. The temperature setpoint, ramp rate and countdown time are adjusted at the touch of a button.

Eurotherm 3216P1 An advanced setpoint programming temperature controller with 8 segment pairs, each a ramp and a dwell. This configuration of a ramp followed by a dwell cannot be altered. Provides precise control with an advanced PID control algorithm giving stable straight-line control of the process. Power feedback is used to stabilise the output power and hence the controlled temperature against supply voltage fluctuations.

The controller continually corrects for drift and this gives high stability and rapid response to process changes. **Eurotherm 3216P5**—Like the Eurotherm 3216P1, except that 5 different programs may be stored for later retrieval. The programs cannot be linked.

Eurotherm 3508P1

An advanced setpoint programming temperature controller with twenty segments, any of which may be a ramp, a step or a dwell.

Housed in a quick release 1/8 din size measuring 48 x 96mm high. Features large numeric and text displays to provide additional information of current status to the user. Provides the same precise control as the 3216P1 model. **Eurotherm 3508P10 & 3508P25** Like the 3508P1, but has 10 programs with a total of 50* available segments and 25 programs of 100* respectively. Example : a single program of 50 segments could be created. The programs may be linked.



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High Temperature Chamber Furnaces

1400°C, 1500°C & 1600°C Laboratory chamber furnaces (RHF)

Maximum operating temperatures of 1400°C, 1500°C & 1600°C with chamber capacities of 3, 8, 15 & 35 litres. These furnaces are heated by powerful silicon carbide elements located on both sides of the chamber that ensure good thermal uniformity (silicon carbide elements can withstand the stress of everyday operation and provide good longevity).

Hardwearing refractory brick in chamber entrance and hearth provide good resistance to abrasion whilst elsewhere, lightweight ceramic fibre insulation is used which ensures good energy efficiency and rapid heating. A vertical counter-balanced door keeps hot door insulation away from operator whilst a positive break door safety switch isolates the chamber from the power supply, when the door is opened.

A double skinned construction allows convection air flow to cool the outer case, conforming to EN61010 safety standard

Choice of PID controller or programmers

Applications in general industry include sintering alumina, smelt trials and checking Al₂O₃ content in alumina. Applications in the ceramics industry include disintegration, testing and analysis of cement samples, refractory porosity tests, long term high temperature tests and firing & sintering of ceramic samples. Applications in the semi-conductor industry include annealing silicon, silicon carbide & nitride samples and solid state synthesis .



Model: RHF	2.9 litre	7.8 litre	14.8 litre	35 litre
Maximum Temperature (°C)	1400 1500 1600	1400 1500 1600	1400 1500 1600	1400 1500 1600 *
Internal dimensions (mm – H x W x D)	120 x 120 x 200	170 x 170 x 270	220 x 220 x 305	250 x 305 x 465
External dimensions (mm – H x W x D)	655 x 435 x 610	705 x 505 x 675	810 x 690 x 780	885 x 780 x 945 1530 x 900 x 1020 *
Maximum power (w)	4500	8000	10000	16000
Holding power (w)				
1400°C model	1900	3200	2900	6000
1500°C model	2000	3500	3000	6200
1600°C model	2400	4000	3500	5000
Nominal heat up time (minutes)				
1400°C model	33	22	35	38
1500°C model	45	40	45	46
1600°C model	55	60	60	90

1700°C Laboratory chamber furnaces (RHF)

A floor standing model with maximum operating temperature 1700°C with a chamber capacity of 25 litres. Powerful MoSi₂ elements located on both sides of the chamber ensure good thermal uniformity and low thermal mass insulation and good element design is used to ensure energy efficiency and rapid heating .



An electrically operated vertical door keeps hot door insulation away from operator with a positive break door safety switch to isolates the chamber from the power supply, when the door is opened. A double skinned construction allows fanned air flow to cool the outer case.

An eight segment programmer is fitted as standard, with options for other types. Also an adjustable over-temperature protection is fitted as standard .

Model	RHF17/25
Maximum operating temperature (°C)	1700
Chamber dimensions (mm – HxWxD)	300 x 274 x 300
External dimensions (door closed)	1800 x 1100 x 680
Volume (litres)	25
Heat up time (to 1600°C)	45
Power rating @ 240V single phase 50/60Hz (kW)	9.6
Holding power @ 1600°C (kW)	5
Net Weight (kg)	403

1700°C & 1800°C Laboratory chamber furnaces (HTF)

The HTF is a range of chamber furnaces with maximum operating temperatures of 1700°C or 1800°C, and chamber capacities up to 27 litres

Powerful MoSi₂ elements located on both sides of the chamber ensure good thermal uniformity and low thermal mass insulation and good element design is used to ensure energy efficiency and rapid heating.

Electrically operated vertical doors keeps hot door insulation away from operator whilst positive break door safety switches isolates chambers from the power supply, when the door is opened

Double skinned construction allows fanned air flow to cool the outer case

Eight segment programmer and adjustable over temperature protection is fitted as standard, with options for other types

Applications in general industry include sintering alumina, smelt trials and checking Al₂O₃ content in alumina

Applications in the ceramics industry include disintegration, testing and analysis of cement samples, refractory porosity tests, long term high temperature tests and firing & sintering of ceramic samples.



Model	HTF17/5	HTF17/10	HTF18/4	HTF18/8
Maximum Operating Temperature (°C)	1700	1700	1800	1800
Max continuous operating Temp (°C)	1600	1600	1700	1700
Chamber Dimensions (mm—H x W x D)	158 x 150 x 225	232 x 200 x 225	140 x 140 x 190	210 x 190 x 190
External dimensions (mm – H x W x D)				
With door closed	565 x 830 x 650			
With door open	870 x 830 x 650			
Height to top of chimney	665			
Volume (litres)	5.3	10.4	3.7	7.6
Maximum furnace load (kg)	2.5	5.0	2.1	4.2
Weight (kg)	87	106	98	114
Heat up time (100°C below maximum)	50	44	65	56
Power rating @ 230V single phase 50/60Hz	4190	5920	4650	6200
Holding power (W) @ 1000°C	1290	1589	1204	1524
1200°C	1672	2043	1526	1901
1400°C	2105	2567	1942	2425
1600°C	2667	3243	2460	3083
1700°C	2985	3683	2772	3453
1800°C	----	----	3108	3897
Temperature Uniformity @ 1000°C	± 8.5°C over 90mm	± 12.5°C over 105mm	± 8.5°C over 113mm	± 8.5°C over 110mm
1200°C	± 7°C over 100mm	± 10°C over 113mm	± 7°C over 129mm	± 7°C over 120mm
1400°C	± 5°C over 120mm	± 6.5°C over 125mm	± 5°C over 109mm	± 5°C over 127mm
1600°C	± 4°C over 130mm	± 4°C over 151mm	± 4°C over 113mm	± 5°C over 127mm
1800°C				± 4°C over 123mm
Voltage supplies available	208 -240V single phase 50/60Hz	208 - 240V single phase or 380 – 415V two phase, 50/60Hz	208 -240V single phase 50/60Hz	208 - 240V single phase or 380 – 415V two phase, 50/60Hz

Controller Options All furnace products feature three term (PID) control for accurate, stable temperature response and have the option of a choice of programmers.

C301 This three term (PID) microprocessor based temperature controller includes an adjustable ramp rate to setpoint, either up or down, and a process timer button for either a controlled process duration or a delayed start. It is a high precision instrument where the measured temperature is displayed by large LED's in a wipe clean membrane panel. The temperature setpoint, ramp rate and countdown time are adjusted at the touch of a button.

Eurotherm 3216P1 An advanced setpoint programming temperature controller with 8 segment pairs, each a ramp and a dwell. This configuration of a ramp followed by a dwell cannot be altered. Provides precise control with an advanced PID control algorithm giving stable straight-line control of the process. Power feedback is used to stabilise the output power and hence the controlled temperature against supply voltage fluctuations.

The controller continually corrects for drift and this gives high stability and rapid response to process changes. **Eurotherm 3216P5**—Like the Eurotherm 3216P1, except that 5 different programs may be stored for later retrieval. The programs cannot be linked.

Eurotherm 3508P1

An advanced setpoint programming temperature controller with twenty segments, any of which may be a ramp, a step or a dwell.

Housed in a quick release 1/8 din size measuring 48 x 96mm high. Features large numeric and text displays to provide additional information of current status to the user. Provides the same precise control as the 3216P1 model. **Eurotherm 3508P10 & 3508P25** Like the 3508P1, but has 10 programs with a total of 50* available segments and 25 programs of 100* respectively. Example : a single program of 50 segments could be created. The programs may be linked.

Eurotherm 2132 or integrated into 301

Recommended for use on any unit left unattended overnight. Housed in a compact 1/32 din size measuring 24 x 48mm wide or integrated into the 201 control panel. The additional control unit uses a separate thermocouple and operates a contactor to shut down the furnace in the event of the set temperature being exceeded. The adjustability of the limiting temperature means that the system may be set to protect either the furnace itself, or at a lower temperature a valuable load inside.



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Ashing Furnaces

1100°C Ashing furnaces (AAF)

Maximum operating temperature 1100°C. Chamber capacities of 3, 7 or 18 litres. Robust mullite muffle design of 3 & 7 litre models and silicon carbide tiles of 18 litre model offer strong resistance to carbon build up and chemical attack. Constant airflow of 4-5 volume changes per minute ensures rapid combustion with a pre-heated airflow to maintain excellent temperature uniformity. The 3 & 7 litre models are supplied with an inconel tray & handle for easy loading/unloading

Tall chimney for fume exhaust by convection

A vertical counter-balanced door keeps hot door insulation away from operator whilst a positive break door safety switch isolates the chamber from the power supply, when the door is opened. The double skinned construction allows convection air flow to cool the outer case, to conform to EN61010 safety standard. Choice of PID controller or programmers

Applications in quality control include ashing of coal samples, samples of food materials or ashing of finished food products for further inorganic analysis.

Applications in environmental research include analysis of agriculture, forestry, fisheries, geology, and veterinary samples.

