Cement Testing Equipment

Cement is a binding material used with fine aggregate to produce mortar for masonry, or with sand and aggregates to produce concrete. Construction cements are usually comprised of lime or calcium silicate and combined with fly ash. They are categorised as either hydraulic (eg. Portland cement) or non-hydraulic, depending on their ability to set in water.

High quality cement is necessary to produce concrete and mortar that meets relevant construction industry specifications. ELE International designs and manufactures a wide range of sample preparation and cement testing equipment which complies with global standards for the assessment of fineness, consistency, setting time, workability, flow, strength, soundness, heat of hydration and chemical composition.

ELE's comprehensive cement testing equipment enables the mixing, moulding and curing of samples prior to compressive and flexural strength testing of prisms, cubes and briquettes.

Chemical Tests

Chemical Tests

Chemical analysis plays an important part in the categorisation of cements and other construction materials such as lime. The use of analytical instrumentation such as flame photometry offers a simple and cost effective solution to the determination of the constituent parts of cement.

Loss-on-Ignition

The Loss-on-Ignition of Cement and Building Lime can be determined using a Muffle Furnace to oxidize the sample in air at 975°C ± 25°C.

Muffle Furnace

Product Codes: 83-4170/10, 83-4170/06

Product Standards:

EN 196-2 (EN 196-21), EN 459-2, EN 13454-2

Specifications	
External Dimensions L x W x H (mm)	545 x 385 x 400
Work Chamber Dimensions L x W x H (mm)	300 x 200 x 120
Internal Volume (ltrs)	6.9
Max Temperature (°C)	1200
Power Supply (W)	2500
Weight (kg)	130
Product Code	**Electrical Supply**
83-4170/01	220-240 V AC, 50 Hz, 1 ph
83-4170/06	220-240 V AC, 60 Hz, 1 ph

Spares/Consumables:

Thermostat, KGrade, 370 mm long, diameter 2.5 mm (83-4170/10)

Controller (83-4170/11)

Heating element/chamber complete (83-4170/12)

Refractory brick (83-4170/13)

Heating Element for use in 83-4170 (83-4170/14)

Refractory Bricks

Product Code: 83-4170/13

Porcelain Crucible

Product Code: 82-3320

30 ml capacity complete with lid.

Specifications	
Capacity (ml)	30

Flame Photometry

Today, cement is manufactured by a chemical process with raw materials being crushed, ground and blended before being heated in a rotary kiln until they combine chemically.

ELE Flame Photometer

The ELE Flame Photometer is built to a high specification and can be used with confidence for the most exacting analysis. It is a low temperature, single channel emission flame photometer with a large clear digital readout. The unit incorporates zero and gain controls with fine and coarse sensitivity, electronic ignition and automatic air supply regulation. The meter is supplied with sodium and potassium filters, fuel and air connections, nebuliser cleaning wire, hose connecting clips, auxiliary power plug, hexagon key, 2 lengths of drain tubing and a comprehensive instruction book and service manual. The unit is housed in a strong case.

ELE Flame Photometer

Product Code: 38-0200/01

Product Standards:

EN 196-2 (EN 196-21), ASTM C114

Special Note: The Flame Photometer requires a source of moisture-free air at 6 litres/minute at a pressure of 1 kg/cm². It also requires a fuel source for the flame and a regulator (see accessories).

Accessories:

Air Compressor (38-0320/01)

Calcium Filter (38-0250)

Barium Filter (38-0260)

Regulators for Natural Gas (38-0270)

Regulators for Propane Gas (38-0280)

Specifications	
Dimensions L x W x H (mm)	420 x 360 x 300
Readout	LED three 12.5 mm digits
Sensitivity Na, K, Ca	Na: 3 to 100 ppm K: 3 to 100 ppm Ca: 5 to 100 ppm (optional filter)
Reproducibility	1% CV for 20 consecutive samples using 10 ppm, set to read 100
Recorder Output	Nominal 1.00 V for a reading of 100.0
Power Supply	220-240 V AC, 50-60 Hz, 1 ph
Weight (kg)	8
Range (ppm)	0 to 199.9

Chemical Tests

Flame Photometer Accessories

Air Compressor

Product Code: 38-0320/01

Product Standards:

EN 196-2 (EN 196-21), ASTM C114

Supplies air at 6 litres/minute at a pressure of 1 kg/cm^2, for use with 38-0200/01 Flame Photometer.

Specifications	
Power Supply	220-240 V AC, 50-60 Hz, 1 ph

Calcium Filter

Product Code: 38-0250

Product Standards:

EN 196-2 (EN 196-21), ASTM C114

Barium Filter

Product Code: 38-0260

Product Standards:

EN 196-2 (EN 196-21), ASTM C114

Regulators for Natural Gas

Product Code: 38-0270

Product Standards:

EN 196-2 (EN 196-21), ASTM C114

Regulators for Propane Gas

Product Code: 38-0280

Product Standards:

EN 196-2 (EN 196-21), ASTM C114

Determination of Fineness Blaine Apparatus

The fineness of cement is a property that must be carefully controlled during the manufacturing process. The total specific surface of the cement represents the surface area available for hydration. Various methods are in use to measure the specific surface of cements. For most purposes air permeability methods produce accurate, repeatable results.

This method has been adopted in Europe as the definitive means of determining the fineness of cement and other powder materials. The system is supplied complete with Stainless Steel cell, perforated disc and plunger, manometer U-tube, aspirator, bottle of manometer liquid and a box of filter papers.

Blaine Air Permeability Apparatus

Product Code: 38-1000

Product Standards:

EN 196-6, ASTM C204, AASHTO T153

Specifications	
Cell	Stainless Steel; 12.70 ± 0.10 mm i.d.
Disk	0.9 ± 0.1 mm thick with 30-40 one mm dia holes
Plunger	Stainless Steel
Manometer	U-tube glass with ground joint, stop cock and rubber bulb assembly
Filter Paper	12.70 mm dia
Fluid	Pure Mineral Oil
Weight	Net 7 lbs. (3.2 kg)

Spares/Consumables:

Manometer U-tube (38-1000/10)

Aspirator (38-0500/11)

Blaine Air Permeability Cell (38-1000/15)

Perforated Disc (38-1000/17)

Filter Papers (38-0650)

Reference Cement 5 g Sachet (38-0645)

Reference Cement (5 g Sachet)

Product Code: 38-0645

Product Standards:

EN 196-6, ASTM C204, AASHTO T153)

Filter Papers

Product Code: 38-0650

Product Standards:

EN 196-6, AASHTO T153

12.7 mm diameter. Box of 100.

Pure Mineral Oil 1 Litre Bottle

Product Code: 38-0620

Product Standards:

EN 196-6, ASTM C204, AASHTO T153

Blaine Air Permeability Cell

Product Code: 38-1000/15

Product Standards:

EN 196-6, ASTM C204, AASHTO T153

Stainless Steel with a perforated disc and plunger.

Spares/Consumables:

Perforated Disc (38-1000/17)

Manometer U-tube

Product Code: 38-1000/10

Product Standards:

EN 196-6, ASTM C204, AASHTO T153

Fineness

Specific Gravity (Relative Density) of Hydration Cement

It is necessary to know the specific gravity of cement for various reasons related to its quality and use. In particular it will be necessary to determine the specific gravity as part of the determination of the specific surface of a cement. The ELE Le Chatelier Flask is a high specification unit that is individually calibrated and supplied with calibration certificate.

