

# Section E

## CEMENT - MORTAR

The raw materials like: limestone, chalk, shale, clay etc., mixed with water, are crushed, ground and blended. They are now submitted to a chemical process in a rotary kiln until they combine into clinker. From the clinker opportunely mixed with gypsum, the cement factories obtain the modern Portland cement, that may be modified in more and more sophisticated binders like expansive mortars, pre-mixed cements etc.

In section "Cement & Mortars" Matest proposes a complete range of equipment for:

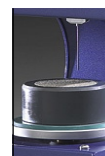
Fineness, Consistency, Setting-time, Workability, Soundness, Flow, Fly Ash, Chemical Tests etc.; and for Mixing, Moulding, Curing and Strength Tests, to satisfy all the above quality variables, in compliance with the EN, ASTM and the most known International Standards.



# Index section

## CEMENT - MORTAR

	Mod.	Page		Mod.	Page
Air entrainment meter .....	E027 .....	179	Le Chatelier flask.....	E014 .....	178
Air content of mortars: measurers.....	E029 .....	180	Le Chatelier mould.....	E066 .....	189
Air permeability apparatus.....	E009 .....	178	Le Chatelier water bath.....	E064 .....	189
Autoclave for soundness.....	E070 .....	190	Length comparator.....	E077 .....	191
Balance, mud, Baroid.....	E037-01 .....	181	Marsh funnel viscometer.....	E037 .....	180
Baths, for curing.....	E136 .....	200	Mixers, mortar.....	E092/E095.....	196
Bath, Le Chatelier.....	E064 .....	189	Modulus of elasticity, mortars.....	E190 .....	208
Blaine air permeability.....	E009 .....	178	Moulds: shrinkage and expansion .....	E072/E115.....	190
Briquette moulds.....	E111 .....	199	Moulds : prisms, briquettes.....	E100/E112.....	198
Bulk density of cement.....	E025 .....	179	Mould: Le Chatelier.....	E066 .....	189
Bulk density of lime.....	E091 .....	192	Mud Baroid balance .....	E037-01 .....	181
Calcimeter, Dietrich - Fruhling.....	A105 .....	180	Pat test.....	E082 .....	192
Calorimeter, heat of hydration.....	E062 .....	188	Penetrometer, setting time .....	E050 .....	186
Compression/Flexural devices.....	E170/E172.....	207	Permeability, air, Blaine.....	E009 .....	178
Compression/Flexural machines.....	E151/E183.....	202/207	Photometer, flame.....	E063 .....	188
Craking test mould, NF P15-434.....	E067 .....	192	Plaster extensometer.....	E080 .....	192
Cube mould.....	E110/E133.....	199	Plunger penetration apparatus.....	E083 .....	192
Curing baths and cabinets.....	E136/E139.....	200	Prism moulds .....	E100/E112.....	198
Dropping ball apparatus.....	E031 .....	180	Pull-Off, Bond strength testers.....	E142 .....	193
Dynamometers, pull-off, bond strength.....	E142 .....	193	Retention water apparatus.....	E039 .....	181
Extensometer, plasters.....	E080 .....	192	Samplers, bulk and packaged cement.....	E020/E021 .....	179
Fineness of fly ash by wet sieving.....	E017 .....	178	Setting time of cement.....	E044/E055.....	182/187
Flame photometer.....	E063 .....	188	Soundness: Autoclave.....	E070 .....	190
Flexural/Compression machines.....	E160/E183.....	203/207	Soundness: Le Chatelier.....	E066 .....	189
Flexural device.....	E172-01 .....	207	Table, flow of mortar.....	E084/E090.....	194
Flowing water sieve.....	E016 .....	178	Vibrating machine, cube 70,7 mm.....	E132 .....	199
Flow cone apparatus.....	E038 .....	181	Vicat apparatus: automatic and manual.....	E044/E055.....	182/187
Flow tables.....	E084/E090.....	194	Vicatronic, automatic vicat.....	E044 .....	182
Fly ash fineness by wet sieving.....	E017 .....	178	Viscosity: Marsh funnel.....	E037 .....	180
Free expansion in plastic period.....	E060 .....	187	Water baths: curing of cement.....	E136/E139.....	200
Funnel groove, UNI 8997.....	E059 .....	187	Water bath: Le Chatelier.....	E064 .....	189
Funnel viscometer; Marsh.....	E037 .....	180	Water flowing sieve device.....	E016 .....	178
Gillmore apparatus.....	E058 .....	181	Water refrigerator .....	E141 .....	201
Hydration calorimeter.....	E062 .....	188	Water retention apparatus.....	E039 .....	181
Jolting table.....	E130 .....	199	Workability apparatus.....	E081 .....	192





## E009

### Blaine air permeability (fineness) apparatus

STANDARDS: EN 196/6 - ASTM C204 - AASHTOT153  
BS 4359/2 - UNI 7374 - NF P15:442 - UNE 80106

Used to determine the fineness of Portland cement in terms of the specific surface expressed as total surface area in square centimeters per gram of cement.

The apparatus is supplied with glass U-tube manometer with valve, steel stand, test cell with disk and plunger all in stainless steel, rubber aspirator bulb, 1000 filter paper disks, manometric liquid, accessories.

Weight: 12 Kg



#### ACCESSORIES:

##### E010-02

Standard reference cement 114p to ASTM/SRM/EN to calibrate the Blaine

##### E055-08

Glass Thermometer -10 to +50° C.

#### SPARES:

**E010-01** U-tube glass manometer complete

**E010-03** Manometric liquid 250 ml bottle

**E010-04** Filter paper (pack of 1000 pieces)

**E010-05** Cell body, stainless steel

**E010-06** Cell plunger, stainless steel

**E010-07** Cell perforated disk, stainless steel

## E014

### Le Chatelier flask

STANDARDS: EN 196/3 - ASTM C188  
AASHTOT133 - UNE 83453

Used to determine the relative density (specific gravity) of hydraulic cement and lime. Capacity 250 ml. The neck is graduated from 0 to 1 ml and from 18 to 24 ml with divisions of 0,1 ml.

Weight: 500 g

## E014



## E016

### Water flowing sieves device

STANDARD: D.M. 3/6/68

Used to determine the fineness of cement.

It consists of a spraying unit with feed cock and gauge; brass sieve body 85 mm dia. and 95 mm high with two stainless steel cloth disks having opening 0,18 and 0,09 mm. A cement sample of 25 g. is placed inside the sieve and washed for two minutes by means of the spraying unit put on top of the sieve. The residue of the retained cement is obtained by drying the sieve at 110 °C.

Weight: 3 Kg

#### SPARES:

**E016-01** Stainless steel cloth disk, opening 0,18 mm

**E016-02** Stainless steel cloth disk, opening 0,09 mm

## E016



## E017

### Fineness of fly ash by wet sieving

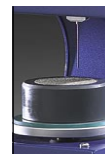
STANDARDS: EN 451:2 - ASTM D430

The set, brass made, consists of: sieve dia. 50 mm. with stainless steel mesh opening 0,045 mm, spray nozzle 17,5 mm ID with 17 holes dia. 0,5 mm, pressure gauge dia. 80 mm range 0-160 kPa, div. 5 kPa, fittings and connectors.

Weight: 3 Kg







## E020

### Bulk cement sampler

STANDARDS: ASTM C183 - AASHTO T127  
EN 196/7

Used to sample cement in bulk storages or shipment. Made of brass, it consists of two concentric tubes with slots.

Inside tube volume is 3 litres approx.

Dimensions: dia. 40x1500 mm

Weight: 5 Kg

## E021

### Packaged cement tube sampler

STANDARDS: ASTM C183 - AASHTO T127  
EN 196/7 - EN 932/1

Used to sample cement homogeneously from cement bags.

Dimensions: dia. 32x1200 mm

Weight: 3 Kg



## AIR CONTENT OF CEMENT AND MORTAR

## E027

### Air content meter 1 litre capacity

STANDARD: EN 459-2

Designed to determine the air content in cement mortar, cement paste and lime mortar. Made from cast aluminium, the test pot one litre capacity and the upper part are air-tight sealed by means of two quick action spring clamps. The whole is connected to a dial gauge directly indicating the air entrainment in percentage, with range 0 - 50%. A built-in operated air pump is also included. The push-buttons TEST and CORRECTION are arranged to perform the test in a simple and quick system.