Applications in the chemical industry include ashing, ignition, fusion or thermal degradation testing of materials such as paints, adhesives, activated carbon, plastics & plastic resins, petrochemicals, cosmetics and rubber.



Each model from the AAF range is supplied with a sample tray and handle as standard. The image above shows the three trays available (from left to right) for the 3, 7 & 18 litre models.

1100°C Ashing furnaces with Quartz Muffle (GSM)

Maximum operating temperature 1100°C, Chamber capacity of 8 litres.

Fused quartz muffle with wire wound element offers superior containment of aggressive atmospheres such as H₂S₄, HN₃ and HCL. Applications in quality control include, ashing of dirty coal samples for further inorganic analysis. Applications in environmental research include analysis of agriculture, forestry, fisheries, geology, and veterinary samples using aggressive chemicals. Applications in the chemical industry include ashing of materials such as plastics & plastic resins, petrochemicals and rubber.

1200°C Burn-off furnaces (BWF)

Maximum operating temperatures of 1100°C & 1200°C. Chamber capacity of 13 litres. Powerful free radiating coiled wire elements on both sides of the chamber ensure good thermal response. Convection airflow is created by air inlet holes in the door and a tall chimney, which rapidly removes smoke from the chamber, reducing the effects of carbon build up. Hard wearing refractory insulation inside chamber and around the entrance provides good resistance to abrasion. A hard ceramic hearth provides robust base, and can be replaced in the event of spillage

Applications in the food industry include burn off of samples of natural materials such as natural fibres and cereal food stuffs such as wheat flour, milk powder and soya.

Applications in general industry include, burn out of dental wax moulds, depyrogenating of critical glassware and cleaning of metal components.

Model	AAF 11/3	AAF 11/7	AAF 11/18	GSM 11/8	BWF 11/13	BWF 12/13
Maximum operating temperature (°C)	1100	1100	1100	1100	1100	1200
Internal dimensions (mm - HxWxD)	85 x 150 x 250	90 x 170 x 455	235 x 196 x 400	120 x 175 x 345	200 x 20 x 325	200 x 200 x 325
External dimensions (mm - HxWxD) excluding chimney	580 x 370 x 485	650 x 430 x 740	705 x 505 x 675	705 x 505 x 725	655 x 435 x 610	655 x 435 x 610
Volume (litres)	3	7	18	7.2	13	13
Nominal heat up time (minutes)	80	110	60	90	65	70
Uniform envelope ±5°C (HxWxD)	50 x 100 x 100	55 x 140 x 260	Not available	85 x 135 x 280	120 x 120 x 185	120 x 120 x 185
Holding power (W)	1200	2300	3500	1200	1500	1700
Maximum power (W)	2000	3900	7000	3000	3100	3100
Temperature sensor	Type K thermocouple					Type R
Net weight (kg)	22	63	70	59		

Slipperiness / Skid Testers

TORTUS 3

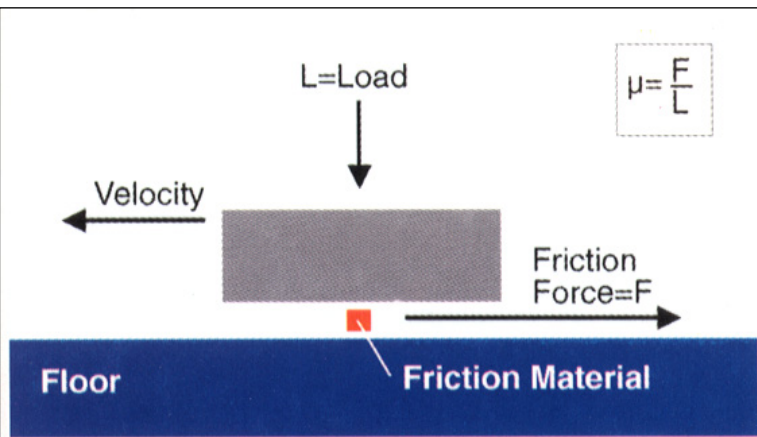
Slips, Trips and Falls account for over half of all reported injuries, costing employers and organizations over £300 million pounds per year. The Health & Safety at Work Act, 1974 emphasises that all employers must take steps to control slip and trip risks in the workplace.

The Tortus III measures directly the dynamic co-efficient of friction as it traverses a surface or flooring material to be used by pedestrians. The measurements recorded are date/time stamped and can be printed from an integral printer, or downloaded as data files onto a USB memory stick.. The unit can be mains or battery operated. The Tortus III has been developed from units originally designed by the British Ceramic Research Association (Ceram Research).

Basis of Measurement.

A friction slider mounted on a leaf spring assembly is held in contact with the surface under a fixed load. As the instrument moves forward at a constant velocity, the friction force deflects the slider and this is measured by a strain gauge attached to the spring assembly.

The slider area, loading and standard friction material were chosen following observations obtained by filming people walking and running; it was shown that the most dangerous type of slip occurs when the heel slides forward on making contact with the ground. Tortus III reproduces the conditions under the heel when it first touches the ground during straight walking. The Tortus III also has a simple and unique calibration method which allows the instrument to be calibrated by the operator within a few minutes, saving the time and cost of sending the unit away for calibration.



The Tortus has been developed over 20 years, during which time it has become internationally recognised in the following standards as acceptable for dry testing:

- ISO 10547-17 draft European standard for the determination of coefficient of friction
- Australian and New Zealand standard AS/NZS 4586 2004
- Ceramic tile institute of America
- Italian single instrument standard

Dimensions: 425mm x 245mm x 160mm

Overall weight: 6kg

Power Requirement: 240V 50Hz or 110V 50/60Hz , internal battery with 12V DC charger

Friction foot material: 4S rubber (standard shoe sole simulating material as developed by the UK Rubber and Plastics Research Association).

PENDULUM SKID TESTER

Also known as the "Wessex Skid Tester, British Pendulum Tester, Pendulum Skid Tester, Skid Resistance Tester, Portable Skid Resistance Tester", the instrument which is portable, is designed and constructed to the requirements of BS EN 1097-8:2000, and can be used to give a direct reading measurement of the following options:

- Road surface testing
- Testing of aggregates in the PSV (polished stone value) test
- Flooring materials product development
- Litigation investigations
- Testing of new road surface materials under development
- Testing of floors and pedestrian walkways
- Accident investigations, both traffic and pedestrian

The **PENDULUM** measures the frictional resistance between a rubber slider mounted on the end of a pendulum arm and the test surface. This provides highway and flooring engineers with a routine method of checking the resistance of wet and dry surfaces to slipping and skidding. The Pendulum Skid Tester is based on the Izod principle. A pendulum consisting of a tubular arm rotates about a spindle attached to a vertical pillar. At the end of the tubular arm a head of constant mass is fitted with a rubber slider. The pendulum is released from a horizontal position so that it strikes the sample surface with a constant velocity. The distance travelled by the head after striking the sample is determined by the friction of the sample surface. A reading of Skid Resistance Values is obtained.

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ceramic

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ISO 9001:2008
Certificate 23478

Standards:

BS 812 Pt. 114

BS EN 1097-8 Determination of Polished Stone Value

AS/NZS 4586:1999 Slip resistance classification of new pedestrian surface materials

BS 6077 Pt 1 Clay and calcium silicate pavers for flexible pavements.

BS 7044 Artificial sports surfaces: person/surface interaction.

BS 7188 Impact absorbing playground surfaces

BS 8204 In-situ flooring, part 3 Code of practice for polymer modified cementitious wearing surfaces.

ASTM E303 Standard Method for - Measuring Surface Frictional Properties Using British Pendulum

BS 7976 Method of operation and calibration of the pendulum tester.

EN 1436 : 1997 Road Marking Materials

BS EN 13036-4:2003 Road and Airfield surface characteristics

The Unit is supplied in a robust carrying case and the standard package includes the following accessories:

'F' Scale - Built in, for use with small slider set for 76mm slide length.

(PSV test); **Set of 6 Sliders** (large or small) - Customer can choose either type. (Certificate included); **125-127mm Setting Gauge** - used to set slide length for road / floor testing;

Brush - For removing unwanted dirt or grit from area to be tested; **C Spanner** - For attaching and releasing arm to rotating head;

17mm Spanner - For fitting rear foot.

Allen keys - For various adjustments; **Water spray bottle** - For wetting surface to be tested; **Feet pads** - For placing under levelling feet when on soft ground;

Operating instructions - A guide to road, floor and PSV testing.

Calibration Certificate - Dispatched calibrated to BS EN1097-8 : 2000 (accredited under ISO 9003)



SLIPPERINESS METERING PLATFORM

This equipment is manufactured in accordance with ISO 10545-17 annex C and DIN 11530

It consists mainly of a painted steel framework with one zinc-plated platform with adjustable angle to accommodate the panel of 100cm x 50cm, with floor tiles suitable adhered.

Before the test is commenced, one must accurately lubricate the operator's shoes and the floor surface.

The operative, wearing a safety harness, walks backwards and forwards on the platform while it is being inclined at a rate of 1° per second until slipping occurs, which makes the movement come to a halt at the critical angle of slipperiness.

The test is then carried out several times around this angle to determine a more precise value.

Technical specification

Inclinable platform controlled by means of an electromechanical actuator, with a thrust of 1000kg.

A control panel suspended by the operator.

Range of working angles between 0° and 45° according to the different standards.

Speed: 1° per second

Digital control of inclination, with a precision of $\pm 0.1^\circ$

Service stairs 500mm long.

For 230V, 50/60Hz supply, 0.25kW

Dimensions: 370 x 130 x 270cm

Net weight: 273kg

Equipment

Electrical cabinet and hanging pushbutton board. Safety harness K4

CEEN 385. Rope for harness FP CEEN 35. Shoes, size 42

Accessories:

Set calibration board panel type E-10,7°, P-18,2°, R-26,8°

Shoes n° 42 (US 8) ISO-DIN standards.