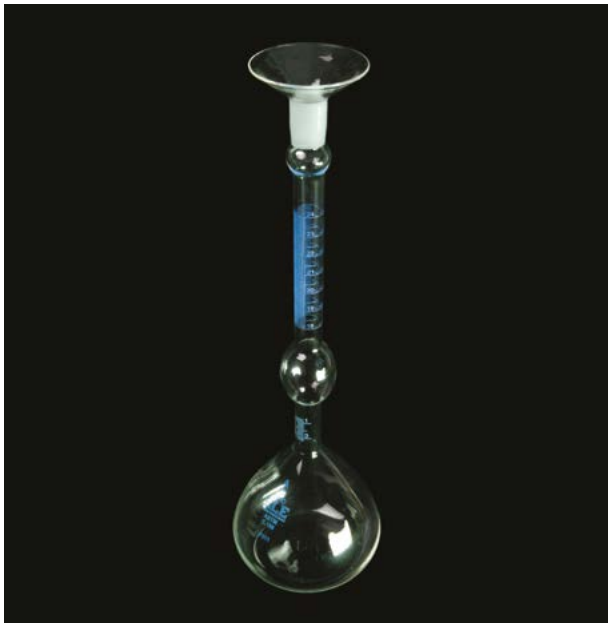
Le Chatelier Flask

Product Code: 38-1200

Product Standards:

EN 196-6, ASTM C128, ASTM C188, E 694, AASHTO T133

For determining the density of hydraulic cement and lime, supplied complete with calibration certificate. Capacity 250 ml. Graduated from 0 to 1 ml and from 18 to 24 ml graduations. Accurate to 0.05 ml.



Specifications	
Graduations	Zero mark represents 250 ml, the capacity of the large bulb; neck graduations from 0-1 ml in 0.1 ml divisions with two extra 0.1 ml graduations above the 1.0 and below the 0 marks; bulb portion of neck holds 17 ml; top portion of neck graduated from 18-24 ml in 0.1 ml divisions; 24 ml capacity
Stopper	Ground glass
Weight	Net 8 oz. (227 g)

Consistency, Setting Time, Workability & Flow

Determination of setting time and soundness of cement requires the use of a neat cement paste of standard consistence. The Vicat method is usually specified as the test used to determine the water content which will produce the desired consistence.

Concrete Mortar Penetrometer

The Concrete Mortar Penetrometer is used for field and laboratory evaluations of the initial set of concrete mortars. The test involves inserting the penetrometer shaft to a depth of 25.4 mm at constant rate and time interval. The resistance in lbf/in^2 is shown on the penetrometer's direct-reading scale.

Pocket Concrete Penetrometer

Product Codes: 38-2696

Product Standards:

ASTM C403/C403M, AASHTO T197

Supplied complete with belt-loop, canvas carrying case.

Specifications	
Needle	Steel shaft; 1/20 sq. in. surface area
Range	0 to 700 psi
Scale	Direct-reading; indicator sleeve holds reading until released
Dimensions Dia. x Length	3/4 inches (19 mm) x 7 inches (178 mm)
Carrying Case	Canvas, with belt-loop
Weight	Net 8 oz. (227 g)

Spares/Consumables:

Spare Indicator Ring (194150033)

Flow & Workability of Mortar Lime

To perform this test, a sample is placed on a metal surface which is then raised and dropped through a known height.

Flow Table

Product Code: 38-6000

Product Standards:

ASTM C230/C230M

Manufactured from cast bronze as specified in BS and ASTM C230. Complete with Tripod and Baseplate.

Specifications	
Dimensions W x D x H (m)	0.6 x 0.42 x 0.43
Weight (kg)	25

Spares/Consumables:

BS/ASTM Flow Table Top (38-6000/10)

Tripod (38-6020)

Baseplate (38-6060)

Flow Mould

Product Code: 38-6040

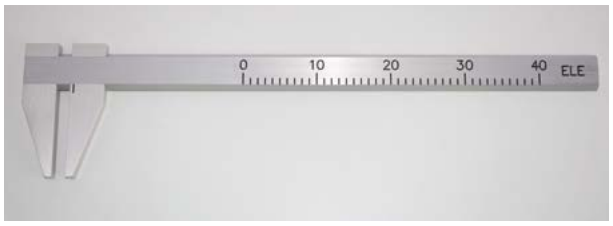
Product Standards:

ASTM C230/C230M

Manufactured from bronze as specified in BS and ASTM.

Calipers ASTM

Product Code: 38-6080



Product Standards: ASTM C230/C230M

For measuring the diameter of the sample.

Specifications	
Dimensions W x D x H (m)	0.04 x 0.1 x 0.33
Weight (kg)	0.2

Plastic Tamper

Product Code: 38-6160

Product Standards: ASTM C230/C230M

Specifications	
Dimensions W x D x H (m)	0.142 x 0.025 x 0.155

Motorised Unit for 38-6000 Flow Table

Product Code: 38-6100/01, 38-6100/06

Product Standards:

ASTM C230/C230M

For use with 38-6000 Flow Table. Operates the cam at a speed of 100 rpm. For 220-240 V AC, 50 Hz, 1 ph.

Specifications	
Dimensions W x D x H (m)	0.39 x 0.55 0.22
Weight (kg)	5
Product Code:	**Power Supply**
38-6100/01	220-240 V AC, 50 Hz, 1 ph
38-6100/06	220-240 V AC, 60 Hz, 1 ph

Consistency, Setting Time, Workability & Flow

Vicat Method

This procedure is used to determine the quantity of water required to produce a cement paste of standard consistence.

Vicat Frame

Product Code: 38-4010

Product Standards:

EN 196-3, EN 480-2, EN 13454-2, ASTM C187, ASTM C191, AASHTO T129, AASHTO T131

Complete with consistency plunger, 10 mm diameter. Requires one initial or final set needle to make up test weight to 300 g (less Needle Sets and Moulds).

Specifications	
Weight (kg)	1.3

Spares/Consumables:

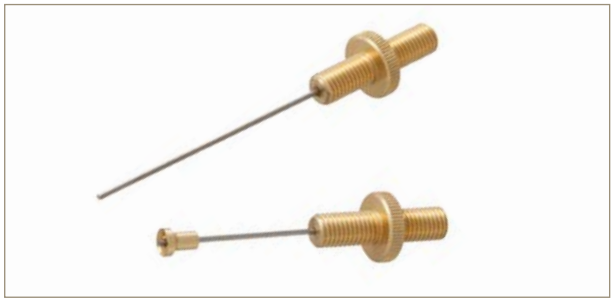
Consistency Plunger (38-4010/14)

Accessories:

ASTM Vicat Mould (38-2660)
EN Vicat Mould (38-2300)
Vicat Mould (38-2200)
Engineer's Steel Rule (81-0805)
Harvard Trip Balance (78-7090)
Weights for Harvard Trip Balance (78-7110)
ASTM Initial Set Needle (38-4010/10)
EN Initial Needle (38-4010/11)
EN Final Needle (38-4010/12)
EN Set of Needles (38-4010/13)

Initial & Final Set Needle EN

Product Code: 38-4010/13



Product Standards:

EN 196-3, EN 480-2, EN 13454-2

1.13 mm diameter.

Initial Set Needle ASTM

Product Code: 38-4010/10

Product Standards:

ASTM C187, ASTM C191, AASHTO T129, AASHTO T131

1 mm diameter.

Automatic Vicat

The Automatic Vicat Apparatus executes the test program using a fully automatic test cycle. The integral LCD display indicates test progress in real time. Firmware in the unit enables up to five user test profiles to be established. Integrated on-board memory will store up to 50 complete tests. On completion of the test the integral printer automatically prints all test data including a graph penetration with related data. As standard, the unit includes an RS232 serial port for connection to PC which, when used in conjunction with the supplied software, enables users to manage test data including graphing and report generation. The timed cycle of events is operator-selectable and penetrations can be selectable at intervals of 30 seconds, 1, 5, 15 or 30 minutes.

Automatic Vicat Apparatus

Product Code: 38-2015/01

Product Standards:

EN 196-3, EN 480-2, EN 13454-2, ASTM C187, ASTM C191, AASHTO T129, AASHTO T131

Complete with EN and ASTM Initial and Final needles, Consistency Plunger, Windows® software and RS232 cable, 1 x EN and ASTM Mould and Glass Plate. Suitable for continuous use in saturated humidity, at a controlled temperature of 20°C ± 1°C.

Specifications	
Power Supply	220-240 V AC, 50-60 Hz, 1 ph

Spares/Consumables:

ASTM Initial and Final Set Needle (38-2023)
Consistency Plunger (38-2015/16)
EN Initial and Final Set Needle (38-2021)

Accessories:

ASTM Vicat Mould (38-2660)
EN Vicat Mould (38-2300)
Vicat Mould (38-2200)
Needle Cleaning Device (38-2015/12)
Printer Paper Rolls (38-2015/14)
Mould Tank (38-2015/15)
Weight, 700 g (38-2015/17)

Consistency, Setting Time, Workability & Flow

Mould Tank

Product Code: 38-2015/15

Product Standards:

EN 196-3

For testing samples under water as per EN 196-3, for use in temperature controlled laboratories.