Dimensions: dia. 200 by 320 mm

Weight: 3,5 kg



## E027-01

### Air content meter 0,75 litre capacity

STANDARD: EN 413-2

Identical to mod. E027, but with vessel having 0,75 litre capacity, conforming to EN 413-2 Specification.

## E028

### Air content meter 1 litre, electric

STANDARD: EN 459-2

Same as mod. E027, but with incorporated an electric mini-compressor giving air pressure and keeping it constant all along the test.  
Power supply: 230V 1ph 50Hz

## E028-02

### Air content meter 0,75 litre, electric

Identical to mod. E028, but with vessel having 0,75 litre capacity, conforming to EN 413-2 Specification.



E028

## ACCESSORY:

**E028-01** Filling Hopper (Ring) for the meters E027, E027-01, E028, E028-02

## E025

### Bulk density of cement

STANDARDS: ASTM C91, C110

This apparatus is used for the measurement of the apparent density (bulk density) of powders and non-cohesive materials. It consists of sieve funnel with tripod, unit weight measure 1 litre capacity, spatula, straight edge, aluminium scoop.

Dimensions: dia. 350x520 mm

Weight: 6 Kg



E025

## Air content of freshly mixed mortars by the density method

MODELS:

**E029**

### Measurer 400 ml capacity

STANDARDS: ASTM C185-85 - AASHTO T137

Steel made, internal diameter 76,2x88,1 mm height

**E030**

### Measurer 500 ml capacity

STANDARD: BS 4551

Steel made, internal diameter 76x110 mm height

**E031**

### Dropping ball apparatus

STANDARDS: BS 4551-1, 6463-4

Used to measure the consistency of cement mortars, this instrument allows a mm. 25 diameter acrylic ball to fall freely from a standard height of 250 mm. into a specimen of mortar contained into a brass ring mould, and the surface of which has been carefully prepared. The depth of the ball penetration into the mortar gives the specimen consistency. The instrument comprises a dropping device mounted on a stand, acrylic ball, mould dia. 100x25 mm. The base of the stand is machined. Chromed finishing. Weight: 8 Kg

ACCESSORY:

**E031-01**

BALL PENETRATION MEASURING DEVICE, formed by a tripod on which a dial gauge 25x0,01 mm is mounted. A device to adjust the height of the dial in relation to the tripod is also included. Chromed finishing. Weight: 1 Kg



ACCESSORIES:

**E030-01** HARD PLASTIC TAMPER, dia. 37,5±0,5 mm. Weight: 250 g

**E055-07** GLASS PLATE, nominally 120 mm diameter

**V192-08** CHATTAWAY spatula

**E037**

### Marsh funnel viscometer

Utilized for viscosity determination on drilling muds and fluid materials.

Orifice opening 4,7 mm

Half part of the funnel mouth is foreseen of sieving cloth 2 mm mesh.

Plastic break-resistant made.

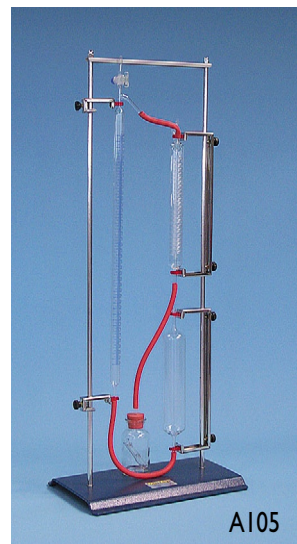
Supplied complete with graduated cup.

Weight: 1 Kg



**A105**

CALCIMETER, DIETRICH-FRÜHLING for the determination of the CaCO<sub>3</sub> (Calcium Carbonate) in limestone and lime marl. See Section "A" Aggregates



**E034**

## Apparatus for lime testing reactivity

STANDARDS: EN 459-2 / NF P98-102

This apparatus is used for determining the reactivity on slaking of ground quicklime.

The equipment consists of a Dewar vessel 1000 ml capacity complete with cover; electric stirrer 300 rpm. complete with stirring paddle (propeller), base with stand, digital thermometer range -50 +200°C. subd. 0,1°C., accessories.

Power Supply: 230V 1ph 50Hz

Dimensions: 400 x 250 x 750 mm

Weight: 10 kg approx.

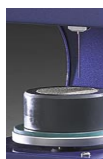
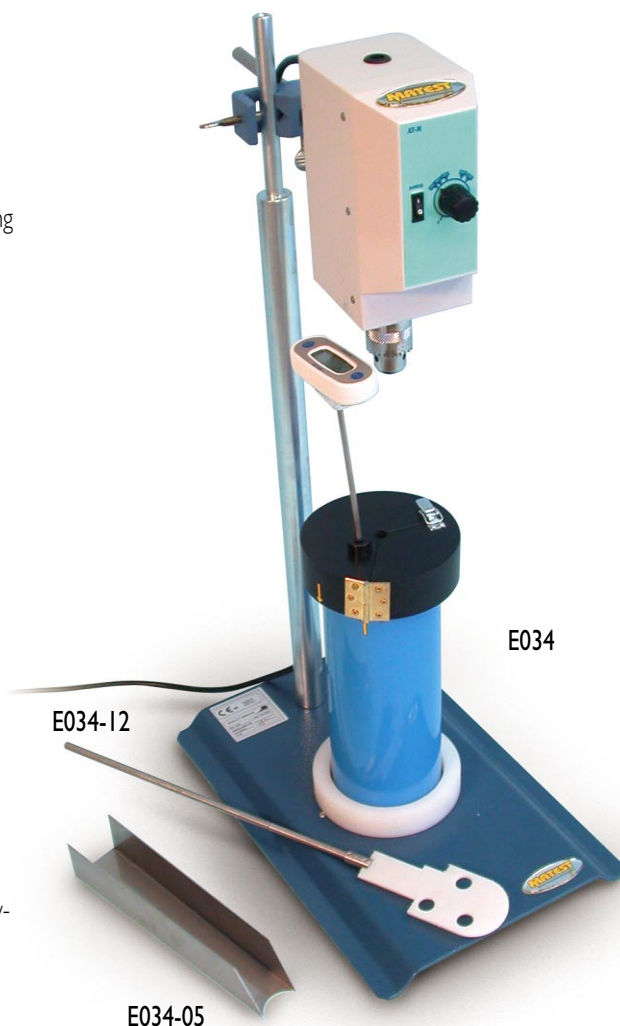
ACCESSORY:

**E034-05** Weighting and filling container

SPARE PARTS:

**E034-11** Dewar vessel

**E034-12** Stirring paddle (propeller)



News

## Building lime – yield of lime

**E035**

## Slaking vessel

STANDARD: EN 459-2

This insulated vessel is used to determine the yield of lime by leaving the lime sample to slake into.

Stainless steel made, double walled insulated with glass fibres, the cylinder has inside dimensions dia. 113 by 140 mm deep.

Supplied complete with cover.

Weight: 4 kg approx.



**E036**

## Settling and swelling ratio apparatus of grouts

STANDARD: EN 445, comparable to DIN 4227, UNI 8996, 8998

Container Method.

Consisting of: 3 stainless steel containers complete with 3 airtight ballast stainless steel covers, 3 plexiglass discs, measuring bridge, vernier calliper, decanter.

SPARE PARTS:

**E036-10**

Container, stainless steel.

**E036-11**

Cover, airtight, ballast, stainless steel.

**E036-12**

Plexiglass disc.

**E036-13**

Measuring bridge.



## E037-01

### Baroid mud balance

It provides a simple method for the accurate determination of mud density, with the advantage that the temperature of the drilling mud does not materially affect the accuracy of readings.

The balance consists of a base and graduated arm with cup, lid, knife edge, rider, built-in spirit level and counter-weight, carrying case. The constant volume cup is affixed to one end of the graduated arm and the counter-weight on the opposite end. Weight: 5 Kg



E037-01

## E038

### Flow cone apparatus

STANDARD: EN 445, NF P18-358, P18-507

Used for viscosity and fluidity determinations of mortars, muds, grouts, fluid materials, etc. Cone top dia. is 155 mm, total length 290 mm, capacity 1700 cc.