Thermal Expansion—Dilatometer

L76 Series

Thermo analytical methods are extensively used in all fields of materials characterization. Particularly in the areas of ceramics and glasses, thermal methods such as pushrod dilatometry yield vital information for the production of the materials and for their later application.

Dilatometry is a technique at which a dimensional change of a substance is measured as a function of temperature while the substance is subjected to a controlled temperature program.

Many international norms such as DIN 51045, ASTM E 831, ASTM D 696 and ASTM D 3386 describe this technique and the exact procedures in detail.

The specific materials properties gathered from this are as follows:

- Linear thermal expansion (dL)
- Sinter-temperatures and sinter-steps
- Determination of glass transition (T_g)
- Phase changes
- Optimization of burning processes
- Determination of thermal expansion coefficient (CTE)
- Influence of additives
- Volume changes
- Rate controlled sintering (RCS)



The newly developed DIL L76 Platinum Series is especially tailored to the needs of the glass and ceramic industries. High resolution and stability, wide measurement range, robust and compact design are only some of the advantages of the new, cost-effective system.

The system can be equipped with three furnaces, allowing measurements to be carried out from room temperature up to 1000°C / 1400°C or even up to 1600°C.

Technical Specifications

Furnaces (exchangeable): RT ... 1000°C,
RT ... 1400°C
RT ... 1600°C

Heating/Cooling rates: 0 ... 50 K/min

Sample holders: Fused Silica (max. 1100°C),
Alumina (max. 1600°C)

(user exchangeable)

Sample thermocouple: type S (Pt/Pt10%Rh)

Resolution: 1.25 nm/digit

Sample diameter: 1 ... 7/14/20 mm

Sample length: 0 ... 25/50 mm

Atmospheres: oxid. (static, dynamic), inert

Electronics: integrated

PC Interface: USB

Accessories

WCU "Water Cooling Unit" for temperature stabilization of the dilatometer measuring system, independent of external water connection. Various vacuum pumps, including turbomolecular pumps for creation of the purest gas atmospheres or for dilatometer measurements under vacuum. Heated adapter for coupling via heated quartz glass capillary. Selection of sample holders of different designs and materials and for various sample sizes Protective sleeves for sample thermocouples Sample supports for various diameters Sample preparation machines Vernier callipers for online input of the sample length..

Software

All thermo analytical devices of LINSEIS are PC controlled, the individual software modules exclusively run under Microsoft® Windows® operating systems. The complete software consists of 3 modules: temperature control, data acquisition and data evaluation. The Linseis 32 — bit software encounters all essential features for measurement preparation, execution and evaluation with a Dilatometer run, just like with other thermo analytical experiments. Due to our specialists and application experts LINSEIS was able to develop this easy understandable and highly practical software.

Features -Software

- Program capable of text editing
- Data security in case of power failure
- Thermocouple break protection
- Repetition measurements with minimum parameter

Input

- Evaluation of current measurement
- Curve comparison up to 32 curves
- Storage and export of evaluations
- Export and import of data ASCII
- Data export to MS Excel
- Multi-methods analysis (DSC TG, TMA, DIL, etc.)
- Zoom function
- 1 and 2 derivation
- Programmable gas control
- Statistical evaluation package
- Free scaling

DIL Features

- Sinter process evaluation
- Glass transition and softening point evaluation
- Softening point determination + system shut down
- Linear thermal expansion evaluation
- Several system correction features
- Automatic zero point adjustment
- Auto-scheduler for up to 16 runs

Optional Software

- Rate Controlled Sintering (RCS) software
- L-DTA analysis: characterization of energetic effects simultaneous to the dilatometer results (calculated DTA)
- Thermokinetics: advanced characterization and optimization of sintering reactions.



Quartz measuring system for large samples, 20mm dia,



Quartz measuring system, 7—12mm diameter.



Al₂O₃ measuring system, standard.



Al₂O₃ measuring system, contact free



Adapter for powders and pastes.

Differential Thermal Analysis—DTA

DTA PT1600

The DTA uses a dynamic measuring principle. This instrument will measure endothermal and exothermal heat flow between the sample and reference (enthalpy).

In general these heat flows are characteristic of chemical or physical changes of the sample. The test sample and an inert reference material are heated simultaneously in the same atmosphere.

Both the sample and reference material temperatures are measured with thermocouples.

Then these 2 thermocouple output voltages are subtracted from one another. There suit is a low voltage signal which is proportional to the endothermal and exothermal reaction.

Endothermic sample reactions absorb heat and exhibit a lower sample temperature when compared to the reference material. Exothermic reactions produce heat and exhibit a higher sample temperature when compared to the reference material.

Options include operations in vacuum and inert atmospheres

Temperature range RT - 1600 °C

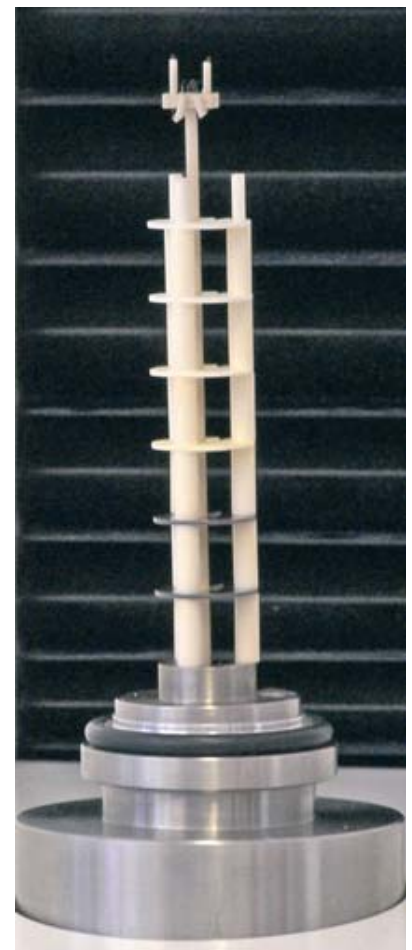
Differential - measuring system -

Thermocouple PtRh(10)/Pt.

The sensitivity range of the Delta T-signal is selectable between 50 -1000uV.

The differential measuring system is easily exchangeable.

It is secured to the base using a gold pinned Lemo plug.



The following characteristics can be determined by DSC measurements:

- Enthalpy, melting energy
- Specific heat
- Glass point
- Crystallinity
- Reaction enthalpy
- Thermal stability
- Oxidation stability
- Aging
- Purity
- Phase transformation
- Solidus / liquidus - relationship
- Eutecticum
- Polymorphs
- Product identification

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LINSEIS DTA PT1600

Features

- Temperature range -150°C up to +2400°C
- Different easy exchangeable furnaces
- Different easy exchangeable sensors
- Low temperature model with LN₂ cooling or with Intercooler

The DTA PT1600 was developed to specifically for the high — as well as low temperature range (-150 up to 2400°C).

For this broad temperature range a number of different exchangeable furnaces is available. Furthermore emphasis was placed on a stable baseline and high reproducibility. Due to its unique features the DTA PT1 600 is an indispensable tool for quality control and R&D. The Instrument can be equipped with a number of different exchangeable furnaces, different measuring systems and numerous different crucibles. Measurements under vacuum, inert, reduced and oxidized atmospheres are possible.

The vacuum tight construction (10E-5 mbar) allows quantitative measurements under cleanest gas atmospheres.

Measuring system

User-friendly exchangeable and different measuring systems. This allows the perfect choice for any application or atmosphere.

Options

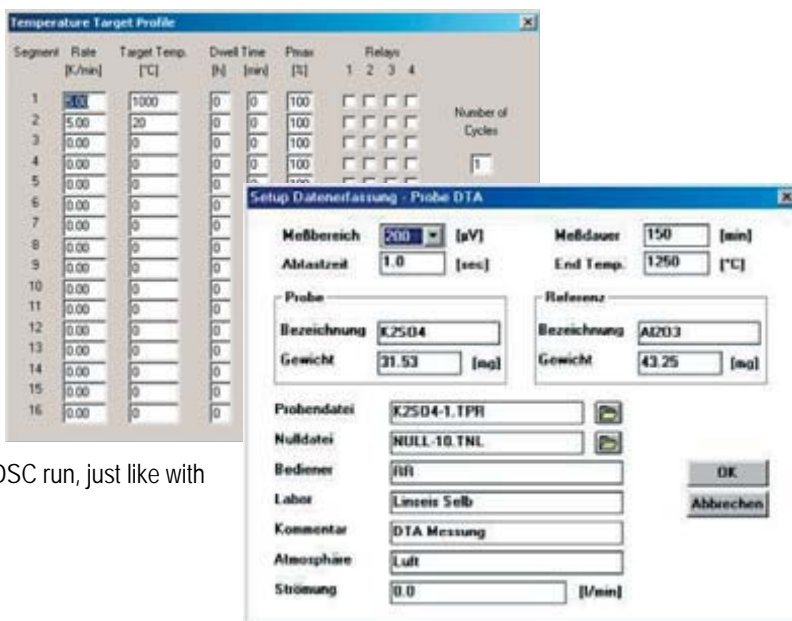
- LN₂ cooling system
- Turbo molecular pump (10E-5 mbar)
- Two stage rotary pump (10E-3 mbar)
- Different protection tubes
- Coupling with MS/FTIR

Software

All thermo analytical devices of LINSEIS are PC controlled, the individual software modules exclusively run under Microsoft® Windows® operating systems.

The complete software consists of 3 modules: temperature control, data acquisition and data evaluation.

The Linseis 32 — bit software encounters all essential features for measurement preparation, execution and evaluation with a DSC run, just like with other thermo analytical experiments.