Printer Paper Rolls (Pack of 10) For Automatic Vicat

Product Code: 38-2015/14

Consistency Plunger

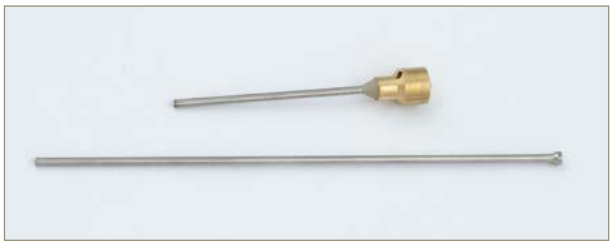
Product Code: 38-2015/16

Product Standards:

EN 196-3, EN 480-2, EN 13454-2, ASTM C187, ASTM C191, AASHTO T129, AASHTO T131

Initial & Final Set Needle EN

Product Code: 38-2021



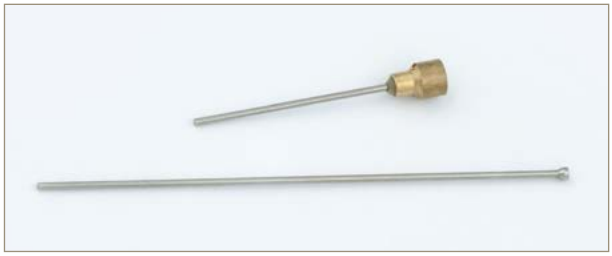
Product Standards:

EN 196-3, EN 13454-2, EN 480-2

3 mm + 1.13 mm diameter with special footing.

Initial & Final Set Needle ASTM

Product Code: 38-2023



Product Standards:

ASTM C187, ASTM C191, AASHTO T129, AASHTO T131

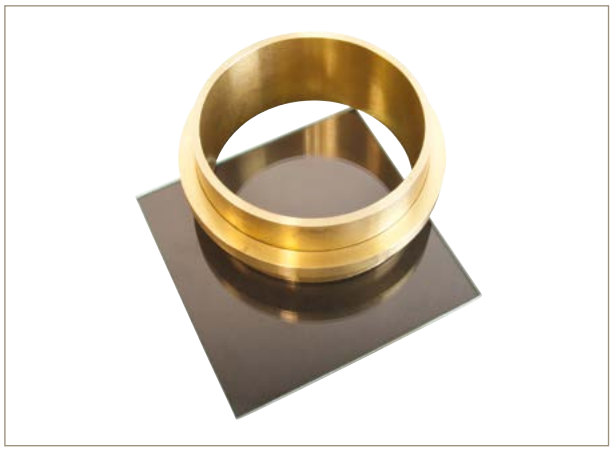
1 mm + 1 mm diameter with special footing.

Automatic Vicat Needle Cleaning Device

Product Code: 38-2015/12

Vicat Mould

Product Code: 38-2200



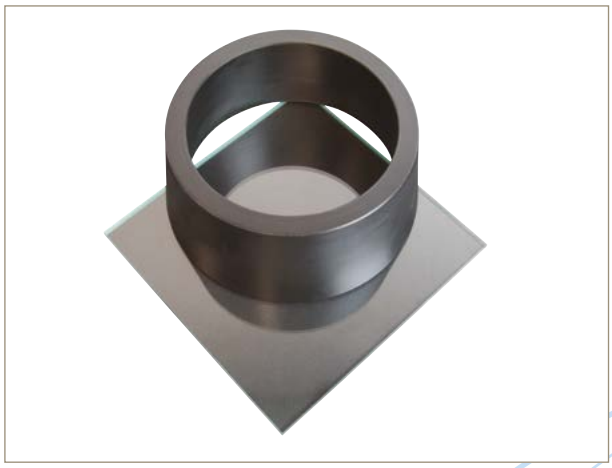
Product Standards:

BS 4550-3-3.5, BS 4550-3-3.6

Manufactured from brass and supplied complete with a ring and glass base plate.

Vicat Mould EN

Product Code: 38-2300



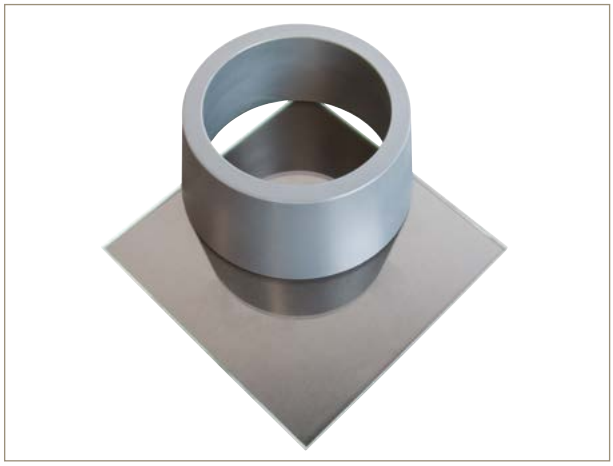
Product Standards:

EN 196-3, EN 13454-2, EN 480-2

Manufactured from a hard rubber compound and supplied complete with a glass base plate.

Vicat Mould ASTM

Product Code: 38-2660



Product Standards:

ASTM C187, ASTM C191, AASHTO T129, AASHTO T131

Manufactured from non-absorbent plastic and supplied complete with a glass base plate.

Soundness

Soundness

The soundness of cement and hydrated lime is of particular importance. It is essential that once hardened the paste does not undergo a large change in volume. The soundness of cements and limes can be determined by an expansion test using Le Chatelier Moulds. The method of curing lime differs from that of cements, lime being cured in a steam tank and cements in a water bath. The ASTM method uses a high-pressure steam vessel (Autoclave) to cure the specimens.

General Expansion of Dry Hydrated Lime by the Le Chatelier Method

Le Chatelier Mould

Product Code: 38-3005

Product Standards:

BS 6463-4, EN 196-3, EN 459-2

Comprising a split cylinder fitted with two indicator stems. The mould is supplied complete with two glass plates and a weight 100 g ± 10 g. Three moulds required for each test.

Specifications	
Weight (kg)	0.9

Extensibility of Mould Apparatus BS

Product Code: 38-3200

Product Standards:

BS 6463-4

The unit comprises a metal sleeve with a hook and set screw to fit over one of the mould pointers, and a clamp to fit onto the other pointer of the mould. Supplied complete with one weight 100 g ±1 g.

Specifications	
Weight (kg)	0.1

Extensibility of Mould Apparatus EN

Product Code: 38-3205

Product Standards:

EN 196-3, EN 459-2

The unit comprises a metal sleeve with a hook and set screw to fit over one of the mould pointers, and a clamp to fit onto the other pointer of the mould. Supplied complete with one weight 300 g ±1 g.

Specifications	
Weight (kg)	0.4

Tamping Rod for Le Chatelier Mould

Product Code: 38-3300

Product Standards:

BS 6463-4

17 mm end diameter.

Specifications	
Weight (kg)	0.07

Soundness of Cement Paste Test Set

Grouped Product Standards:

EN 196-3

Set Contains:

Product Code	Product	Qty
38-3005	Le Chatelier Mould	3
38-3205	Extensibility of Mould Apparatus EN	1
38-3420/01	Le Chatelier Water Bath	1
Additional Set Items		
81-0335	Trowel BS 4550	1
24-0430	Glass Plate	1

Soundness of Cement Paste by the Le Chatelier Method

Le Chatelier Water Bath

Product Code: 38-3420/01

Product Standards:

BS 6463-4, EN 196-3, EN 459-2

Manufactured from corrosion resistant material, complete with a removable rack to hold up to 12 moulds and timer unit.