Mortar fluidity is considered suitable when the flow time of 1000 cc of mortar is comprised between 17 to 25 seconds.

Entirely brass made, it is supplied complete with four interchangeable nozzles dia. 8 - 9 - 10 - 11 mm, stand adjustable in height, plastic graduated cup.

Weight: 10 Kg

ACCESSORIES:

### E038-01

Interchangeable nozzle dia. 12,5 mm for the flow cone E038

### E038-02

SIEVE, 150 mm dia., 1,5 mm mesh opening that fits the upper cone



## E039

### Water retention apparatus

STANDARDS: ASTM C91, C110

Used to determine the density of masonry cement and lime putty so to obtain a yield volume value.

The unit comprises a water aspirator, mercury column, manometer, three-way stop-cock, metal perforated disk, glass funnel, stand, mercury valve, pack of paper filter disc, 1 Kg. of mercury, accessories, but except the pump which must be ordered separately.

Dimensions: 500x280x600 mm Weight: 8 Kg

ACCESSORY:

### V203

Vacuum pump. Power supply: 220-240V 1ph 50 Hz



E039

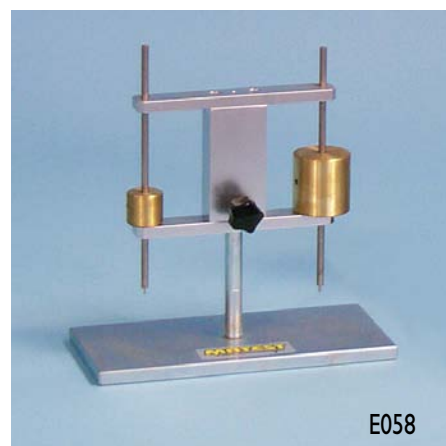
## E058

### Gillmore apparatus

STANDARDS: ASTM C91, C141, C266 - AASHTO T154

Used to determine the setting time of cement. Vertical support shaft has a device to maintain the horizontal arms in alignment. Support assembly is adjustable in position. The two steel weights needles are calibrated to meet Specifications. Needle points are from stainless steel. The initial setting needle has dia. 2,12 mm and weight of 113 g, while the final setting needle has dia. 1,06 mm and weight of 453,6 g.

Weight: 3 Kg



E058

E039



**E039**

## Cement water retention apparatus

STANDARDS: ASTM C91, C110

Used to determine the water retention value of cement and lime putty.

The unit comprises: water aspirator; mercury column manometer; three-way stopcock; metal perforated dish; glass funnel; mercury valve; pack of filter paper; 1 kg of mercury; accessories; the whole assembled on stand.

The vacuum pump is not included in the supply and has to be ordered separately.

Dimensions: 400x300x600 mm

Weight: 8 kg approx.

ACCESSORY:

**V203**

Vacuum pump. Power supply : 230V 1ph 50Hz

## Products and systems for the protection and repair of concrete structures.

### Determination of stiffening time

STANDARD: EN 13294

**E083-10**

LEVER SUPPORT (drill-holder type), complete with washer and penetration rod brass made, clamp and locking support. Used for the determination of stiffening time on products and systems for the protection and repair of concrete structures.

Dimensions: 380 x 300 x h500 mm

Weight: 12 kg approx.

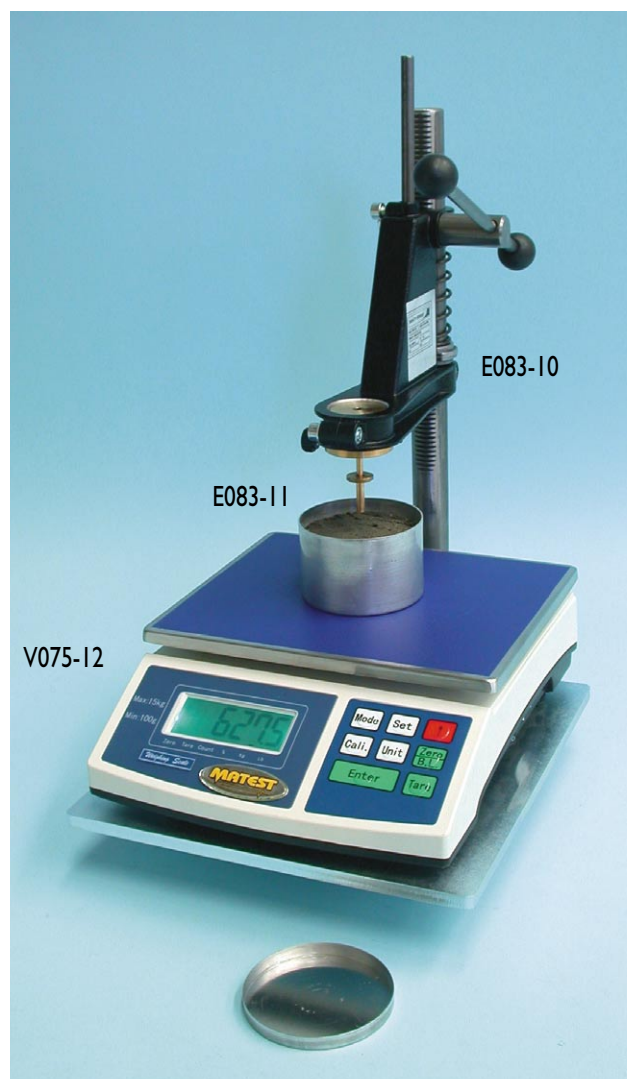
SPARE PARTS:

**E083-11**

CONTAINER, rigid aluminium made, dia. 90 by height 60 mm, complete with cover.



E083-10



V075-12

ACCESSORY:

**V075-12**

DIGITAL BALANCE, 15 Kg capacity, 0,5 div. with tare facility.



E044

## "VICATRONIC" AUTOMATIC COMPUTERISED VICAT RECORDING APPARATUS

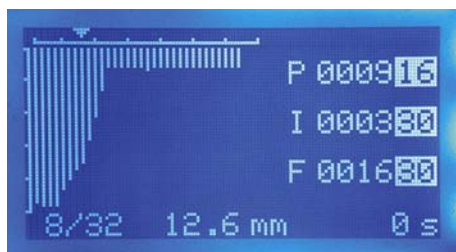
STANDARDS: EN 196/3, D.M. 3/6/68, ASTM C191, DIN 1164, 1168, BS 4550, UNE 80102, NF P15-414, P15-431, AASHTO T131

The Vicatronic apparatus, that is designed and manufactured using the most recent and sophisticated technology, is used for the initial and final setting time determination of cements or mortar pastes.

The entire test is made in a fully automatic way and gives a very precise and repeatable result. The results are printed on the incorporated printer and this eliminates the manual operations of installing and zeroing the paper graph on the drum.

The use of the appliance is extremely simplified by the guiding menu that is available in different languages.

section E



### DISPLAY

The large high contrast LCD display (negative blue) has a high resolution and shows the test data together with the general functions of the appliance. It visualises for the first time in real time the graph of the test (see picture) replacing and simulating what the old fashioned pen tracing on the paper. The appliance has a clock calendar that is used to program the test cycles.

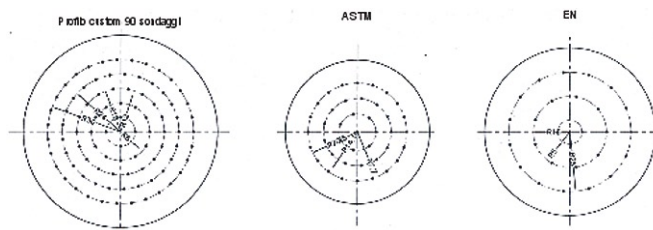


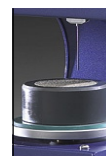
E044

### FIRMWARE

The Vicatronic is supplied with the standard programs to make automatically, all the tests according to the following Standards: EN 196/3, ASTM C191, DIN 1164, DIN 1168 gypsum, NF P15/431, BS4550 AASHTO T131.