Features

- Program capable of text editing
- Repetition measurements with minimum parameter input
- Evaluation of current measurement
- Curve comparison up to 32 curves
- Curve subtraction
- Multi-methods analysis (DTA TG, TMA, DIL, etc.)
- Zoom function
- 1. and 2. Derivative
- Complex peak evaluation
- Multipoint calibration for sample temperature
- Multipoint calibration for change of enthalpy
- Storage and export of evaluations
- Export and import of data ASCII
- Data export to MS Excel
- Signal-steered measuring procedures

Specifications LINSEIS DTA systems

Temperature range	-150 ...2400°C*
Heating/Cooling rates	0,1 up to 50°C/min
Temperature accuracy	+/-0,5°C
Time constant	7s
Resolution	0,05 µV
Data acquisition rate	0,1 s up to 3600 s / data point
Atmospheres	N ₂ , Argon, O ₂ etc., reducing and oxidizing
Measuring range	50 ...1000pV

*Different Furnaces

Calibrations material included

Calibration: recommended 6 month interval

The versatility of the LINSEIS DTA is supported by the large selection of crucibles. Select for your application and samples the ideal crucible material, the best form and kind of sealing. Crucibles made of metal; precious metal, graphite and oxide ceramics are available in different dimensions.

Aluminium crucibles can be sealed gas-tight in a handy locking press, so that samples can be protected from the influence of the Environment atmosphere and that gas splitting off from the samples is suppressed.

Digital Thermometers

2000 Series

The ETI 2000 series of hand held digital thermometers are lightweight, portable instruments, displaying temperatures over the range of -49.9 to +1000°C with a 0.1°C, 1°C or 1°F resolution. The thermometers feature a 12.7mm LCD display, with hold, open circuit and low battery indication. Four models are available, the ETI 2001, ETI 2002, ETI 2003 °C and ETI 2003 °F. All models feature silicone rubber push buttons and incorporate a hold facility that enables the user to freeze the display for ease of reading. The ETI 2000 series also incorporates an auto power off facility, turning the instrument off automatically after approximately three minutes, maximizing battery life.

The ETI 2000 series has a conveniently located, front-mounted miniature thermocouple probe socket, which enables a variety of different hand held type K thermocouple probes to be used. Each instrument is battery powered by a standard 9 volt PP3 or MN1604 battery with a minimum life expectancy of 150 hours continuous use.

- four models 0.1°C/1°C, 0.1°C, 1°C or 1°F
- front-mounted thermocouple socket that facilitates the use of a wide range of probes
- easy to use silicone rubber push buttons
- large 12.7mm easy to read display
- low battery, open circuit & hold indication
- wide temperature range



specification	ETI 2001	ETI 2002	ETI 2003
temperature range 1°C	-50 to +1000°C	n/a	-50 to +1000°C (-58 to +1832°F)
temperature range 0.1°C	-49.9 to +199.9°C	-49.9 to +199.9°C	n/a
resolution	0.1°C & 1°C	0.1°C	1°C or 1°F
accuracy 1°C	±1°C ±0.5%	n/a	±1°C ±0.5% (±2°F ±0.5%)
accuracy 0.1°C	±0.5°C ±1%	±0.5°C ±1%	n/a
sensor type		K thermocouple	
ambient temp. range		0 to +50°C	
CJC type		silicon diode	
CJC stability		±0.05°C/°C (0.1°F/°F)	
battery		9 volt MN1604/PP3	
battery life	approximately 150 hours	approximately 175 hours	approximately 175 hours
display		12.7mm LCD	
case dimensions		141 x 73 x 35mm (h x w x d)	
case material		ABS plastic (medium grey)	
input socket type		miniature thermocouple	
weight	220 grams	210 grams	210 grams

2202 & 2203 SERIES

The differential digital thermometers allow the user to use two type K thermocouple probes simultaneously. The display can be switched to show probe T1 or T2 temperature or the difference between probes T1 and T2 (T1 - T2). This facility allows, for example, the temperature drop across radiators or the temperature rise or fall of two items to be measured.

The differential thermometers measure temperature over the range of -50 to +550°C with a 1°C resolution or -49.9 to +199.9°C with a 0.1°C resolution. Both thermometers feature a custom, easy to read, LCD display with °C, T1, T2, diff, hold, open circuit and low battery indication.

Both the 2202 and 2203 incorporate easy to use, silicone rubber key switches which activate the various functions of each instrument. Conveniently located are the front mounted thermocouple probe sockets which allow a wide range of interchangeable thermocouple type K probes to be connected to the instrument.



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ISO 9001:2008
Certificate 23478

Specification	ETI 2202	ETI 2203
Range	-49.9 to +199.9°C	-50 to +550°C
Resolution	0.1°C	1°C
Accuracy	±0.5°C ±1%	±1°C ±1%
Battery & Battery Life	9 volt MN1604/PP3 - 150 hours	
Sensor Type	K Thermocouple	
Display	12.7mm LCD	
Dimensions	35 x 73 x 141mm	
Weight	300 grams	

a traceable certificate of calibration is issued with each instrument

MICROPROCESSOR BASED THERMOMETERS

The MicroTherma microprocessor based thermometers measure temperature over the range of -210 to +1760°C with a 0.1°C or 1°C resolution, autoranging 0.1°C up to +199.9°C, 1°C thereafter. Each microprocessor thermometer incorporates an easy to read, multi-function 3½-digit LCD display with open circuit, low battery, hold, max/min and °C/°F indication.

The thermometers should never need re-calibrating as the built-in microprocessor enables the instruments to continuously and automatically carry out self diagnostic re-calibration. An additional feature allows the user to adjust the reading (±2.5°C) to offset any probe errors, correcting any inaccuracies of the thermocouple probe. Each thermometer thereafter will automatically store, display the offset and adjust the instrument for the known probe error, maximising system accuracy.

Seven models are available that utilise type K, J, T, N, R, S or E thermocouple probes. Each instrument incorporates both max and min readings with a reset function. The unit also features an auto power-off facility which maximises the battery life, turning the instrument off automatically after 30 minutes.

A clear polycarbonate wall bracket and a protective PVC boot are available for both the MicroTherma 2 and 3.

- seven models available K, J, T, N, R, S or E



Specification	Microtherma 1	MicroTherma 2
Range	-210 to +1760°C	-210 to +1760°C
Resolution	0.1°C or 0.1°F	0.1°C or 0.1°F
Accuracy	±0.2°C ±1 digit	±0.2°C ±1 digit
Battery & Battery Life	2 x MN2400 (AAA) - 1,000 Hours	2 x MN2400 (AAA) - 1,000 Hours
Sensor Type	K, J, T, N, R, S or E Thermocouple - selectable	K, J, T, N, R, S or E Thermocouple
Display	12.7mm LCD	12.7mm LCD
Dimensions	35 x 73 x 141mm	35 x 73 x 141mm
Weight	220 grams	220 grams

a traceable certificate of calibration is included with each instrument

The MicroTherma 5K microprocessor recording thermometer incorporates the additional feature of being able to store and recall up to 20 temperature readings on demand. This feature, for example, allows the user to securely collect temperature data without pen or paper. This recording thermometer is ideal for monitoring process temperatures in a variety of applications.

The MicroTherma 5K recording thermometer measures temperature over the range of -200 to +1372°C with a 0.1°C/°F resolution. This thermometer incorporates an easy to read 4½ digit LCD display with open circuit, low battery, hold, max/min and °C/°F indication. The thermometers should never need re-calibrating, as the built-in microprocessor enables the instruments to continuously and automatically carry out self-diagnostic re-calibration.

Digital Thermometers

Temperature Probes

Temperature measuring is only part of the system, of equal importance is the design of the temperature probes used to physically measure the required food or products. ETI manufactures a wide range of fully interchangeable thermocouple type K probes designed to meet today's customer requirements. Probes with additional lead length can be manufactured on request, to a maximum of 100 metres.

Below is a selected list of the most popular temperature probes. If you require a particular type of probe that is not indicated, please contact us.

penetration probe



These pointed, stainless steel, penetration probes are strong and versatile. Ideal for a variety of food applications including liquids and semi-solids. Dimensions $\text{Ø}3.3 \times 130$ or 300mm. Maximum tip temperature $+250^{\circ}\text{C}$.

fast response penetration probe



The pointed reduced tip, fast response, stainless steel, penetration probe. Ideal for liquids and semi-solids and other delicate foods and materials. Dimensions $\text{Ø}3.3 \times 100$ mm, Maximum tip temperature $+250^{\circ}\text{C}$.

needle penetration probe



This pointed fast response, stainless steel, needle penetration probe is suitable for liquids and semi-solids including fish and other delicate foods. Dimensions $\text{Ø}1.8 \times 130$ mm, Maximum tip temperature $+250^{\circ}\text{C}$.

high temperature probe



These flexible, high temperature, MI probes can be bent to any shape without affecting their performance. Ideal for measuring the temperature of fryers. Dimensions $\text{Ø}1.5$ or 3×130 mm, Maximum tip temperature $+1100^{\circ}\text{C}$.

air or gas probe



This stainless steel, fast response, hand held air or gas probe is ideal for measuring air temperature in fridges, freezers and chill cabinets. Dimensions $\text{Ø}4.5 \times 130$ mm, Maximum tip temperature $+250^{\circ}\text{C}$.

exposed junction wire probe



These fibreglass exposed junction wire probes are suitable for measuring the air temperature of ovens, hot cupboards etc. Dimensions $\text{Ø}1.5 \times 1000$ mm, Maximum wire temperature $+350^{\circ}\text{C}$.

heavy duty surface probe



These heavy duty, high temperature, surface probes are ideal for measuring the temperature of griddles etc. A right-angled version is available. Dimensions $\text{Ø}12 \times 130$ mm, Maximum tip temperature $+1000^{\circ}\text{C}$.

Non-contact Thermometers (Pyrometers)

The series 8 pyrometers are high-quality, battery driven portables for non-contact temperature measurement between 250 and 2500°C. The *pro* series is a revision of the 15 years proven *plus* series. The instruments feature fully digital signal processing, resulting in wider temperature ranges as well as higher accuracy. With the additional integrated graphic display the measuring results can be shown and analyzed directly on site.

The aluminium die-cast housing is specially designed for the daily use under rough industrial conditions. The easy focusable precision optics provides small spot sizes for measuring distances between 500 mm and ∞. The bright, optimized view finder with exact spot indication and built-in temperature display facilitates the accurate aiming on the object.