Specifications	
Weight (kg)	5.4

Spares/Consumables:

Element (38-3420/10)
Switch (SP16522)
Heating Element Seal (38-3420/11)
Heating Timer

Soundness of Portland Cement by the Autoclave Method

Specimens are cured in a high-pressure steam vessel and the change in specimen length is determined using Drying, Shrinkage and Moisture Movement Apparatus. **Note:** This unit draws a current of 20 amps.

Autoclave

Product Code: 38-3800/01

Product Standards:

ASTM C151, AASHTO T107

The Autoclave provides high pressure steam curing of the specimens and is supplied with a safety valve, pressure gauge and controlled heater unit. The pressure vessel is independently certified and certificated. A specimen rack with capacity for 12 specimens included. The unit conforms to the requirements of ASTM C151.
220-240 V AC, 50-60 Hz, 1 ph.

Specifications	
Power Supply	220-240 V AC, 50-60 Hz, 1 ph

Spares/Consumables:

Safety relief valve (5021A0038)
Vent valve (1135A0050)
Gauge (5022A0118)
Heating element (38-3800/14)
Specimen Rack (38-3800/15)
Vent valve Seal (8439X0203))

Autoclave Lid Sealing Gasket

Product Code: 38-3800/13

Autoclave Spares Kit

Product Code: 38-3800/K1

Spares Kit Includes:	Qty
Heating Element 110/240 V Dual Voltage	1
Lid Gasket	5
Energy Regulator 240 V	1
Safety Relief Valve. 707-11 MD Safety VV set at 350 psi 15 mm: complete with certificates	1
Folded Copper Washer; 1/2 BSP	5
Folded Copper Washer; 3/8 BSP	1
Valve Assembly for Autoclave	1

Soundness

Heat of Hydration Cement

The Heat of Hydration Apparatus is manufactured to the requirements specified in BS 4550. It comprises a Dewar flask, an internally lagged case, a constant speed electric stirrer, filler funnel and a Beckman-type thermometer complete with reader.

Heat of Hydration Apparatus

Product Code: 38-4600/01, 38-4600/06

Product Standards:

BS 4550-38

Specifications	
Product Code	**Power Supply**
38-4600/01	220-240 V AC, 50 Hz, 1 ph
38-4600/06	220-240 V AC, 60 Hz, 1 ph

Dewar Flask, 600ml

Product Code: 38-4600/10

Product Standards:

BS 4550-3.8

Filling Funnel

Product Code: 38-4600/11

Glass Paddle for Stirrer

Product Code: 38-4600/13

Product Standards:

BS 4550-3.8

Air Content & Density

Mortars are used for a variety of purposes, the most common being as a bond between brick and blockwork.

Air Content of Mortar, Masonry Cement & Lime by the Pressure Method

Both air content and density are important if durability and strength of mortar is to be adequate. Specifications often require minimum levels of air content and density. The equipment described enables standard tests to be performed on mortars and similar materials.

Laboratory Humidifier/Vapouriser

Product Code: 39-1510/01

- Used to humidify curing rooms for concrete and mortar specimens.
- Max room capacity 500 cubic meters.
- Supplied complete with level regulator with anti-overflow that allows direct connection to the water network for continuous use.

Specifications	
Capacity	500 m^3
Water Source	Water mains
Use	Continuous when used with level regulator
Dimensions L x W x H (mm)	350 x 350 x 420
Power Supply	220-240 V AC, 50-60 Hz, 1 ph
Weight	7 lbs (3.2 kg)

Air Entrainment Meter

Product Code: 38-7087

Product Standards:

EN 459-2, EN 413-2

0.75 litre capacity, complete with integral pump.

This Air Entrainment Meter is designed to satisfy the requirements of a variety of EN and other standards for testing mortars, limes and masonry cement.

The unit incorporates a large pressure gauge giving direct reading of air content in percent.

- Direct reading of air content in percent.
- Fine control test valves.
- Positive sealing, quick release clamps.
- Heavy duty 0.75 litre container.

Specifications	
Capacity (ltrs)	0.75
Weight (kg)	6

Fly Ash

Fly Ash

Fly Ash of Pulverised Fuel Ash is a by-product of coal-fired power stations. It is a fine material with spherical particles. Uses include as an additive in composite cements, as a cementitious component in concrete and as a filler in certain types of asphalt. Various test methods are specified in BS and EN Standards and include the determination of moisture content, water requirement, strength, loss-on-ignition, initial setting time, and soundness. These tests are based on those described in BS EN 196. A major requirement for Fly Ash is consistency of fineness.

Loss-on-Ignition

This method is for cement specified in EN 196-2 with an ignition time of 1 hour at 975°C.

Muffle Furnace

Product Code: 83-4170/10, 83-4170/06

Product Standards

EN 196-2 (EN 196-21), EN 459-2, EN 13454-2

Specifications	
External Dimensions L x W x H (mm)	545 x 385 x 400
Work Chamber Dimensions L x W x H (mm)	300 x 200 x 120
Internal Volume (ltrs)	6.9
Max Temperature (°C)	1200
Power Supply (W)	2500
Weight (kg)	130
Product Code	**Electrical Supply**
83-4170/01	220-240 V AC, 50 Hz, 1 ph
83-4170/06	220-240 V AC, 60 Hz, 1 ph

Spares/Consumables:

Thermostat, K-Grade, 370 mm long, diameter 2.5 mm (83-4170/10)

Controller (83-4170/11)

Heating element/chamber complete (83-4170/12)

Refractory brick (83-4170/13)

Heating Element for use in 83-4170 (83-4170/14)

High Temperature Laboratory Furnace 1600°C (Muffle Furnace Alternative)

Product Code: 83-4180/01

Product Standards

BS EN 61010-2-010:2014, BS EN 61326-1:2013

Features:

- 1600°C maximum operating temperature.
- Controller, with single ramp to set-point and process timer.
- 3 litre chamber volumes.
- Soft closing parallel action door.
- Silicon carbide heating elements provide long life and are able to withstand the stresses of intermittent operation.
- Have a cast alumina hearth.
- Low thermal mass insulation for high energy efficiency.

Specifications	
External Dimensions L x W x H (mm)	655 x 435 x 610 (905 - door open)
Internal Dimensions L x W x H (mm)	120 x 120 x 205
Internal Volume (ltrs)	3
Max Temperature (°C)	1600
Configuration	Bench Top
Max Power (W)	4500
Holding Power (W)	2300
Weight (kg)	42

Activity Index

The activity index is the ratio (in percent) of the compressive strength of standard mortar prisms 40 x 40 x 160 mm, prepared with 75% reference cement and 25% fly ash, to standard mortar prisms prepared with reference cement alone. The equipment required comprises that which is used to prepare specimens and determine their compressive strength in accordance with EN 196-1.

Product Code	Product
39-7160/01	ADR Touch Control PRO 250/25 Cement Machine 220-240 V AC, 50 Hz, 1 ph
39-7160/02	ADR Touch Control PRO 250/25 Cement Machine 110 V AC, 60 Hz, 1 ph
39-7160/06	ADR Touch Control PRO 250/25 Cement Machine 220-240 V AC, 60 Hz, 1 ph
39-1100	Three Gang Mould for 40.1 x 40 x 160 mm Mortar Prisms
39-7160/K	Spares Kit for Control Pro 250/25

Fineness of Fly Ash (Wet Sieving)

Spray Nozzle Apparatus

Product Code: 38-7600

Product Standards:

EN 451-2, ASTM C430, AASHTO T192

Comprising a spray nozzle 17.5 mm internal diameter with 17 holes as specified in EN 451, a vacuum pressure gauge, 160 kPa graduated at 5 kPa divisions and fittings to attach the apparatus to a standard domestic water supply. Supplied without sieve.

Specifications	
Weight (kg)	2.1

Fly Ash Sieve 45 μm

Product Code: 38-7600/12

Product Standards:

AASHTO T192, EN 451-2, ASTM C430

Stainless Steel mesh, 50 mm internal diameter.

Mixing, Moulding, Curing & Strength

Mixing

The correct mixing sequence and homogenity of mix is important if consistent, repeatable test results are to be obtained. Mixers should be powerful enough to ensure that the motor's speed is not affected by the mix constituents and designed to ensure that the mixer action and blade does not break down individual sand particles and preferably provide automatic mixing cycles. In the USA, ASTM C109 and C190 are the definitive methods for determining compressive and tensile strength. The BS 4550 method using either 70.7 mm or 100 mm cubes has been retained in the UK only for comparative purposes. EN 196-1 is now the definitive method.