Further programs can be developed by the operator using the specific menu "free tests" available on the base firmware; the user has the possibility to set 5 totally free test profiles defining the number of penetrations and the coordinates of each penetration (ray in mm of the circle where the number of penetrations have to be distributed) and number of circles. This possibility is particularly useful when testing new mortars, additives and to make research tests that requires sophisticated and flexible applications.





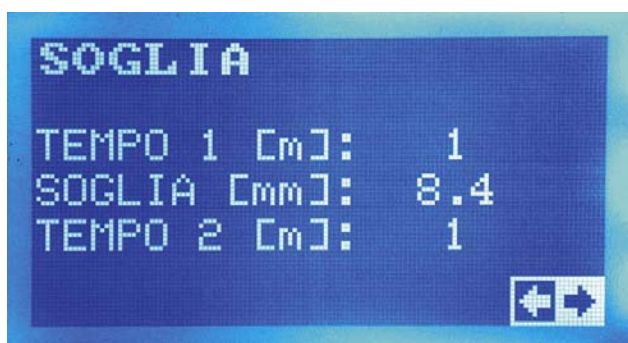
### PROBES

The mobile probe weighs 300 g (1000 g following the EN, NF Standards), the penetration needle has 1,13 mm diameter (1 mm following ASTM Standard) and its fall can be programmed in free fall or in guided fall. Totally flexible as far as the time is concerned, the penetrations time can be selected between 0,5 minutes and 999 minutes (fix interval between two penetrations of a test) or can change during the test up to 5 different phases with different interval time; it can even change automatically during the setting time fixing a penetration depth. The two options described here above can be combined together.

The penetration measure is read by a very accurate encoder having a resolution of 0,1 mm.

The Vicatronic also calculates, visualises and prints:

- The time from the moment of the sample preparation (set by the operator).
- The time the test starts.
- The residual time to the next penetration.
- The residual time to the end of the test
- The number of penetrations made and the residual penetrations to be made.



### TIMER 0 – 999 MINUTES

The firmware allows activating a delay on the appliance to the beginning of the test. This program is particularly useful when the approximate setting time of the mortar is known and the operator wants to start the working of the Vicatronic after a certain time in order to concentrate the penetrations with a short interval of time between them and have better measuring values.

### TEST RESULTS

The Vicatronic can memorise all the test parameters and results and keeps a file with a capacity of more than 50 complete tests.

In case of a power cut, even a short one, during the test execution, the test will be invalidated and the appliance will be automatically stop keeping the set data.

At the end of the test the appliance will print automatically by the incorporated printer a report with all the data concerning the last test made including a graph tracing each single penetration with its values of time and penetration number (see example printed).

The appliance has a USB connection port for connection to a separate printer with standard format (accessory mod. E044-I4)) and HP protocol.



NUMERO PROVA	: 200A_____
TIPO PROVA	: BS4550
PUNTI TRAS. [mm]	
17	0.00
11	10.00
5	10.00
1	10.00
COD. OPERATORE	: 12AB_____
COD. CLIENTE	: 7MA_____
DATA PROVA	: 11/09/2003
ORA PROVINO	: 08:23:06
RIT.AUVIAM. [m]	: 1
ORA 1.A PENET.	: ---:---:---
TIPO PROVINO	: CEM025_____
CONT. ACQUA [%]	: 88.3
TEMPERAT. [°C]	: 26.4
UMIDITA' [%]	: 74.2
TIPO DISCESA	: ACCOMPAGNATA
TIPO INTERVAL.	: FISSO
RIL. INIZ. PRESA	: NO
TEMPO [m]	: 0.5
ID PEN. [mm]	
1	0.0
2	0.0
3	0.0
4	0.0
5	0.0
6	0.0
7	0.1
8	5.4
9	6.6
10	7.9
11	9.3
12	11.1
13	12.6
14	13.6
15	14.9
16	15.8
17	16.5
18	19.3
19	20.3
20	21.6
21	23.1
22	24.8
23	26.7
24	28.3
25	29.6
26	31.1
27	35.8
28	37.2
29	39.8
30	40.5
31	42.6
32	42.5
33	42.9
34	42.9

PRINTING EXAMPLE





## PC CONNECTION AND NET OPTIONS

Despite the totally independent working of the machine that includes an incorporated printer, the Vicatronic has been designed for a PC connection (RS232) with the possibility to download the test data using a common program (Microsoft Hyper Terminal) that is normally incorporated with the Windows package of the PC. In this case the data processing will have to be made by the operator.

The "Vicat-Win" software (accessory mod. E044-11) allows receiving, managing, processing and completing the test dates; it will trace automatically the graph, personalise and print the test report.

The Vicatronic offers the possibility, buying the kit "Vicat-Net" (accessory mod. E044-12), to connect up to 20 appliances on a net managed by a PC through two pins RJ45 with RS485 protocol. This allows obtaining a complete remote control from the PC of each single Vicatronic.

The details of the performances are following:

- Transfer each single control or function of the Vicatronic on the PC
- Verify in real time each phase of the test being made.

- Automatically download the final results at the end of the test on all the connected Vicatronic.
- Process and file at the same time all the tests without obliging the operator to move from his working place.

Additionally the firmware has many other functions detailed in the technical chart that will be transmitted to the user interested to know more about it.

The Vicatronic is supplied complete with the incorporated printer, two needle (one with 1 mm diameter and one with 1,13 mm. diameter), two conical moulds EN and ASTM, a glass plate to hold the conical mould.

Power supply: 220-240 V I Ph 50 Hz. 50W

Dimensions: 400 x 200 xh 470 mm. h.

Weight: 13 kg.

### E044-01

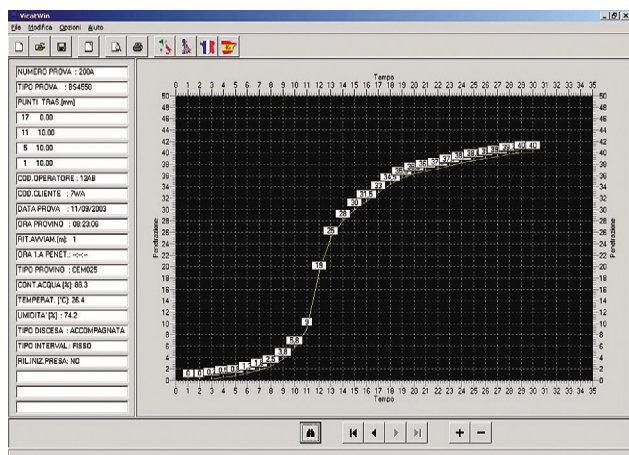
VICATRONIC identical to the model E044, but made with anti-corrosion and tropicalised components to be used in places with humidity not below 90% and controlled temperature of 20° C. ± 1° C. as required by the Standard EN196-3.

## ACCESSORIES:

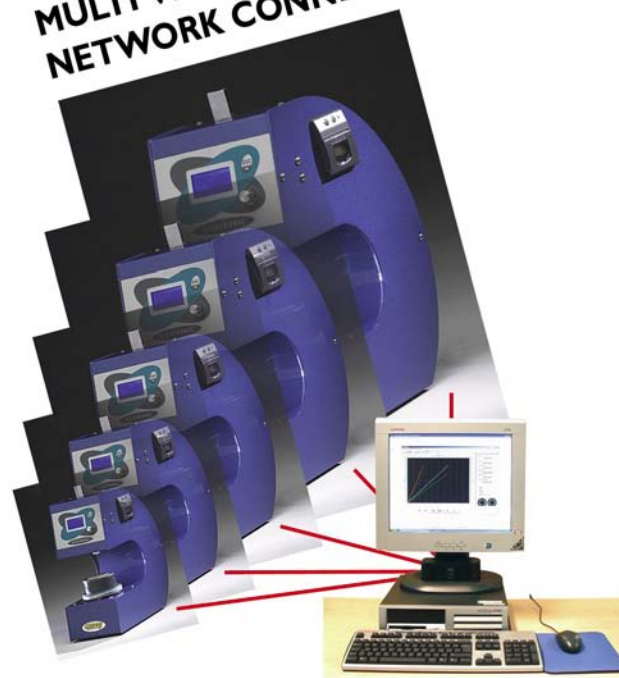
**E044-11** Software "VICAT-WIN" complete with connection cable of 3 metres that allows by the RS232 port downloading, processing, printing and managing all the data directly from the PC.