Moreover, the large measurement data storage offers the best possibility for subsequent interpretation of the measured values. The extremely short response time of 1 ms allows exact measurements of fast moving objects and a very quickly detection of temperature differences. The maximum temperature can be stored in the built-in peak picker (maximum value storage).

- Very robust aluminum die-cast housing for use in rough environments
- Focusable precision optics for adjusting smallest spot sizes
- Temperature display on the housing, in the view finder and on the multifunctional display sideways
- Large data storage for subsequent analysis of measuring data
- Integrated maximum value storage to determine the peak value achieved during a measuring series
- Extremely short response time for measurements on fast-moving objects
- USB interface for using the optional analyzing software *PortaWin*



Temperature ranges	IS 8 pro: 600 to 1800°C (MB18) 750 to 2500°C (MB25)	IGA 8 pro: 600 to 1800°C (MB16) IG 8-GS pro: 1000 to 2000°C (MB20)
Spectral ranges	IS 8 pro: 0.78 to 1.1µm / IGA 8 pro: 1.45 to 1.8µm / IG 8-GS pro: 0.55µm	
Accuracy:	0.4% of reading + 1°C (at ε = 1, T _{amb} = 23°C)	
Temperature coefficient:	0.01% / K (T _{amb} = 23°C) of reading	
Repeatability:	0.1% of reading or 0.8°C (the larger value is valid; at ε = 1, T _{amb} = 23°C)	
Resolution:	LED inside: 1°C/°F; LED outside: 0.1° up to 1000°C / °F, after this 1°, LCD: 0.1°C/°F	
Response time t ₉₀	1 ms	
Emissivity ε	Adjustable from 10 to 100% in 0.1% steps	
Parameters	Emissivity, direct emissivity setting, storage interval, temperature indication in °C or °F	
Data storage:	4000 values, storage of: measurement value, date, time, parameters, emissivity, temperature unit	
Serial interface:	USB 2.0 (supplies the instrument when connected, but without battery charging function)	
Power supply:	6 x 1.5V alkali-manganese IEC LR6 or 6 x 1.2 V rechargeable batteries	
Dimensions / weight:	210 x 75 x 175mm (L x W x D), 1.2kg with batteries	

The "Payne" Torsion Viscometer (Gallenkamp Type)

Developed with the Ceramic Industry in mind, (but easily modified for other use), the "Payne" Torsion Wire Viscometer is simple to use and maintain.

The machine has three levelling points for easy adjustment, a PTFE bearing and a unique sample table which is raised vertically or rotated horizontally into position.

All accessories are fitted and adjustments easily made by means of the "brass thumb screws". This principle removes the need for fiddly screwdrivers or allen keys.

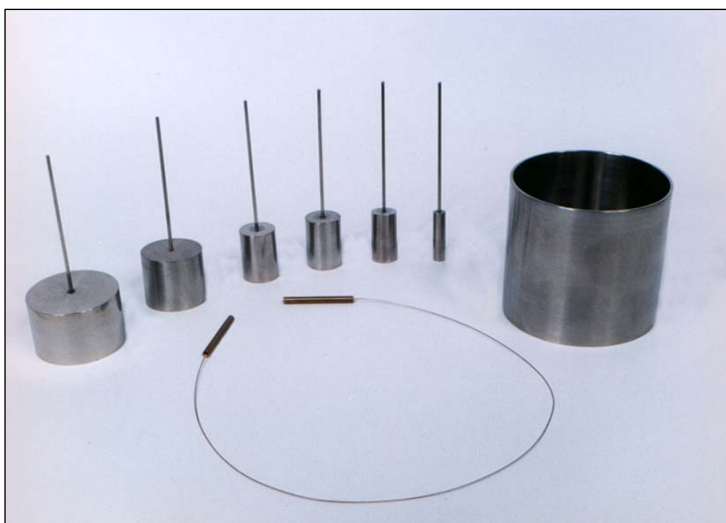
The standard model is supplied with a 30swg torsion wire, an 11/16" cylinder bob and a stainless steel sample cup.

Product Code: VIS003

Repairs and Servicing.

E.J.Payne Ltd are able to offer a full service / repair on all types of Torsion Viscometer. Please contact us for a competitive quotation.

A full range of spare parts are available from stock.



Accessories and Spares.

Torsion wire 24swg	VWIO24
Torsion wire 28swg	VWIO28
Torsion wire 30swg	VWIO30
Torsion wire 32swg	VWIO32
Torsion wire 36swg	VWIO36
Viscometer bob 1/4" (6.35mm)	VCY025
Viscometer bob 1/2" (12.7mm)	VCY005
Viscometer bob 11/16" (17.5mm)	VCY116
Viscometer bob 1 1/8" (28.57mm)	VCY118
Viscometer bob 1 5/8" (41.27mm)	VCY158
Sample cup	VFC001
Sample cup stirrer	VST001

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Viscosity (Flow) Cups

Simple to use cups for the approximate measurement of apparent viscosity in a wide range of materials including paints, varnishes, lacquers, inks and other viscous products.

BS-ISO Flow Cups. (For flow times 30 – 100 seconds)

To BS3900 part A6, 1996; ASTM D5125; EN535 – ISO2431; DIN 53224.

For flow times 30 – 300 seconds

Model	Orifice	Viscosity Range	Code
No.3	3mm	7 to 42 cSt	417/3
No.4	4mm	35 to 135 cSt	417/4
No.5	5mm	91 to 315 cSt	417/5
No.6	6mm	188 to 684cSt	417/6
No.8*	8mm	600 to 2000cSt	417/8

(* This cup is not in the current BS-ISO series but is offered for use with very high viscosity samples).



B-Type Flow Cups (For flow times 30 - 300 seconds)

As specified in former BS3900 Section A6, 1971. Viscosity range stated is approximate.

Jet	Orifice	Viscosity Range	Code
B2	2.38mm	38 to 71 cSt	401/2
B3	3.17mm	38 to 147 cSt	401/3
B4	3.97mm	71 to 455 cSt	401/4
B5	4.76mm	299 to 781 cSt	401/5
B6	7.14mm	781 to 1650 cSt	401/6

Ford-Type Flow Cups (For flow times 55 – 100secs (1), 40 – 100 secs (2), 30 – 100 secs (3, 4, 5))

With detachable jet. To ASTM D1200. Viscosity range stated is approximate.

Jet	Orifice	Viscosity Range	Code
Ford 1	2.1mm	10 to 35 cSt	406/1
Ford 2	2.8mm	25 to 125 cSt	406/2
Ford 3	3.4mm	49 to 220 cSt	406/3
Ford 4	4.1mm	70 to 370 cSt	406/4
Ford 5	5.8mm	200 to 1200 cSt	406/5

Accessories for Flow Cups.

Stand with levelling feet, c/w spirit level	418
Stand, economy light aluminium c/w spirit level	418/LC



Zahn Flow Cups.

Stainless steel with 30mm looped handle with ring which allows cup to be held vertically. Cup capacity 44ml. To ASTM D816 and ASTM D1084

No.	Orifice	Viscosity Range	Flow Times	Code
1	1.93mm	5 to 60 cSt	35 – 80 seconds	405/1
2	2.69mm	20 to 250 cSt	20 – 80 seconds	405/2
3	3.86mm	100 to 800 cSt	20 – 80 seconds	405/3
4	4.39mm	200 to 1200 cSt	20 – 80 seconds	405/4
5	5.41mm	400 to 1800 cSt	20 – 80 seconds	405/5



FLOW CUP COMPARISON CHART				
Oil Viscosity cSt (mm ² /s) @ 25°C	Cup reference / Flow time (seconds)			
	401/4	406/4	405/4	417/4
87	34	27	39	66
115	43	34	47	86
228	82	64	79	167
393	139	106	126	287

This chart illustrates the variations in flow times when comparing different cups. (NB. These times are derived by calculation and are for illustrative purposes only.)

Electric (driven) Viscometers

Brookfield Viscometers

Brookfield viscometers employ the well-known principle of rotational viscometry; they measure viscosity by sensing the torque required to rotate a spindle at constant speed while immersed in the sample fluid. The torque is proportional to the viscous drag on the immersed spindle, and thus to the viscosity of the fluid.

For the user, rotational viscometry has several advantages:

The continuous rotation of the spindle allows uninterrupted measurements to be made over long periods of time-dependent fluid properties.

The rate of shear the sample fluid is subjected to is constant, so the instrument is suitable for measuring Newtonian and non-Newtonian fluids.

By rotating the spindle at several different speeds, shear dependent behaviour of non-Newtonian fluids can be detected and analysed.

Dial Reading Viscometer



with Electronic Drive... The Best Just Got Better!

The original Brookfield Dial Reading Viscometer is the lab standard used around the world.

Now it's improved with a multi-speed electronic drive and ergonomically designed speed control knob. Quickly select any one of 10 pre-set speeds (8 speeds on LVT models). This new direct-drive design means extremely quiet operation and greater versatility. The new Universal Power Supply

facilitates the use of worldwide power sources.



DV-E Low Cost Digital Viscometer



The DV-E combines economy and ease of operation with traditional Brookfield excellence. The Brookfield DV-E has set a new world standard for value in viscosity measurement. Simplified controls allow operators to change test parameters quickly with the push of a switch and turn of a knob.

The digital display ensures easy and accurate readout of test results for simultaneous measurement of viscosity and torque. Quality of manufacture guarantees reliable performance and long life.

Low Cost and Easy to Use

Direct Display in:

cP or mPa·s

% Torque, Spindle, and Speed

18 Speeds for Greater Range Capability (0.3 to 100 rpm)

Accuracy 1%, Repeatability: 0.2%

DV-I Prime Digital

The DV-I+ Digital Viscometer combines traditional Brookfield accuracy, reliability, and versatility with the advantages of electronic sensing, indication, and output.

Sensing of viscosity is continuous, allowing close scrutiny of rapidly changing rheological processes. This instrument offers sophisticated performance at an affordable price.