Mortar Mixer Digital 5 Litre Capacity

Product Code: 39-0045/01, 39-0045/06

Product Standards:

EN 196-1, EN 196-3, ISO 679, EN 413-2, EN 459-2, EN 1744-1, EN 13279-2, EN 1015-2, EN 13395-1, EN 13454-2, BS 6463-103

This mixer is designed to mix mortars and cement pastes to the requirements of the above Standards. The mixing paddle has a planetary motion and is driven by a motor with a microprocessor based speed and program controller. The mixer can be operated either in an automatic or manual mode. When the mixer is used in the manual mode, the two mixing speeds can be changed by means of a rocker switch, without switching off the motor. In the automatic mode any one of the pre-set mixing programs may be selected.

- New microprocessor control.
- New mix program selector.
- Complies with latest EN Standards update.
- Choice of automatic mixing cycles.
- Sand and water dispenser supplied as standard.

Further Information:

Complete with bowl and paddle, sand and water dispensers.

Specifications	
Dimensions L x W x H (mm)	530 x 350 x 580
Speeds (rpm) Low, High	Paddle: 140 ± 5, 285 ± 10 Mixing Head: 62 ± 5, 125 ± 10
Rated Power (W)	180
Bowl Capacity (ltrs)	5 (approx)
Weight (kg)	54

Spares/Consumables:

Bowl (39-0045/10)

Paddle (39-0045/11)

Plastic Scraper (39-0045/12)

Cleaning Brush (39-0045/13)

Paddle

Product Code: 39-0045/11

Product Standards:
BS 3892-1, EN 451-2

Stainless Steel complies with EN 196.

Bowl

Product Code: 39-0045/10

Product Standards: BS 3892-1, EN 451-2

Stainless Steel complies with EN 196. 5 litre capacity (approx).

Scraper (Pack of 5)

Product Code: 39-0045/12

Product Standards: EN 196-1

Plastic 200 mm long.

Moulding

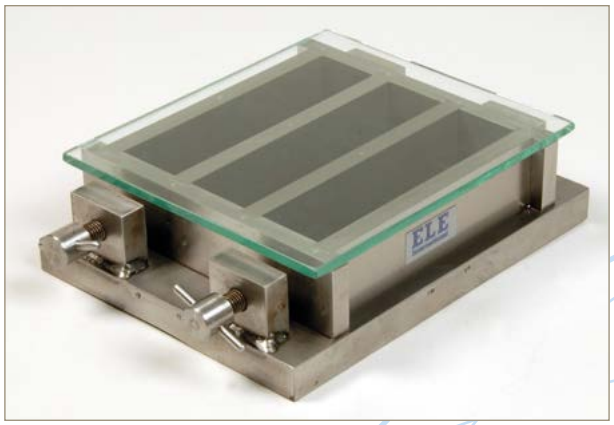
The successful preparation and moulding of prisms, cubes and briquettes is essential if subsequent strength tests on the specimens are to be meaningful. Moulds should be manufactured from material which is capable of retaining its form under heavy usage. The equipment detailed in this section has been designed and manufactured to meet the requirements for moulding laid down in the various standards.

Moulding of Prisms

Two methods of moulding and compaction are used in the various testing standards. The jolting table method is usually described as the reference method and a vibratory method is permitted as an alternative.

Three-Gang Mould

Product Code: 39-1100



Product Standards:

EN 196-1, ISO 679, EN 413-2, EN 459-2, EN 13454-2

For 40.1 x 40 x 160 mm mortar prisms. This mould is manufactured to a very high specification. Supplied with glass plate.

Specifications	
Weight (kg)	12.2

Spares/Consumables:

Glass Plate (39-1100/10)

Mortar Sand EN 196 (39-1170)

Scraper (39-1130)

Feeding Hopper

Product Code: 39-1120

Product Standards:

EN 196-1, ISO 679, EN 413-2, EN 459-2, EN 13454-2

For 39-1100 Mould.

Specifications	
Weight (kg)	1.4

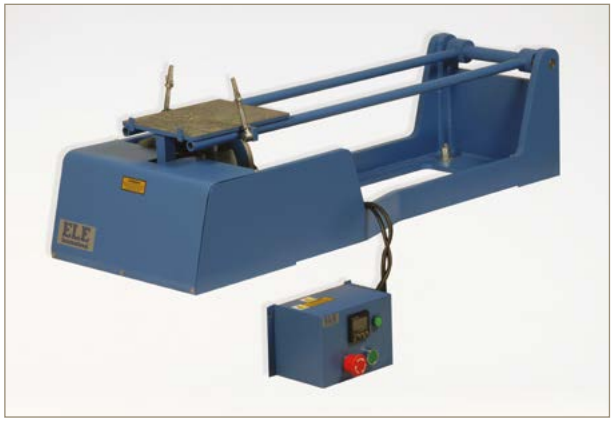
Mixing, Moulding, Curing & Strength

Jolting Table

This machine consists of a mould table seated on a rotating cam driven at 60 revolutions per minute. The apparatus is supplied with a remote mains switch box, incorporating a push button start/stop control, and automatic stop control at end of test.

Jolting Table

Product Codes: 39-1150/01, 39-1150/06



Product Standards:

EN 196-1, ISO 679, EN 413-2, EN 459-2, EN 13454-2

Supplied without moulds.

Specifications	
Weight (kg)	55
Product Code	**Power Supply**
39-1150/01	220-240 V AC, 50 Hz, 1 ph
39-1150/06	220-240 V AC, 60 Hz, 1 ph

Jolting Table Spares Kit

Product Code	Product
39-1150/K	Spares kit for Joining Table

Moulding of 50 mm & 100 mm Specimens

Three-Gang Mould

Product Code: 39-0410

Product Standards:

ASTM C109/C109M

For 50 mm mortar cubes. Manufactured from cast iron with simple cube release mechanism.

Specifications	
Weight (kg)	6.5

Accessories:

Mould Oil (25 litre Drum) (82-7341)

Three Gang Mould 2 Inches (50.8 mm)

Product Codes: 39-0412

Product Standards:

ASTM C87, ASTM C109, ASTM C141, ASTM C579, ASTM C593, AASHTO T106

Machine forged bronze with simple cube release mechanism.

Cover Plate

Product Codes: 39-0412/10

Product Standards:

ASTM C617

Moulding of 70.7 mm Mortar Cubes

Cube Mould 70.7 mm

Product Code: 39-0100

Product Standards:

BS 4550-3.4

Manufactured from steel to dimensions specified in the relevant British Standard. Supplied complete with baseplate. Three moulds required for each test.

Specifications	
Weight (kg)	2.9

Moulding of Mortar Briquettes

Briquette Mould

Product Code: 39-1000

Product Standards:

ASTM C307

Manufactured to the dimensions in the relevant specification. Two part construction, supplied complete with baseplate.

Specifications	
Weight (kg)	1.3

Curing

Humidity Cabinet 150 Litre Capacity

Product Codes: 39-1600/01, 39-1601/01, 39-1600/06, 39-1601/06

Prior to testing, prisms to be cured for a period of at least 24 hours at 20°C ± 1°C, 90% RH minimum. The prisms are then de-moulded and stored under water for the required curing time, usually 48 hours, 72 hours, 7 and 28 days.

The Humidity Cabinet is built to a high specification and is designed for the early curing of mortar prisms prior to storing under water. Relative humidity up to 98%.

- Micro-processer controller for temperature and humidity for precise and reliable control.
- Stainless Steel interior with adjustable shelves.
- CFC-free polyurethane insulation to provide efficient thermal stability.
- 12 mm access port.
- Temperature and humidity digital data recorder (only with ASTM models).
- 4 shelves.