**E044-12** Kit "VICAT-NET" to connect up to 20 Vicatronic on a net by means of two connectors RS485 managed by a PC. The kit includes: the software, the RS232/485 converter and the cable for the connection of one appliance.



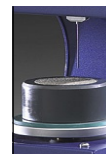
## VICAT-NET MULTI VICATRONIC NETWORK CONNECTION



### E044-13

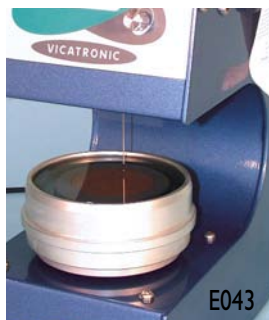
Complete kit with cable for serial connection RS485, 5 metres long for the connection of one Vicatronic to the PC or to a net (cables with different length are available on demand).





## E044-14

Table colour printer; A4 format, complete with connecting cable to the UBS port of the Vicatronic.



## E043

MOULD TANK to test the specimen immersed in water. The test must be performed in room having a controlled temperature of  $20^{\circ}\text{C} \pm 1^{\circ}\text{C}$ . The saturated humidity is obtained by the immersion in water of the specimen as required by the standard EN196-3.



## E044-20

THERMOSTATICALLY CONTROLLED HEATING/COOLING SYSTEM  
The device produces water at a controlled temperature of  $20^{\circ}\text{C} \pm 1^{\circ}\text{C}$ , that is circulated into the tank E043 to perform the test at controlled temperature and humidity as required by the Standard EN196-3. Can be used only with one single Vicatronic.  
Power supply: 220-240 V | Ph 50 Hz | 150 W  
Dimensions: 615x375x400 mm.  
Weight: 24 kg.

## E044-21

THERMOSTATICALLY CONTROLLED HEATING/COOLING SYSTEM  
Same as the mod. E044-20 but can be used simultaneously for "TWO" Vicatronic.

## E044-30

### NEEDLE CLEANING DEVICE

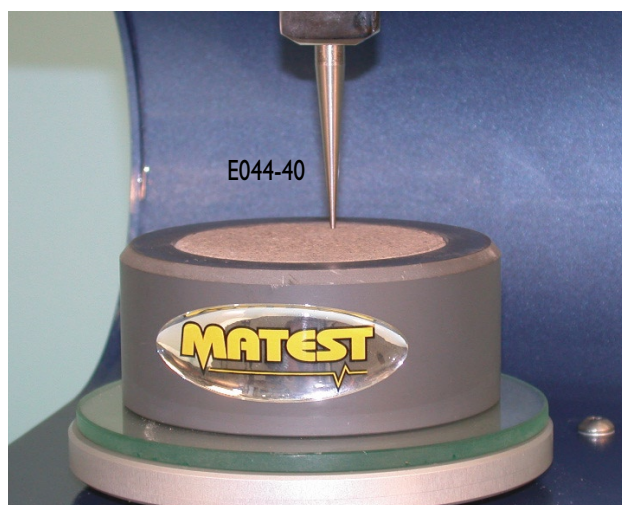
It removes the residual cement particles from the needle keeping it constantly lubricated.

## E044-40

CONICAL PENETRATION NEEDLE, having 8 mm. diameter and 50 mm. long, to make gypsum tests following DIN 1168.

## E044-41

PROBE 100 g, to make test on gypsum following DIN 1168 Standard



**E042-02** Consistency probe dia. 10x50 mm

**E042** Needle for final setting EN/BS 1, 13 mm. diameter.

**E042-01** Needle for final setting ASTM 1 mm. diameter.

**E044-45** Additional 700 g weight (NF, EN Standard).

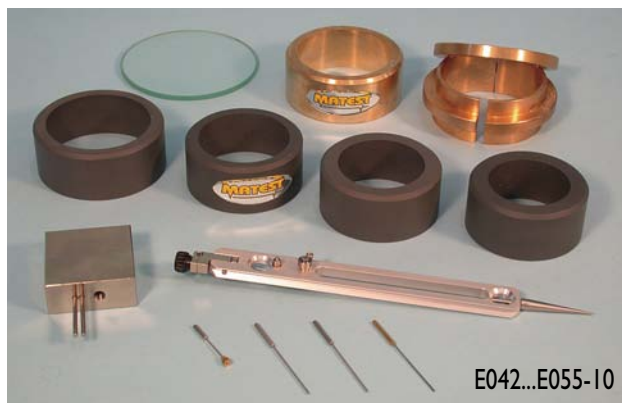
**E046-03** "Hardened" 1, 13 mm. Ø needle (EN, UNI, NF, DIN, BS)

**E055-04** Plastic mould Ø 80/90 x 40 mm. high following UNI

**E055-11** Brass mould Ø 80/90 x 40 mm. high following BS

**E055-12** Split brass mould two halves Ø 80/90 x 40 mm. (BS)

**E055-13** Plastic mould Ø 65/75 x 40 mm. high following DIN



### SPARE PARTS:

**E046** 1, 13 mm. Ø penetration needle (EN, UNI, NF, DIN, BS)

**E046-01** 1 mm. Ø penetration needle (ASTM)

**E055-05** Plastic mould Ø 60/70 x 40 mm. high following ASTM

**E055-07** Glass base plate

**E055-10** Plastic mould Ø 70/80 x 40 mm. high following EN, NF

## SETTING TIME AND CONSISTENCY OF CEMENT

**E050**

### Automatic recording penetrometer "Italcementi model" \*

Used for determining the initial and final setting time of hydraulic binders.

THE PENETROMETER IS SUPPLIED COMPLETE WITH:

- two penetration needles
- two plastic moulds dia. 70/80 h 40 mm complete with base and humidity hopper
- two writing ink pens
- 100 recording diagrams

Power supply: 220-240V 1ph 50Hz 100W

Dimensions: 450 x 185 x 370 mm

Weight : 22 kg

SPARE - PARTS:

**E050-10** Recording diagrams (pack of 100)

**E050-11** Penetration needle

**E050-12** Writing ink pen (pack of 5)

**E050-13** Conical plastic mould dia 70/80 h 40 mm

**E050-14** Mould base plate

**E050-15** Mould humidity collar

section E

This instrument automatically measures and records the time needed by a cement paste to reach a pre-established consistency degree.

The setting of the specimen is measured in static conditions; it is continuously and automatically recorded on a diagram allowing an accurate and uniform determination of the initial, intermediate and final hardening process.

The operator obtains a graph with the results of each tested specimen, accurately showing the progressive increasing of the consistency-time ratio (consistogram).

The instrument automatically cut-off at the end of the test.

\* NOTE

This Penetrometer has been expressly manufactured on specific request of "Italcementi group" cement factory.



E050



## E055

### Vicat apparatus for setting time and consistency of cement

STANDARDS: EN 196-3-2005 - ASTM C187, C191  
AASHTO T129, T131 - DIN 1164 - BS 4550  
NF P15-414 - D.M. 3/6/68 - UNE 80102

The instrument consists of a metallic frame, graduated scale with index, sliding probe of 300 g, consistency plunger dia. 10 mm, glass base plate.

The needle and conical mould are not included and have to be ordered separately (see accessories)

Dimensions: 160x200x300 mm

Weight: 5 Kg



E055  
WITH ACCESSORIES

#### NEEDED ACCESSORIES:

- E046** Needle dia. 1,13 mm (EN - BS - NF - DIN - UNI - UNE)
- E046-01** Needle dia. 1 mm (ASTM - AASHTO)
- E046-03** "Hardened" needle dia. 1,13 mm (EN - BS - NF  
DIN - UNI - UNE)

#### CONICAL MOULDS:

- E055-10** Conical plastic mould dia. 70/80 h 40 mm (EN - NF)
- E055-05** Conical plastic mould dia. 60/70 h 40 mm (ASTM - AASHTO)
- E055-04** Conical plastic mould dia. 80/90 h 40 mm (Standard: UNI)
- E055-13** Conical plastic mould dia. 65/75 h 40 mm (Standard: DIN)
- E055-11** Conical brass mould dia. 80/90 h 40 mm (Standard: BS)
- E055-12** Conical brass mould dia. 80/90 h 40 mm in two halves  
with ring (Standard: BS)

#### ACCESSORIES:

- E055-06** Additional weight 700 g to the sliding probe (EN - NF)
- E042** Final needle dia. 1,13 mm (EN - NF - BS - DIN - UNI - UNE)
- E042-01** Final needle dia. 1 mm (Standards: ASTM - AASHTO)
- E055-08** Glass thermometer -10° to +50° C.