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- Senses and Displays Continuously:
- Viscosity (cP or mPa·s)
- Temperature (°C or °F) (OPTIONAL)
- % scale (Brookfield)
- Speed (rpm)
- Spindle used
- Select all functions from user-friendly keypad
- Choice of 18 rotational speeds
- Optional RTD Temperature Probe
- Auto-zero and auto-range
- Warns of under- or over-range condition
- Direct output to chart recorder
- Timed Stop Feature to measure viscosity at precise user specified time interval
- Time To Torque Feature to measure the time interval for sample to reach user defined torque value
- Compatible with all Brookfield accessories
- NIST traceable viscosity standards available
- Traditional Brookfield accuracy: $\pm 1.0\%$ of range, Repeatability: 0.2%



DV-II+ PRO Digital Viscometer *The Most Versatile Viscometer*



Now Compatible with *Rheocalc*[®] software for automated viscosity testing via PC. The DV-II+ PRO Digital Viscometer combines traditional Brookfield accuracy, reliability, and versatility with the advantages of electronic sensing, display, and output. When controlled by PC, the DV-II+ PRO becomes a Rheometer with variable speed capability from 0.01 to 200 rpm.

Features And Benefits

- Continuous display of: Viscosity (cP or mPa·s), Temperature (°C or °F), Shear Rate, Shear Stress, % Torque, Spindle
- 54 selectable speeds provide superior range of viscosity/shear measurements for use in stand-alone operation
- Automated program control by PC running optional Rheocalc[®] software; speed control from 0.01 to 200 rpm.

- LV, RV, HA, and HB torque ranges available...
- Built-in RTD temperature probe for sample monitoring
- Easy-to-use keypad for simple selection of test parameters
- Auto Range feature to display viscosity limits
- Customizable options
- Download custom programs with DV Loader software (included)
- Parallel printer, serial RS-232, and analog voltage outputs
- Automatic data collection and historical comparison with optional Wingather[™] software
- Complete with appropriate spindles, DV Loader program, viscometer stand, guard leg, and carrying case

Electric (driven) Viscometers

DV-III Ultra Programmable Rheometer

A Sophisticated Rheometer With Easy-To-Use Intuitive Controls and now with the added new capability to measure static yield stress using vane spindle geometry.

Features And Benefits

- Two instruments in one for easily analyzing a material's yield stress and flow behaviour by measuring (1) the stress response versus strain during constant-rate tests and (2) viscosity changes as a function of changing shear rate, respectively.
- Continuous display of: Viscosity (cP or mPa·s), Temperature (°C or °F), Shear Rate, Shear Stress, % Torque, Spindle, Program status
- Also displays yield stress values (Pa, dynes/cm², and % torque)
- 2600 speeds for incredible characterization possibilities
- LV, RV, HA, HB and 5xHB torque ranges available...
- Built-in RTD temperature probe for sample monitoring
- Easy-to-use keypad with numeric keys for stand-alone program entry
- Stand-alone programming: Enter program requirements, start program, see the results on the built-in display
- Download custom programs with RheoLoader software (included) for viscosity tests and EZ-Yield software (included) for yield stress tests
- Customizable options: time to stop, time to torque, data averaging
- Built-in Math Models: Models provide data analysis without the use of external software. Casson Yield Values, NCA/CMA Casson (Chocolate), Power Law, Bingham Plastic and IPC Paste Analysis calculations are included
- Parallel printer, serial RS-232, and analogue voltage outputs
- Computer programmable using optional Rheocalc[®]; software lets you control all aspects of Rheological testing directly from the computer



ACCESSORIES:

TC-502 Water Bath for Refrigerating and Heating



Stand-alone - No water tap required

Built-in circulator to pump to all the same jacketed devices as the TC-102

Easy control of set-point -20° to + 200°C

Small work area with cover for tempering individual samples - accommodates 600 mL beaker

Configured to measure viscosity directly in the bath

Programmable Controller version is designed for automated temperature control when used with appropriate

Helipath™ Stand

The Brookfield Helipath™ Stand, when used with a suitable Brookfield Viscometer/Rheometer fitted with a special T-bar type spindle, will permit viscosity/consistency measurements in relative centipoise values for materials having characteristics similar to paste, putty, cream, gelatin, or wax.

Many substances, because of the nature of their yield values, have previously been considered unsuited for viscosity or consistency measurements with rotational viscometers. Any rotating member, be it cylinder, disc, or paddle, will create a channel in such substances and after a very short time exert a negligible and meaningless torque on any sensing device. This effect also occurs with materials that have a gel structure. Paint dyes, lithographic inks, and many other substances are thixotropic in that their structure is broken down and their viscosity is decreased when subjected to internal shearing. While no rotating member will ever spin freely in such materials, the torque required to produce this motion will become less as the period of internal shearing lengthens. The study of such data will lead to difficulties and necessarily rigid testing procedures in product control work. Other materials, notably pastes and creams, show a combination of the two effects listed above. They will show a yield value as well as a change in relative viscosity/consistency with time.

The Brookfield Helipath™ Stand is designed to slowly lower or raise a Brookfield Viscometer/Rheometer so that its rotating shear element will describe a helical path through the test sample. By always cutting into fresh material, the problem of channelling or separating is eliminated and meaningful viscosity/consistency measurements can be made. The reversing feature of the Helipath™ Stand allows measurements to be made over a variable period of time.

MODEL SELECTION TABLE

Model**	Viscosity Range cP(mPa•s)		Speeds	Readout		Data Displayed							Output				Program Features		
	Minimum*	Maximum		Analog	Digital	Torque %	cP (centipoise)	mPa•s (millipascal seconds)	Shear Rate	Shear Stress	Temperature 0F/C0	0-1V Chart Reader	Printer Output	RS-232 PC - Data Output	RS-232 PC - Full Computer Control	Time to Torque	Time to Stop	Customize 4 Programs	Customize 10 Programs
LVT	15	2M	8	4	X		X												
LVDV-E	15	2M	18	4		X	X	X	X										
LVDV-I PRIME	15	2M	18	4		X	X	X	X		O	X				X	X		
LVDV-II+ PRO	15	6M	54 Selectable	4		X	X	X	X	X	X	X	X	X	X	X	X	X	X
LVDV-III Ultra	15	6M	0.01-250 rpm in varying inc.	4		X	X	X	X	X	X	X	X	X	X	X			X
RVT	100 ***	8M	10	6	X		X												
RVDV-E	100 ***	13M	18	6		X	X	X	X										
RVDV-I PRIME	100 ***	13M	18	6		X	X	X	X		O	X				X	X		
RVDV-II+ PRO	100 ***	40M	54 Selectable	6		X	X	X	X	X	X	X	X	X	X	X	X	X	X
RVDV-III Ultra	100 ***	40M	0.01-250 rpm in varying inc.	6		X	X	X	X	X	X	X	X	X	X	X			X
HAT	200 ***	16M	10	6	X		X												
HADV-E	200 ***	26M	18	6		X	X	X	X										
HADV-I PRIME	200 ***	26M	18	6		X	X	X	X		O	X				X	X		
HADV-II+ PRO	200 ***	80M	54 Selectable	6		X	X	X	X	X	X	X	X	X	X	X	X	X	X
HADV-III Ultra	200 ***	80M	0.01-250 rpm in varying inc.	6		X	X	X	X	X	X	X	X	X	X	X			X
HBT	800 ***	64M	10	6	X		X												
HBDV-E	800 ***	104M	18	6		X	X	X	X										
HBDV-I PRIME	800 ***	104M	18	6		X	X	X	X		O	X				X	X		
HBDV-II+ PRO	800 ***	320M	54 Selectable	6		X	X	X	X	X	X	X	X	X	X	X	X	X	X
HBDV-III Ultra	800 ***	320M	0.01-250 rpm in varying inc.	6		X	X	X	X	X	X	X	X	X	X	X			X

* Minimum ranges can be extended to as low as 1cP with the use of UL Adapter Accessory.

** Standard torque range values

*** Optional #1 RV/HA/HB spindle available to measure lowest range in table

LV = 673.7 dynes—cm RV = 7,187 dynes—cm HA = 14,374 dynes—cm HB = 57,496 dynes—cm



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W.C. Trailing Volume Test Rig

Trailing Volume Test Rig

WC suites for sale in the UK and many countries around Europe must comply with EN 997: 2003 'WC pans and WC suites with integral traps'. The standards sets performance levels for the efficiency of flushing and the trailing volume of water after the pan is cleared. WRC, as a leading test house for water pipes and fittings, has designed and built a test rig for compliance testing, which is now used by WC manufacturers across the world.

The rig can also be used for conducting flush volume testing as required in Australian AS 1172.2.

The test rig was originally designed for WRC's own engineers to carry out compliance testing to EN 997 on behalf of manufacturers. Many manufacturers of WCs have since bought these test rigs, for development of new pans, and for quality control.

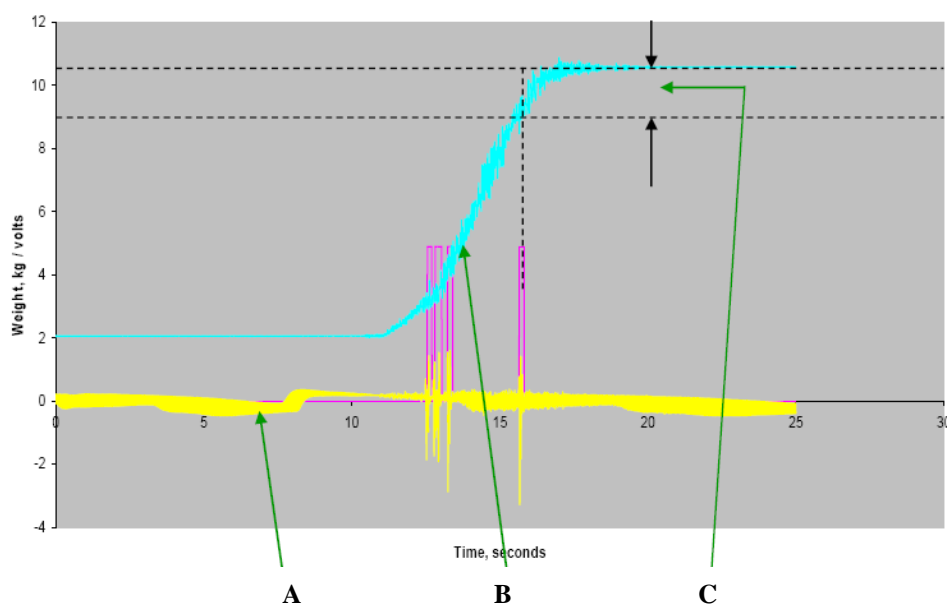
The test rig uses an optical principle for detection of the test pieces specified by the standard. The flushed volume is weighed in a small tank on a load cell mounted on the steel frame. The test data is recorded on to a PC through an electronic interface unit.