Specifications

Standard	BS EN	ASTM	BS EN	ASTM
Product Code	39-1600/01	39-1601/01	39-1600/06	39-1601/06
Power Supply	220-240 V AC, 50 Hz, 1 ph		220-240 V AC, 60 Hz, 1 ph	
Capacity (ltrs)	150		150	
External Dimensions L x W x D (mm)	1075 x 635 x 660		1075 x 635 x 660	
Internal Dimensions L x W x D (mm)	590 x 510 x 490		590 x 510 x 490	
Temperature Range (°C)	+5 to 60		+5 to 60	
Temperature Control (°C)	0.2 at 20		0.2 at 20	
Temperature Variation (°C)	± 0.5 at 20		± 0.5 at 20	
Humidity Range	0 - 98%		0 - 98%	
Shelves	4 Shelves hold 6 x 39-1100 moulds		4 Shelves hold 6 x 39-1100 moulds	
Shelf Capacity (kg)	15		15	
Input Power (W)	800		800	
Weight (kg)	100	100	100	100

Mixing, Moulding, Curing & Strength

Humidity Cabinet BS EN 196-320 Litre Capacity

Product Code: 39-1300/01, 39-1300/06

Product Standards:

EN 196-1, EN 459-2

Further Information:

10 reinforced shelves and Digital Data Recorder.
USB connection, stores up to 1 year of data.

Specifications	
Capacity (ltrs)	320
Dimensions External L x W x D (mm)	660 x 635 x 1745
Dimensions Internal L x W x D (mm)	490 x 510 x 1275
Temperature Range (°C)	+5.0 to +60
Fluctuation (better than) (°C)	± 0.2
Variation (better than) (°C)	± 0.5
Rated Power (W)	850
Number of Shelves	10
Weight (kg)	200
Product Code	**Power Supply**
39-1300/01	220-240 V AC, 50 Hz, 1 ph
39-1300/06	220-240 V AC, 60 Hz, 1 ph

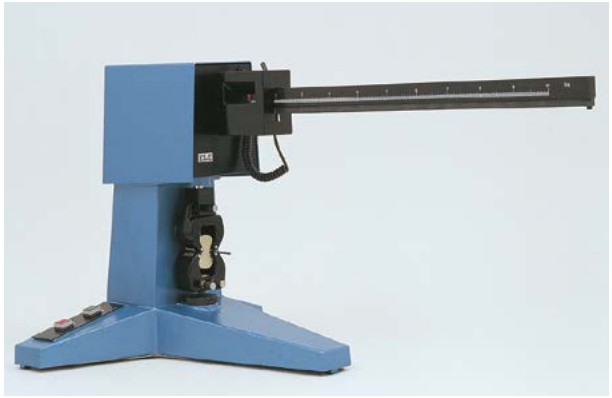
Spares/Consumables for 39-1300/01:

Temperature Sensor (39-1300/11)
Humidity Cabinet Fan/Motor (39-1300/12)
470 Ohm Resistor for Humidity Cabinet Fan/Motor (39-1300/17)
Buzzer for Humidity Cabinet (39-1300/18)
Over/Under temperature cut-out (39-1300/19)
Over temperature relay (39-1300/20)
Fuse (39-1300/21)
Spare Shelf (39-1300/23)
Stand Alone Data Logger (39-1300/24)
Calibration Certificate for temperature and RH (39-1300/25)

Strength

Flexural/Tensile Testing Machine 10 kN

Product Code: 39-7100/01



Product Standards:

EN 196-1, ASTM C307

This single lever machine is designed for flexural tests on 40.1 x 40 x 160 mm mortar prisms and tensile tests on mortar briquettes. The rate of applied loading for flexural testing is to EN 196-1. Load is applied by a weight travelling along the beam at a constant rate, driven by a motor/gearbox. Readings are made by means of a cursor visible through a window in the moving weight. Failure of a specimen triggers a switch mechanism and brings the weight to a halt immediately. To prevent overloading, a sensor is incorporated in the weight and automatically stops the machine at its maximum capacity of 10 kN. Supplied complete with flexural and tensile jaws.

Specifications	
Power Supply	220-240 V AC, 50 Hz, 1 ph

Spares/Consumables:

Flexural Jaws (39-7100/10)
Tensile Jaws (39-7100/15)

ADR Touch Control PRO

250/25 Cement Machine

Innovation in Design – Simplicity in Performance

Other products in this range:

- 2000 kN
- 2000 BS
- 2000/250 BS
- 3000 BS

Full specifications available on page190

Tilt and turn screen

Favourites option available

Mixing, Moulding, Curing & Strength

ADR Touch Control Pro 250/25 Cement Machine complete with Compression with Flexural Jigs & Platen Sets

Product Codes: 39-7160/01, 39-7160/02, 39-7160/06

Product Standards:

EN 196-1, EN 196-2, ISO 679, EN 459-2, EN 1015-11, EN 13454-2, ASTM C109/C109M, ISO 7500-1, ASTM E4

The ADR Touch Control Pro 250/25 machine provides consistent automatic testing of a wide range of specimens. As standard the machine is supplied with platens fitted to the load frame, compression jig with 40 mm and 2.06 inch square platen sets and flexural jig for testing 40.1 x 40 x 160 mm prisms. The availability of the 25 kN low capacity load frame as standard extends the test capability of the machine for low strength compression or flexural testing.

- Rotatable high-resolution control display.
- Favourites option for test samples.
- On average 10% time savings per test sample.
- LAN connectivity for remote operation and diagnostics.
- Over 100 pre-programmed test profiles available.
- 7 inch 800 x 480 TFT LED touch screen (IP31 rated).
- Connects to external PC.
- 6 customised test profile favourite buttons for rapid testing.
- Stores over 1 million test results.

Specifications

Product Code	Power Supply
39-7160/01	220-240 V AC, 50 Hz, 1 ph
39-7160/02	110 V AC, 60 Hz, 1 ph
39-6160/16	220-240 V AC, 60 Hz, 1 ph
250 kN frame	
Overall Dimensions L x W x H (mm)	520 x 850 x 1255
Max Vertical Clearance (mm)	230
Max Horizontal Clearance (mm)	225
Upper and Lower Platens	150 mm dia
Max Ram Travel (mm)	15
Related Power (W)	1600
Weight (kg)	700

Micro-processor Control Specifications

Measurement Units	kN, lbf or kgf - selectable
Accuracy	Better than ±1% over calibrated range
Display Backlit	7 inch touch screen
Max Load	Held until reset
Output	Serial RS 232C/USB/Ethernet

ADR Touch Control Pro 250/25 Cement Machine Spares Kit

Product Code	Product
39-7160/K	Spares kit for ADR Touch Control Pro 250/25 Cement Machine

Impact Printer RS 232 Serial Connection

Product Code: 37-4859/01

Supplied complete with serial RS232 communications cable and one paper roll.

Spares/Consumables:

Paper Roll 76 mm wide (Box of 20) (37-4859/12)

Printer Ribbon(Black/Red) for use with Impact Printer (37-4859/10)

Distance Pieces Full Set

Product Code: 39-6220

Accessory for testing samples 40 mm, 50 mm, 70.7 mm and 100 mm.

These items are required when testing above sample sizes NOT using the compression jig.

Cement Testing Accessories

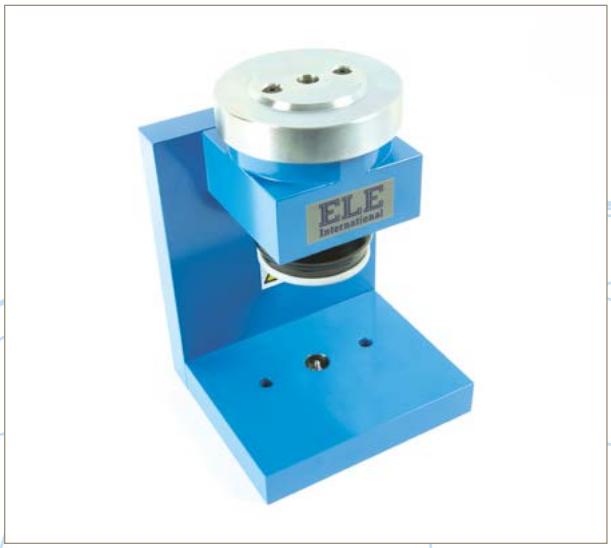
Flexural Jig Assembly

Product Code: 39-6160

Comes as standard with 39-7160/01, 39-7160/02, 39-7160/06.