ACCESSORIES AND  
SPARES FOR VICAT

#### SPARE PARTS:

- E055-07** Glass base plate dia. 120 mm
- E055-03** Consistency plunger dia. 10 x 50 mm

## E059

### Funnel groove

STANDARDS: EN 13395-2 / UNI 8997

Used to determine the consistency of the expansion premixed cement mortars for anchorages, mixed with water, classified of super-fluid type. Supplied complete. - Weight: 20 Kg



E059

DETERMINATION OF THE FREE EXPANSION IN PLASTIC PERIOD, and of the exudation quantity of the mixing water on expansion premixed mortars for anchorages, mixed with water.  
STANDARDS: UNI 8996, 8998

The equipment consists of:

- E060** Bridge of dual measure, formed by a steel square straightedge with two adjustable measure screws
- E060-01** Fix caliper at two steps, having heights of 100 and 107 mm
- E060-03** Metallic container dia. 99x120 mm with 3 hermetic covers



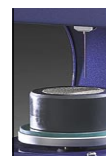
E060

MATEST

E060-03

E060-01





### E061 CALORIMETER HEAT OF HYDRATION OF CEMENT

STANDARDS: EN 196-8, ASTM C186

Comparable to : BS 4550, 1370, UNE 80102, 7105,  
DIN 1164, UNI 7208

Used to determine the heat of hydration of low heat Portland and hydraulic cement.

The apparatus consists of a Dewar flask contained in an insulated material and housed in a wooden box which is hinged so that the flask can be easily removed or replaced.

A “second” hinged wooden box contains the first one, granting a better insulation, as expressly requested by the a.m. Standards.

The Calorimeter is supplied complete with a constant speed electric stirrer; Beckman centesimal thermometer; filler glass funnel.

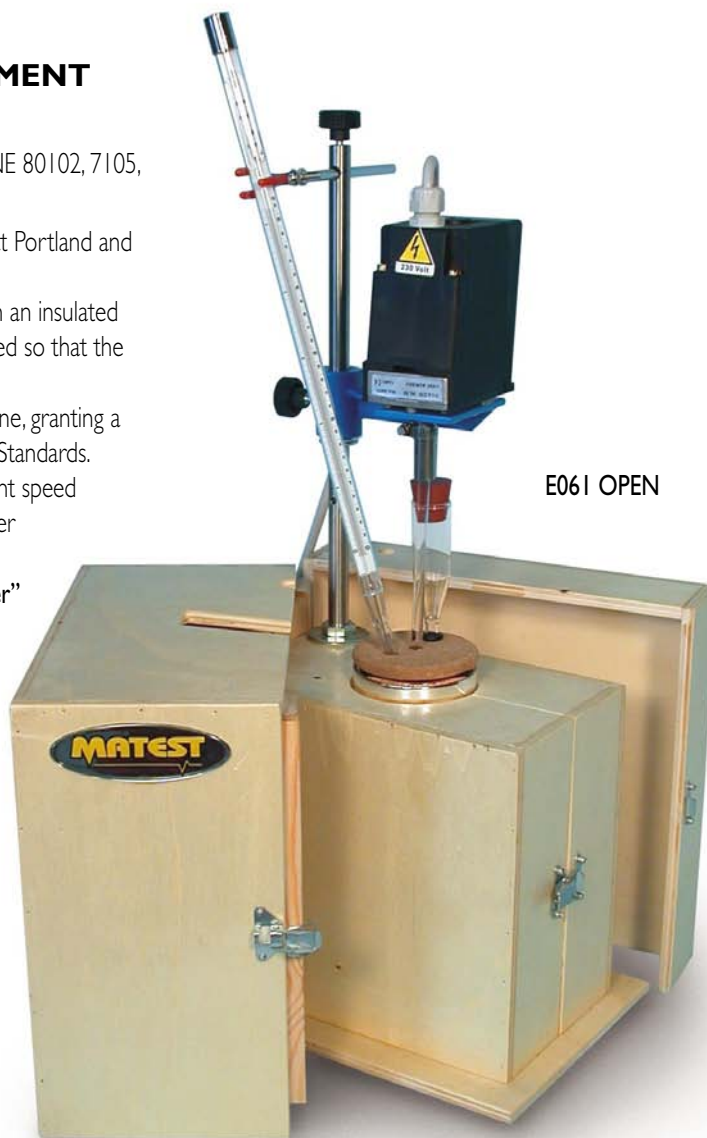
The standard supply “does not include the propeller” which must be ordered separately, selecting it from the specific Standard (see accessories)

Power supply: 230V 1ph 50Hz 150W

Dimensions: 350 x 250 x 680 mm

Weight : 12 kg approx.

E061 OPEN



E061 CLOSED



#### ACCESSORIES:

##### E061-I1

PROPELLER, conforming to ASTM C186 Specifications.

##### E061-I2

PROPELLER, conforming to EN 196-8 Specifications.

##### V300-I9

Paraffin wax with melting point 55°C to coat the glass parts which are in contact with the hydrofluoric acid.

#### SPARE PARTS:

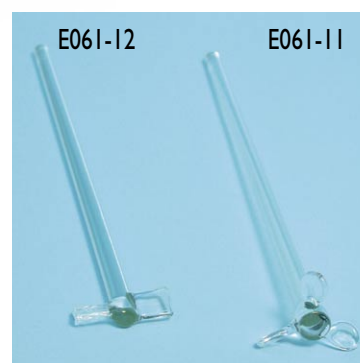
**E062-01** Dewar flask

**E062-02** Beckman thermometer

**E062-03** Filler glass funnel

E061-I2

E061-I1



**E062**

## Calorimeter - heat of hydration

STANDARDS: E196/8 - ASTM C186 - BS 4550, 1370 - UNI 7208  
DIN 1164 - UNE 7105, 80102

Used to determine the heat of hydration of cement by the solution method.

The apparatus consists of a dewar flask which is housed in an insulated wooden box, constant speed electric stirrer, Beckmann centesimal thermometer and funnel pouring the cement.

The wooden box is hinged so that the flask can be easily removed or replaced.

Power supply: 220-240V 1ph 50 Hz 150W

Dimensions: 350x250x650 mm

Weight: 15 Kg

ACCESSORY:

### V300-19

Paraffin wax with melting point at 55 °C to coat the glass parts which are in contact with the hydrofluoric acid.

Pack of 5 Kg

SPARE PARTS:

**E062-01** Dewar flask

**E062-02** Beckman thermometer



E062

**E063**

## Flame photometer

STANDARDS: EN 196:21 - ASTM C114:17 - BS 4550

Used to determine the alkali content of cement

Supplied complete with sodium (Na) and Potassium (K) filters, fuel and air connections, accessories.

Digital readout: 0 to 199,9 ppm

Reading range: K or Na 3 - 100 ppm, sens. 3 ppm

Reproducibility: 1% coefficient of variation for 20 consecutive samples. Operates on propane, butane, natural gas supplies

Air supply: 6 litre/min. with pressure of 1 Kg/cm<sup>2</sup> through specific dry compressor (see accessories)

Power supply: 220-240V 1ph 50 Hz

Dimensions: 420x360x300 mm

Weight: 8 Kg



ACCESSORIES:

**E063-01** Lithium (Li) filter

**E063-02** Barium (Ba) filter

**E063-03** Calcium (Ca) filter

**E063-04** Natural gas regulator

**E063-05** Propane gas regulator

**E063-06** Butane gas regulator

**E063-07** Dry Compressor; pressure 1-2 Kg/cm<sup>2</sup> (14-30 psi), capacity 6 litre/min. 220-240V 1ph 50Hz

LOSS-ON-IGNITION OF CEMENT AND BUILDING LIME AND CONTENT OF CHLORIDE, CARBON DIOXIDE AND ALKALI INTO THE CEMENT

STANDARDS:

EN 196/2 - EN 196/21 - EN 459/2

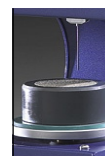
A muffle furnace is used to oxidize the sample in air at 975 ± 25 °C.