The test rig is straightforward to use and is typically operated by quality control staff. The rigs have been in use for over ten years and have proved accurate and reliable. The test rigs are guaranteed for a year and are supported by WRC.

The test rig is used with a PC so that the results can be logged easily and are directly available for quality control or for reports for customers. The graph below shows a typical output from a test. The test piece detector (A) and load cell outputs (B) are recorded straight into Microsoft XL on a PC. The load cell reading rises as the tank fills during the test. At the same time the four test pieces specified by the standard are recorded by the detector as they are flushed away. The user can then measure the trailing volume (C)



Example of trailing volume test rig output



Standard Rig Includes:
Main test rig components mounted on a steel frame;
Computer interface unit
PC data acquisition software
Software backup CDs
Spare lamps for the fibre optic source
Test Pieces
Calibration weight for load cell
Paint for the test pieces
Handbook

Water Absorption Testing

Tank for vacuum water absorption tests VSVD/60.

Suitable for rapidly determining the water absorption of ceramic tiles under the vacuum immersion method according to International ISO standards 10545-3 and ISO 10545-12

Suitable for tiles up to 60cm x 60cm

(The device can be programmed for testing cycles as requested by the standard and, furthermore, for various other cycles up to a vacuum value of -65 KPa)

General features:

- Stainless steel tank and sample basket.
- Basement and cabinet for switch board made of dry painted sheet metal.
- Aluminium cover with handles, and fly wheels for locking.
- Vacuum pump, power 0.35 HP.
- Automatic cycle test.
- Control board with keyboard and LCD display for test cycle setting and checking.
- 2 languages can be selected (- I - GB - F - E - D -)
- 3 available units of measure: KPa - mbar - mm/H2O
- Programmable vacuum range: from -1 up to -65 KPa (-650 mbar / -6630 mm/H2O).
- 4 board-selected, water levels for adapting the level to the size of the tiles being tested.
- Automated electrovalve operated water inlet and outlet system.
- Power input 230 V, single-phase, 50 Hz.
- Overall dimensions: 126 x 60 x 114 cm.
- Total net weight: 182 kg.

Part Number: 01C12804/1

Thermostatically controlled tanks for Water Absorption Tests. (Non vacuum) - VTD60

Suitable for determining the water absorption of ceramic tiles, according to UNI EN ISO 10545-3.

General features:

- Stainless steel tank and sample basket.
- Basement and cabinet for switch board made of dry painted sheet metal.
- Cover with handles and vent pipe.
- Basket for containing ten 25x25 cm tiles or five 60x60 cm tiles.
- Electric heating 4.5 kW armoured elements.
- Cooling with electro valve controlled water cooling coil.
- Automatic test cycle with end-of-test beeper.
- Control board with digital temperature indicator/adjuster, 2 timers and various LED's indicating the various test sequences.
- Power input 400 V, single-phase, 50/60 Hz, 4.6 kW.
- Control board with keyboard and LCD display for test cycle setting and checking.
- Settable parameters from the operator:
 - Boiling temperature
 - Maintain boiling time
 - Cooling time
 - Cooling gradient
- 5 languages can be selected (- I - GB - F - E - D -)

Dimensions of instrument body: 126x60x114 cm, Total net weight: 150 kg.
Part number: 01C12803



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ISO 9001:2008
Certificate 23478

Thermal Shock Testing

Standardised Cooling Tanks, suitable for determining the resistance to thermal shock in accordance to the UNI EN ISO 10545-9.

According to the standard, each sample must undergo 10 heating and cooling cycles.

The sample must be heated in a thermostatically controlled drying oven and cooled in accordance with one of two methods, depending on the water absorption of the samples examined.

Tiles with a low porosity (water absorption of less than 10%) are immersed in water (VR/60/A tank).

Glazed tiles with water absorption of over 10% are indirectly cooled without immersion (VR/60/B tank).

Standardized tank, model VR/60/A.

Designed for cooling ceramic tiles by immersing them in water; suitable for sizes of up to 60x60 cm.

Entirely made of stainless steel.

The water supply is adjustable thanks to the provision of a flow-meter with a scale of 0 to 5 litres/min, (the standard mentions a flow rate of 4 litres/minute).

Water drainage outlet with pipe fitting.

Stainless steel bucket for samples, featuring 4 vibration-damping feet, adjustable height.

Overall dimensions: 895x38x93 cm.

Gross weight: 45 kg.

Part number: 01CI2810/5



Standardized tank, model VR/60/B.

Designed for the indirect cooling of ceramic tiles, without immersion; suitable for sizes of up to 50x50 cm.

Tank structure made of stainless steel.

Top aluminium plate with adjustable feet made of stainless steel, handles and raised edge for retaining the aluminium granules.

The water supply is adjustable thanks to the provision of a flowmeter with a scale of 0+5 litres/min. (the norm mentions a flow rate of 4 litres/minute).

Water drain-age outlet with pipe fitting.

4 vibration-damping feet, adjustable height.

Supplied complete with a 5 kg pack of aluminium granules of different diameters (from 0.3 to 0.6 mm).

Overall dimensions 84x67x26 cm.

Gross weight 25 kg.

Part number: 01CI2812/5



Spares:

5 kg pack of aluminium granules of different diameters (from 0.3 to 0.6 mm). 01CI2812/A

Water Absorption Testing Tank VSVD/60

Standardised Tank, suitable for fast determination of the water absorption of ceramic tiles under the vacuum immersion method, according to Norm: **UNI EN ISO 10545-3 and 10545-12**

Suitable for tile sizes up to 60x60 cm.

(The device can be programmed for testing cycles as requested by the standard and, furthermore, for various other cycles up to a vacuum value of -65 KPa)

General features:

- Stainless steel tank and sample basket.
- Basement and cabinet for switch board made of dry painted sheet metal.
- Aluminium cover with handles, and fly wheels for locking.
- Vacuum pump, power 0.35 HP.
- Automatic cycle test.
- Control board with keyboard and LCD display for test cycle setting and checking.
- 2 languages can be selected (- I - GB - F - E - D -)
- 3 available units of measure: KPa - mbar - mm/H₂O
- Programmable vacuum range: from -1 up to -65 KPa (-650 mbar / -6630 mm/H₂O).
- 4 board-selected, water levels for adapting the level to the size of the tiles being tested.



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Frost Resistance Testing Tank

Tank for determining resistance to frost, model DFR/60

Suitable for performing the test envisaged by the UNI EN ISO 10545-12 standard for tiles of up to 60 x 60 cm.

General features:

Stainless steel tank and climatic cell.

The cabinet for the switch board and compressor is made of dry painted sheet metal.

Large clearances within the cabinet and easy access to the tank and climatic cell, guarantee easy maintenance.

- Climatic tank capacity: test samples up to the size 60 cm x 60 cm complying with the norm UNI EN ISO 10545-12 (capacity of 10 tiles)
 - Double overlapping tray for large and small sizes
 - Complete submersion in water of the test samples
 - Heating system for the reservoir water
 - Touch screen control panel
 - Video-graphic recorder with display and data storing on compact Flash (data processing software included) for recording the temperatures of the tank, reservoir and the room
 - Pre-set program that cannot be changed for the test complying with the norm UNI EN ISO 10545-12
 - Storage of 9 customized programs
 - 2 languages can be selected (Italian and English)
 - Temperature measurement units expressed in °C with 0.1°C resolution
 - Displaying of the test status and of the temperatures in real time
 - Temperature sensors: PT100 thermo-resistances
 - Level sensors for tank and reservoir water
 - Reservoir water level indicator
 - Climatic tank drain valve: 1-1/2" ball type, with electric actuator
 - Reservoir drain valve: 1-1/2" ball type, manual
 - Illuminated and acoustic signalling tower
 - "Mushroom" emergency push button
 - External RS 232 C serial output of the video-graphic recorder (communication software excluded)
 - Power supply: 400 V three-phase 50 Hz + N + PE 32A
 - Weight empty 470 Kg.
- Overall dimensions: 161x155x161 cm.



Product Code: 01C12892

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Mohs Hardness Pencils

PENCILS FOR MOHS SCALE HARDNESS TEST. MOD CI/8

Special model manufactured on the basis of 20 years experience of this type of instrument.

Comprises 8 pencils made from aluminium, 10mm diameter x 146mm long to which the mineral with a sharpened head is attached.

The mineral is very thick and has a diameter of 6mm

The pencils are supplied in a carrying case in the following hardness:

5, 5.5, 6, 6.5, 7, 7.5, 8 and 9

The minerals are accurately selected and of top quality.

Case dimensions: 180x28x170mm

Net weight: 0.37kg

Product Code: 01CI1470



MINERALS FOR MOHS SCALE HARDNESS TEST

Set of 14 Mohs scale minerals. The minerals are packed in an elegant wooden carrying case, and squared in approximate dimensions of 30x30x10 mm. The hardness are: 2-2.5-3-3.5-4-4.5-5-5.5-6-6.5-7-7.5-8-9.