Compression Jig Assembly

Product Code: 39-5600



Comes as standard with 39-7160/01, 39-7160/02, 39-7160/06.

39-5600/10 = 40 mm Square Platens

39-5600/11 = 2.06 inch Square Platens
(also for use with 50 mm cubes)

39-5600/13 = Aligning Block for 40 mm Square Platen

39-5600/14 = Single Oversize Square Platen 2.06 inch

Mixing it up with full control

- 5 litre nominal capacity.
- Microprocessor control.
- New mix program selector.
- Complies with latest EN Standards update.
- Choice of automatic mixing cycles.
- Sand and water dispenser supplied as standard.

Digital Mortar Mixer

Automatic & Manual Modes

Designed to mix mortars and cement pastes to the required industry Standards, the Digital Mortar Mixer has a planetary motion and is driven by a motor with a microprocessor based speed and program controller.

Operated in either automatic or manual mode allowing complete control of the mixing. When used in manual mode, the two mixing speeds can be changed by means of a rocker switch, without switching off the motor. In automatic mode, any one of the pre-set mixing programs may be selected.

Product Standards:

EN 196-1	EN 196-3
ISO 679	EN 413-2
EN 459-2	EN 1744-1
EN 13279-2	EN 1015-2
EN 13395-1	EN 13454-2
BS 6463-103	

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Air Permeability Method (Blaine Method)

The Air Permeability (Blaine) method measures the specific surface by comparison with a reference cement sample. The determination of the specific surface is to primarily check the consistency of the grinding process.

Standard(s)	EN 196-6, ASTM C204	
Product Code	**Product**	**Qty**
24-2900	50 ml Density Bottle with Perforated Stopper	6
38-0620	Pure Mineral Oil 1 ltr Bottle	1
38-0640	NBS - Srm Reference Cement 10 g	1
38-0650	Filter Paper equivalent to Whatman No 40 12.7 mm dia. Box of 100	1
38-1000	Blaine Air Permeability Apparatus	1
78-6000/01	Electronic Top Loading Balance 200 g at 0.001 g. Dual Voltage 50-60 Hz	1
81-0518	Timer Clock	1
82-5310	Max-Min Thermometer (Mercury Free) Range -40.0˚C to +50.0˚C	1

Also requires Mercury not supplied by ELE

Determination of Density of Cement

This test determines the density of cement by the displacement of a non-reactive liquid in a pyknometer.

Standard(s)	EN 196-6	
Product Code	**Product**	**Qty**
24-2900	50 ml Density Bottle with Perforated Stopper	6
78-6000/01	Electronic Top Loading Balance 200 g at 0.001 g. Dual Voltage 50-60 Hz	1
81-0180	Chattaway Spatula 125 mm	1
81-0375	Red Rubber Tubing H 6.5 mm Bore 5.0 mm Wall priced by metre	2
82-2170	Vacuum Desiccator 250 mm internal dia	1
82-2180	Safety Cage for Desiccator	1
82-2660	Polythene Funnel 200 mm dia	1
82-7091	Silica Gel 500 g pack, particle size 2.5-6.0 mm	1
82-7700	Filter Pump	1
82-8500/01	12 ltr Water Bath with Digital Controller LED Display 0 to 99.9˚C x 0.1˚C	1

Specific Gravity of Hydraulic Cement

This test method determines the specific gravity of hydraulic cement and lime.

Standard(s)	EN 196-6, ASTM C188	
Product Code	**Product**	**Qty**
38-1200	Le Chatelier Flask EN 196-6 ASTM C188 complete with Calibration Certificate	3
78-6000/01	Electronic Top Loading Balance 200 g at 0.001 g. Dual Voltage 50-60 Hz	1
81-0180	Chattaway Spatula 125 mm	1
82-8500/01	12 ltr Water Bath with Digital Controller LED Display 0 to 99.9˚C x 0.1˚C	1

Buyer's Guide

Standard Consistence Test

Cement paste of standard consistence has a specified resistance to penetration by a standard plunger.

Standard(s)	EN 196-3	
Product Code	**Product**	**Qty**
38-4010	Vicat Frame Complete	1
38-4010/10	ASTM Initial Set Needle	1
38-4010/13	EN Initial and Final Set Needle	1
38-2300	Vicat Mould to EN 196 Part 3 complete with Glass Plate	1
39-0035/01	Automatic/Manual Mortar Mixer 5 ltr capacity supplied with Sand and Water Dispensers	1
78-7090	Harvard Trip Balance 2000 g capacity x 0.1 g with 225 g Additional Tare	1
78-7110	Weight Set for 78-7090	1
81-0518	Timer Clock	1
81-0805	Engineers' Steel Rule 300 mm	1

Automatic Standard Consistence & Setting Time Test

Cement paste of standard consistence has a specified resistance to penetration by a standard plunger.
The setting time is determined by measuring the penetration of a needle into cement paste of standard consistence until it reaches a specified value.

Standard(s)	EN 196-3	
Product Code	**Product**	**Qty**
38-2015/01	Digital Automatic Vicat Apparatus	1
38-2015/12	Needle Cleaning Device for 38-2015 Series Automatic Vicat Apparatus	1
38-2015/15	Mould Tank for use with 38-2015/01 Automatic Vicat for testing samples under water to EN 96-3	1
39-0035/01	Automatic/Manual Mortar Mixer 5 ltr capacity supplied with Sand and Water Dispensers	1
78-7090	Harvard Trip Balance 2000 g capacity x 0.1 g with 225 g Additional Tare	1
78-7110	Weight Set for 78-7090	1
81-0518	Timer Clock	1
81-0805	Engineers' Steel Rule 300 mm	1

Part 4: General Expansion Test for Dry Hydrated Lime

This test method determines the expansion of dry hydrated lime.

Standard(s)	BS 6463	
Product Code	**Product**	**Qty**
38-3005	Le Chatelier Mould to EN 196-3 complete with Glass Plates and Counterweight	3
38-3200	Extensibility of Mould Apparatus	1
38-3300	Tamping Rod 17 mm dia	1
38-3420/01	Le Chatelier Water Bath complete with Timer. Complies with EN 196-3. 220-240 V AC, 50-60 Hz, 1 ph	1
81-0335	Trowel Gauging to BS:4550 approximately 175 mm long	1
Also required:		
39-0035/01	Automatic/Manual Mortar Mixer 5 ltr capacity supplied with Sand and Water Dispensers	1
39-1400/01	Humidity Cabinet complete with Nebulizer and 5 Shelves	1

Soundness of Cement Paste

Soundness is determined by observing the volume expansion of cement paste of standard consistence as indicated by the relative movement of two needles.

Standard(s)	EN 196-3	
Product Code	**Product**	**Qty**
38-3005	Le Chatelier Mould to EN 196-3 complete with Glass Plates and Counterweight	3
38-3205	Extensibility of Mould Apparatus to EN 196-3	1
38-3420/01	Le Chatelier Water Bath complete with Timer. Complies with EN 196-3. 220-240 V AC, 50-60 Hz, 1 ph	1
81-0335	Trowel Gauging to BS:4550 approximately 175 mm long	1
Also required:		
39-0035/01	Automatic/Manual Mortar Mixer 5 ltr capacity supplied with Sand and Water Dispensers	1
39-1400/01	Humidity Cabinet complete with Nebulizer and 5 Shelves 112 ltr	1

Heat of Hydration of Portland Cement

This test method determines the heat of hydration of cements by means of solution calorimetry, also known as the solution method.
The test is applicable to cements and hydraulic binders whatever their chemical composition and the heat of hydration is expressed in joules per gram of cement.