See section "A" Aggregates



A024





## LE CHATELIER EQUIPMENT FOR SOUNDNESS OF CEMENT

STANDARDS: EN 196/3 - BS 6463 - NF P15-432 - UNE 80102  
D.M. 3/6/68 - EN/ISO 9597

The equipment is composed by:

### E064

#### Le Chatelier water bath

Constructed with stainless steel inside chamber and exterior case in painted steel sheet, it can hold up to 12 Le Chatelier moulds (to be ordered separately) in the removable rack.

The bath reaches the boiling point in approx. 30 minutes. Now an original device keeps the bath temperature at the boiling point, by avoiding the water evaporation and assuring that Le Chatelier moulds remain covered by the water during all the test execution. Power supply: 220-240V 1ph 50/60 Hz 1800 W  
Dimensions: 405x265x205 mm - Weight: 7 Kg

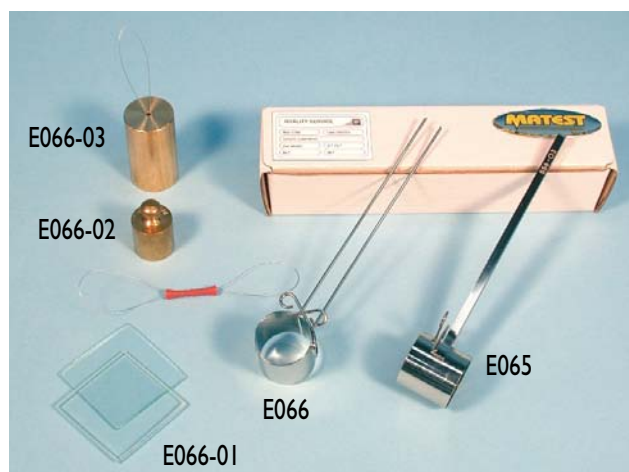


E064  
WITH E065 MOULDS

### E066

#### Le Chatelier mould

Made from a brass spring tensioned split cylinder having internal dia. 30 by 30 mm high, with two pointers 150 mm long. Chromed finishing. Used to determine the cement expansion (soundness) either in cold and in boiling water.  
Weight: 30 g



### E065

#### Le Chatelier mould individually tested

Similar to mod. E066, but with pointers bigger sized, granting a higher number of test utilisations (about 10 times more) within the tolerances requested by EN Specifications. The moulds are checked one by one with engraved a serial number for an easier identification of each mould, they perfectly meet EN 196/3 Specification.

### E066-01

Glass plate 50x50 mm to cover the mould. Pack of 2 pieces.

### E066-02

Weight: 100 g to be placed over the glass plate.

### E066-03

Extensibility of mould apparatus to check the elasticity of the split cylinder of the mould. Complete with 300 g weight.

### E068

#### Le Chatelier digital water bath, automatic, programmable

Stainless steel inside chamber; painted exterior case with double insulation.

The digital programmer allows to select and display:

- the time of total cycle and the boiling time,
- the bath temperature with 0,1°C. resolution.

To select and control:

- the initial heating time (from 20 to 100°C. in 30 +/- 5 minutes)
- the boiling time (180 minutes)
- the automatic cut-off at the end of the cycle

The apparatus is supplied complete with:

- stainless steel removable rack holding up to 12 moulds
- connectors for direct water inlet and overflow
- emptied drain cock
- insulated cover with gasket to minimize water evaporation
- safety device if the electric heating resistance is not covered by water

Water capacity: 13 litres

Power supply: 220-240V 1ph 50/60Hz 2200W

Inside dimensions: 320 x 290 x 150 mm

Outside dimensions: 480 x 430 x 280 mm

Weight : 11 kg



E068 WITH MOULDS





## E070

### Autoclave for soundness (expansion) of portland cement

STANDARDS: ASTM C151, C141 - D.M. 3/6/68 - UNE 7207

It consists of a high pressure boiler made from special alloy steel, inside dia. mm. 154x430 high, receiving a holding rack for 10 cement specimens. The heating system is achieved by electric resistances. The control panel encloses: "digital thermometer" to visualize the boiler temperature, pressure gauge scale 0 - 600 psi with built in pressure regulator and power switches.

Supplied complete with safety valves, rack for holding the specimens. Not sellable on CE market.

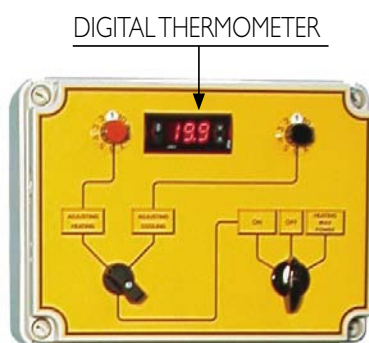
Power supply: 230V 1ph 50/60 Hz 3500W 295 psi

Dimensions: 450x475x1080 mm

Weight: 75 Kg



E070



DIGITAL THERMOMETER

DETAIL: CONTROL PANEL

## MOULDS FOR SOUNDNESS (EXPANSION) AND SHRINKAGE TESTS

Available models:

### E072

STANDARD: ASTM C490

Two gang prism mould to produce 25x25x250 mm specimens for expansion tests in autoclave. Complete with 4 steel inserts. Weight: 6 Kg

### E073

STANDARD: BS 1881, 6073

Two gang prism mould to produce 75x75x254 mm specimens. Complete with 4 steel inserts. Weight: 9 Kg

**E072-01** Spare stainless steel inserts for E072 and E073 moulds. Pack of 10 pieces.



E073

E072

E072-01



E075

E075-01

### E075

STANDARD: EN 12617-4

Three gang prism mould to produce 40,1 x 40 x 160 mm specimens. Complete with 6 inserts. Weight: 8,6 Kg

### E075-01

Spare stainless steel inserts for E075, complete with fixing screw. Pack of 12 pieces

### E107

STANDARDS: NF P15-434 - DIN 1164

Three gang prism mould to produce 40x40x160 mm specimens. Made from steel 55 HRB. Complete with 6 inserts. Weight: 8 Kg

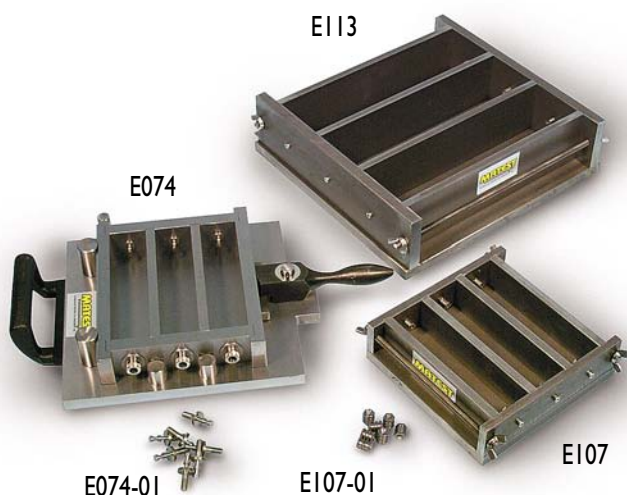
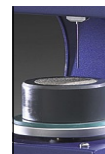
### E113

STANDARD: NF P18-427

Three gang prism mould to produce 70x70x280 mm specimens. Made from steel 55 HRB. Complete with 6 inserts. Weight: 17 Kg

### E107-01

Spare steel inserts for E107 and E113 moulds. Pack of 12 pieces.