Case dimensions: 37x16x5.5 cm. Net weight: 1 kg

Product Code **01CI1473**

Single Mohs scale minerals:

Hardness 2 Plaster	01CI1474/2
Hardness 2.5 Volpinite	01CI1474/3
Hardness 3 Calcite	01CI1474/4
Hardness 3.5 Aragonite	01CI1474/5
Hardness 4 Fluorite	01CI1474/6
Hardness 4.5 Serpentine	01CI1474/7
Hardness 5 Apatite	01CI1474/8
Hardness 5.5 Opal	01CI1474/9
Hardness 6 Orthoclase	01CI1475
Hardness 6.5 Jade	01CI1475/1
Hardness 7 Quartz	01CI1475/2
Hardness 7.5 Tourmaline	01CI1475/3
Hardness 8 Topaz	01CI1475/4
Hardness 9 Corundum	01CI1475/5



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ISO 9001:2000
Certificate No: 23478

Cup Handle Adhesion Tester

Cup Handle Adhesion Tester

The "Payne" Cup Handle Adhesion Test Machine has been developed to give a repeatable test procedure to determine the adhesion test of cup handles to their bodies

The unit consists of a falling weight, a spring balance with a maximum reading finger, and adjustable clamping holders to suit all sizes and shapes of cup.

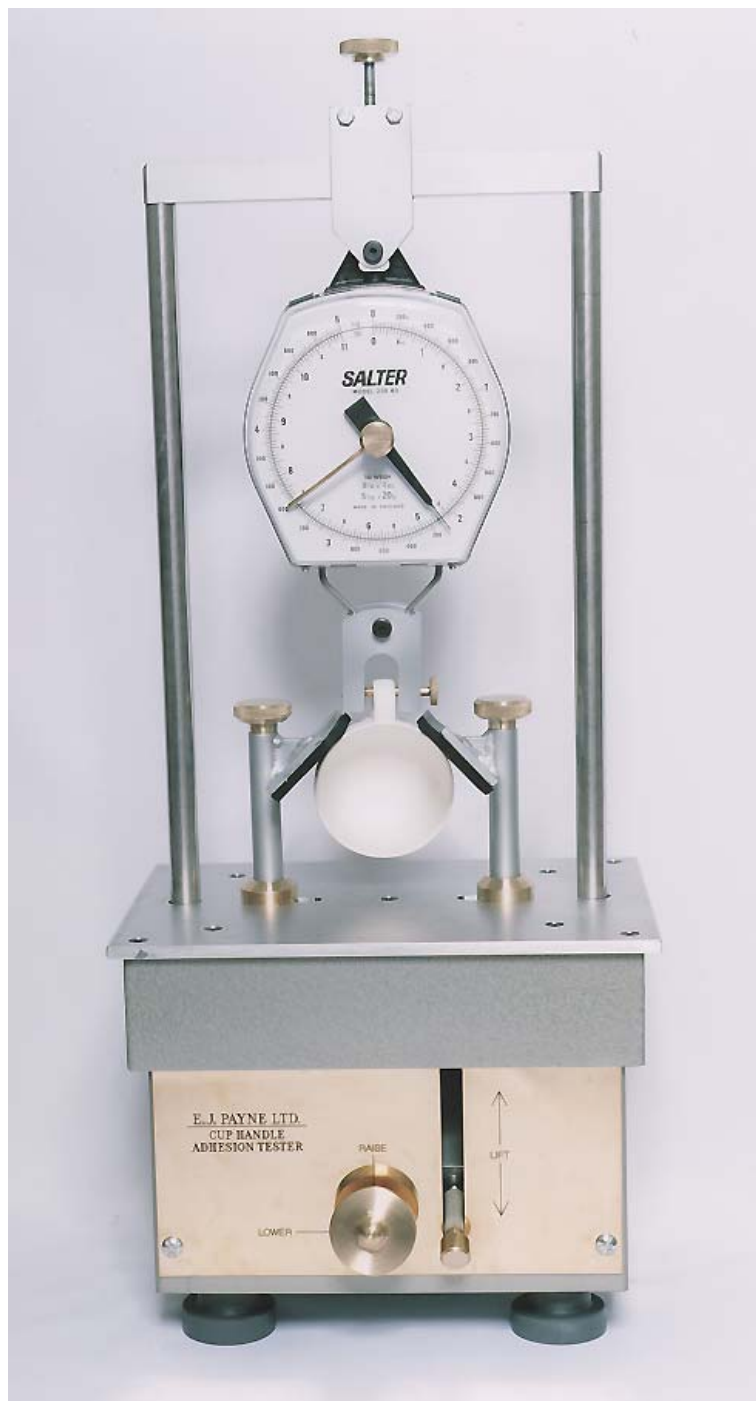
Principle of Operation.

The handle of the cup is looped onto a hook below the spring balance. The clamping device is then fixed around the body of the cup. A holding lever is released which allows the damped weight to fall freely at a consistent speed. As the strain on the cup increases the dial finger on the spring balance increases. At the ultimate point the handle will break away from the body. The dial finger will revert to zero, but the maximum finger will remain at the maximum point attained.

"Payne" Cup Handle Adhesion Testing Machine
Order Code: CHST002

Accessory

Conversion kit to change the machine to a 5kg maximum capacity MODULUS OF RUPTURE Machine (see below)



This is just one of the pieces of equipment designed by E.J. Payne Ltd specifically to a customer's requirements. If you have any bespoke requirements, please do not hesitate to contact our Sales Department.

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ISO 9001:2008
Certificate 23478

Atomic Absorption Spectrophotometer

The 205 is a rugged, economical, & highly sensitive instrument which is perfect for industrial, educational and QC operation.



Features:

- Internal microprocessor and software perform statistical analysis and graphically display calibration curves.
- Dual lamp power, one for warm up
- High throughput "Stable Beam" optical system
- Modulated HCL power supply to cancel DC emission from flame
- Digital readout for absorbance, emission, direct concentration, lamp currents and PMT voltage
- Autozero, curve correction, integration and high gain damping features
- Bandpass resolution from 0.2 - 0.7 - 2.0nm
- Burner safety interlock system for nitrous oxide/acetylene flame operation
- High sensitivity detection using quartz PMT detector
- Analog and digital output for chart recorders/PC data systems
- Compact and portable

The 205 AAS uses a unique burner system to get more sample to the flame, which results in more signal and better sensitivity. We use an impact bead nebulizer to get an efficient generation of a fine aerosol of sample solution. The short path spray chamber permits difficult solutions containing organics or high dissolved solids to be aspirated with superb precision and minimal instabilities.

To take advantage of this enhanced signal, we design an optical layout that provides the highest throughput of any commercially available spectrophotometer. Our very simple straight line optical path uses a monochromator with a single reflector mirror. This cuts down on the amount of light loss often associated with models having 10 or more mirrors. Because of this, the 205 AAS can detect far-UV elements, such as arsenic and selenium, with ten times greater sensitivity.

Wavelength range	190 to 900nm
Accuracy	± 0.2nm
Precision	± 0.1nm
Monochromator / Optics	250nm Ebert mount 600 lines/mm high efficiency grating. 0.2, 0.7, 2.0nm bandpass to cover analytical wavelengths for use on atomic absorption and emission measurements
Hollow Cathode Lamp	Dual HCL modulated power supply, 0 to 25mA peak.
Burner / Nebulizer	Polypropylene spray chamber with premix burner and high efficiency adjustable nebulisers (SS or PT/Ru), Titanium burner heads for Air/Acetylene, Argon/Hydrogen and Nitrous Oxide/Acetylene operation
Integration	User selectable times from 0.5 to 10 seconds for stabilizes readings
Calibration	Automatic, weighted least squares fit to 1st, 2nd, 3rd or 4th order functions, up to 8 points
Display:	16 line backlit LCD for all text & graphics
Output modes:	LCD display, IEEE Parallel port for dot matrix printer, RS-232 serial interface.

pH Meters

PORTABLE pH METER

The WalkLAB microprocessor pH meter is a three-in-one pH meter measuring pH, mV and temperature. The pH meter features a clear LCD display and indicates pH over the range of 0 to 14pH, mV over the range of -999 to +999mV and temperature 0 to +99.9° C.

The pH meter simultaneously displays pH and temperature and incorporates a simple to use autocalibration feature. The pH meter incorporates an easy to use membrane keypad and is housed in an ABS plastic zip case.

The pH meter is supplied as a complete kit; a pH electrode, temperature probe and buffer solutions, in a PVC carrying case.



PRODUCT CODE: 813-625

Specification	pH	mV	Temperature
Range	0 to 14 pH	± 999 mV	0 to 99.9°C
Resolution	0.01pH	1mV	0.1°C
Accuracy	± 0.01pH	± 1mV	± 0.05°C
Battery	9 Volt PP3		
Battery Life	300 hours		
Display	Custom LCD		
Dimensions	32 x 83 x 163mm		
Weight	350 grams		

BENCH pH METER



The MicroBench pH meter is an economical benchtop pH meter that is mains-powered and suitable for basic laboratory applications, educational institutions and similar. The MicroBench pH meter features an easy to read LCD display that indicates pH over the range of 0 to 14pH, mV over the range of -999 to +999mV and temperature 0 to +99.9°C. The MicroBench pH meter is housed in an ABS plastic, splashproof housing with an easy to use membrane keypad. The MicroBench pH meter is supplied with a power adaptor but no probes.

Specification	pH	mV	Temperature
Range	0 to 14 pH	± 999 mV	0 to 99.9°C
Resolution	0.01pH	1mV	0.1°C
Accuracy	± 0.01pH	± 1mV	± 0.05°C
Battery	AC/DC adaptor 110/230 volt AC/12 volt DC		
Battery Life	300 hours		
Display	Custom LCD		
Dimensions	55 x 150 x 200mm		
Weight	500 grams (excluding adaptor)		

This general purpose, plastic bodied, pH electrode is ideal for measuring the pH in liquids and semisolids in a wide variety of applications including food processing, agriculture and laboratories.

Product Codes:

MicroBench pH Meter 813-650

General Purpose Electrode 823-501

ATC temperature probe 813-626

general purpose electrode



Ø12 x 120mm

e.j.payne
ceramic

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