Standard(s)	EN 196-8, BS 4550-3	
Product Code	**Product**	**Qty**
23-3505	Mortar and Pestle Porcelain	1
38-4600/01	Heat of Hydration Apparatus BS 4550. 220-240 V AC, 50 Hz, 1 ph	1
78-5335/01	Analytical Electronic Balance 220 g x 0.001 g with 100 mm dia Top-Loading Pan and Draught Shield	1
78-7090	Harvard Trip Balance 2000 g capacity x 0.1 g with 225 g Additional Tare	1
78-7110	Weight Set for 78-7090	1
79-0020	200 mm dia Receiver	1
79-0110	200 mm dia BS Sieve 125 Mic Stainless Steel Mesh	1
79-0200	200 mm dia BS Sieve 600 Mic Stainless Steel Mesh	1
79-7210	Sieve Brush Double-Ended Nylon	1
81-0100	Spatula 100 mm	1
81-0518	Timer Clock	1
82-1540	Weighing Bottle nominal size 30 mm dia x 50 mm height	5
82-2100	Non-Vacuum Desiccator 200 mm internal dia	1
82-3320	Porcelain Crucible 30 ml supplied with Lid	
82-7091	Silica Gel 500 g pack, particle size 2.5-6.0 mm	1
83-4140/01	Muffle (Ashing) Furnace with Digital Control Pid. 1100˚C max temperature	1

Flow of Mortars & Hydraulic Cement

To perform this test method a sample is placed on a metal surface which is then raised and dropped through a known height.

Standard(s)	BS 4551, ASTM 230	
Product Code	**Product**	**Qty**
38-6000	BS/ASTM Flow Table Top (complete with tripod/baseplate)	1
38-6020	Tripod for Flow Table	1
38-6040	BS/ASTM Flow Mould	1
38-6060	Baseplate for Flow Table	1
38-6080	Calipers	1
38-6100/01	Motor Unit for use with 38-6000 220-240 V AC, 50-60 Hz, 1 ph	1
38-6160	Plastic Tamper	1

Fineness of Fly Ash (PFA) by Wet Sieving

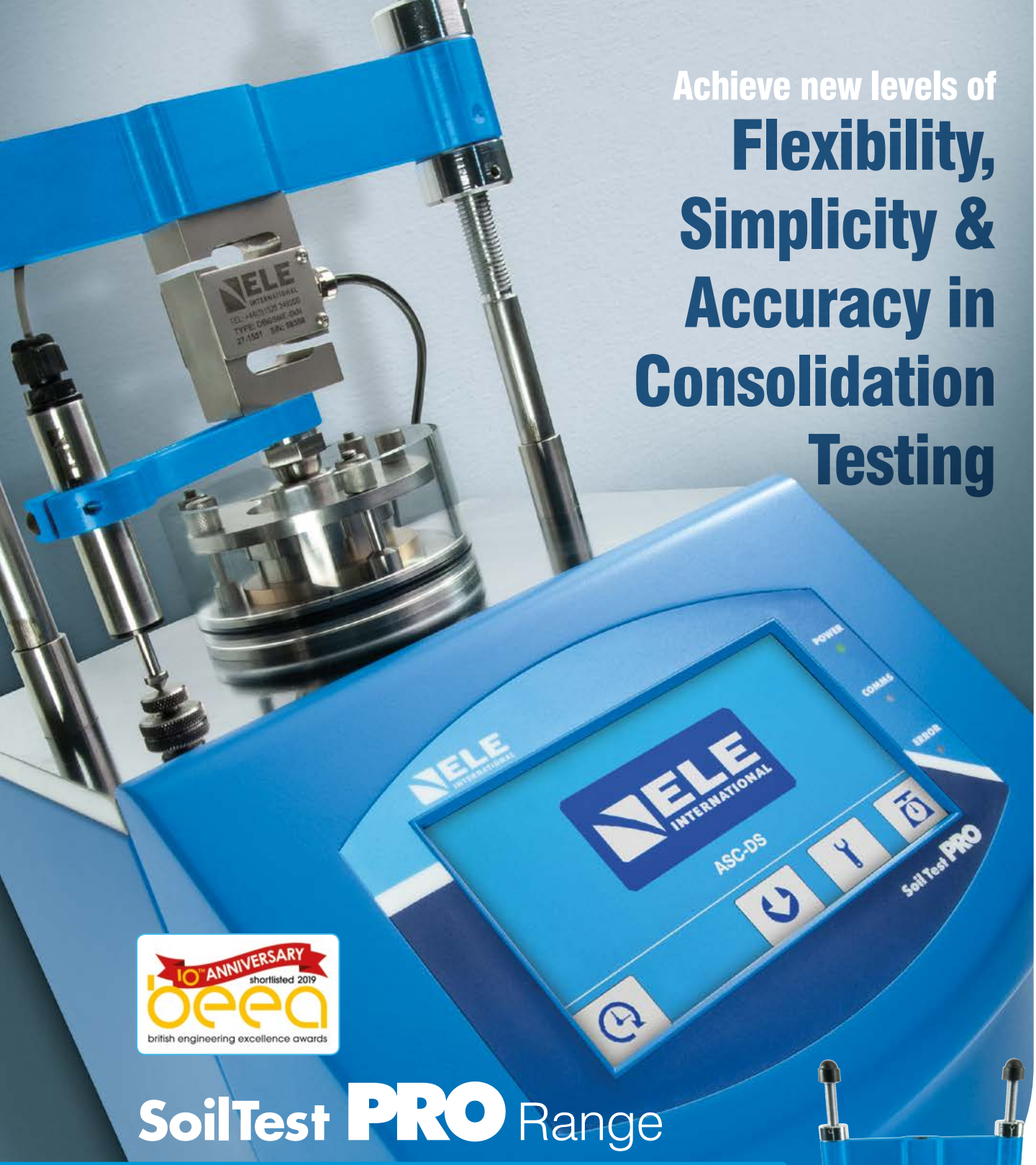
This test method determines the fly ash fineness by wet sieving on a 45 micron sieve.

Standard(s)	EN 451-2, ASTM C115, C430	
Product Code	**Product**	**Qty**
38-7600	Spray Nozzle Apparatus for Wet Sieving of Fly Ash to EN 451 ASTM C115 C430	1
38-7600/12	45 Mic Sieve Stainless Steel Mesh 50 mm internal dia	1
78-1215/01	Drying Oven 50 ltr capacity 220-240 V AC, 50-60 Hz, 1 ph	2
78-6000/01	Electronic Top Loading 200 g at 0.001 g Balance	3

Preparation and Testing of 40 x 40 x 160 mm Mortar Prisms

This test method determines the compressive strength and optionally the flexural strength of cement mortar. The test is used to assess whether the compressive strength is in conformity with its specification.

Standard(s)	EN196-1, 413-2, 459-2, BS 3892	
Product Code	**Product**	**Qty**
24-9010	Straight Edge 300 mm	1
34-6575/01	Large Curing Tank complete with Circulating Pump Heater/Thermostat Unit and Lower Rack	1
39-0035/01	Automatic/Manual Mortar Mixer 5 ltr capacity supplied with Sand and Water Dispensers	1
39-1100	Three Gang Mould for 40.1 x 40 x 160 mm Prisms complete with Glass Plate	3
39-1120	Feeding Hopper	1
39-1130	Scraper	1
39-1150/01	Jolting Table to EN 196-1 supplied without Moulds. 220-240 V AC, 50 Hz, 1 ph	1
39-1170	Standard Sand Graded Pack for Mortar Prisms to EN 196 (1350 g)	10
39-1400/01	Humidity Cabinet complete with Nebulizer and 5 Shelves	1
39-7160/01	ADR Touch Control Pro 250/25 Cement Machine 220-240 V AC, 50 Hz, 1 ph	1
78-6020/01	Electronic Top Loading 6 kg x 0.1 g Balance	1
79-0085	200 mm dia Sieve 80 Mic Stainless Steel Mesh according to ISO 3310-1	1
79-0125	200 mm dia Sieve 160 Mic Stainless Steel Mesh according to ISO 3310-1	1
79-0190	200 mm dia BS Sieve 500 Mic Stainless Steel Mesh	1
79-0230	200 mm dia BS Sieve 1 mm Stainless Steel Mesh	1
79-0255	200 mm dia Iso: 565 3310/1 Sieve 1.6 mm Stainless Steel Mesh	1
79-0270	200 mm dia BS Sieve 2 mm Stainless Steel Mesh	1
81-0518	Timer Clock	1
81-0705	Wire Brush	1
82-7341	Mould Oil (25 ltr drum)	1



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