## E077

### Length comparator

STANDARDS: ASTM C151, C490 - NF P15-433, P18-427

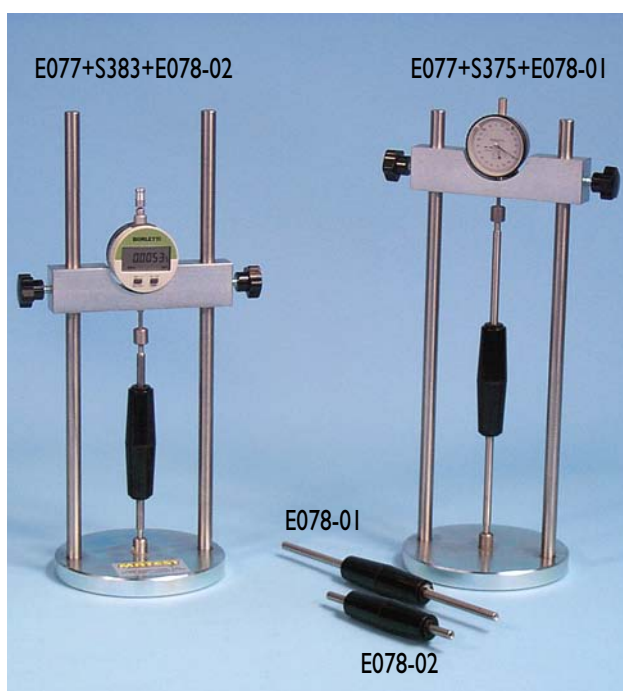
BS 1881, 6073 - D.M. 3/6/68 - DIN 1164

UNI 8147, 8148, 6687 - EN 1367-4 BS 812: 102

Used to measure the length variations of 25x25x250 mm (ASTM C490) cement specimens in autoclave soundness tests. It can also be used to measure linear shrinkage of specimens 40x40x160 mm (UNI 6686, ASTM C348, NF P15-433, DIN 1164), 70x70x280 mm (NF P18-427), 50x50x250 mm (UNI 8147), 80x80x240 mm (UNI 8148), 75x75x254 mm (BS 1881), 50x50x200 mm (EN 1367-04). The unit comprises a steel frame with an adjustable height beam. Supplied "without reference rod and gauge" (see accessories)

Dimensions: dia. 180x450 mm.

Weight: 10 Kg



## E114

STANDARD: UNI 8148

Three gang prism mould to produce 80x80x240 mm specimens for the determination of restrained expansion of a concrete containing the expansive agent.

Complete with three screwed rods and six restrained end plates.

Weight: 15 Kg

## E114-02

Restrained end plate 80x80 mm; spare to the E114 mould.

## E115

STANDARD: UNI 8147

Three gang prism mould to produce 50x50x250 mm specimens for the determination of restrained expansion of a mortar containing the expansive agent, and the effect of the aggregates on the drying shrinkage of concrete.

Complete with three screwed rods and six restrained end plates.

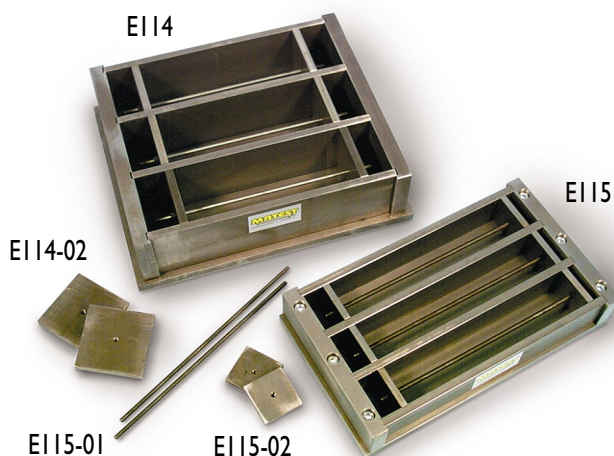
Weight: 10 Kg

## E115-02

Restrained end plate 50x50 mm; spare to the E115 mould.

## E115-01

Steel screwed rod 280 mm long; spare to the E114 and E115 moulds.



## ACCESSORIES:

- S375** DIAL INDICATOR 5 mm travel x 0,001 mm divisions
- S383** DIGITAL DIAL INDICATOR, 25 mm travel x 0,001 mm divisions, complete with battery and RS232 connector to PC
- S383-01** CABLE to connect mod. S383 to PC
- E078-01** REFERENCE ROD for 25x25x250 and 75x75x254 mm specimens. STANDARDS: ASTM C490 and BS 1881
- E078-02** REFERENCE ROD for 40x40x160 mm specimens STANDARDS: ASTM C348 - UNI 6687
- E078-03** REFERENCE ROD for 70x70x280 mm specimens STANDARD: NF P18-427
- E078-04** REFERENCE ROD for 40x40x160 mm specimens STANDARD: NF P15-433
- E078-05** REFERENCE ROD for 50x50x250 mm (UNI 8148), and 80x80x240 mm (UNI 8147) specimens
- E078-06** REFERENCE ROD for 50x50x200 mm specimens STANDARD: EN 1367-04



## DETERMINATION OF HYDRAULIC SHRINKAGE AND EXPANSION OF CEMENT MORTAR

### E075

### Shrinkage mould for 40,1 x 40 x 160 mm mortar prisms

STANDARD: EN 12617-4

Comparable to: ASTM C348, NF P15-433, UNI 6687-73

Used for the determination of linear shrinkage of cement mortar.

Manufactured from steel with hardness over 200 HV, it meets the dimensional tolerances of EN Specifications.

All surfaces are grinded and all parts are marked with an identification number for a correct assembling.

A part-number is engraved on each mould and a Certificate of Conformity is supplied along with.

Complete with 6 steel inserts and fixing screws.

It is used in conjunction with the Length Comparator mod. E077

Weight: 8,600 Kg

SPARE PART:

#### E075-01

STEEL INSERT, complete with fixing screw. Pack of 12

ACCESSORIES:

### E077

### Length comparator

STANDARDS: EN 12617-4, 1367-4, ASTM C151, C490, NF P15-433, P18-427, BS 1881, 6073, 812:102, D.M. 3/6/68, DIN 1164, UNI 8147, 8148, 6687

Used to measure the length variations of mortar specimens after autoclave soundness tests.

It also measures the linear shrinkage of specimens having different dimensions like:

40x40x160 mm (EN 12617-4, ASTM C348, UNI 6686, NF P15-433, DIN 1164)

25x25x250 mm (ASTM C490)

70x70x280 mm (NF P18-427)

50x50x250 mm (UNI 8147)

80x80x240 mm (UNI 8148)

75x75x254 mm (BS 1881)

50x50x200 mm (EN 1367-04)

Supplied "without gauge and reference rod" (see accessories)

Dimensions: dia. 180 x 450 mm

Weight : 10 kg

ACCESSORIES:

**S375** Dial indicator 5 mm travel x 0,001 mm divisions

**S382-01** Digital dial indicator, 12 mm travel x 0,001 mm divisions, complete with battery and RS 232 connector to PC

**S383-01** Cable to connect S382-01 to PC



**E078-04** Reference rod, Invar; for 40x40x160mm specimens  
Standards: EN 12617-4, NF P15-433

**E078-01** Reference rod, Invar; for 25x25x250mm and 75x75x254mm specimens.  
Standards: ASTM C490, BS 1881

**E078-02** Reference rod, Invar; for 40x40x160mm specimens  
Standards: ASTM C348, UNI 6687

**E078-03** Reference rod, Invar; for 70x70x280mm specimens  
Standard: NF P18-427

**E078-05** Reference rod, Invar; for 50x50x250mm and 80x80x240mm specimens. Standards: UNI 8148, 8147

**E078-06** Reference rod, Invar; for 50x50x200 mm specimens  
Standard: EN 1367-04





**E067**

## Cracking test mould STANDARD: NF P15-434

Used to produce ring-shaped specimens designed for cracking tests on hydraulic binders. This test consists of measuring the formation time of a crack on the test specimen. Weight: 8 Kg



E067

**E083**

## Plunger penetration apparatus

STANDARDS: EN 413/2, 459/2 - DIN 4211

Used to determine the consistency of fresh mortar, lime and masonry cement. The base is foreseen of a device to locate the test cup. The height of the drop can be accurately adjusted to 100 mm. Supplied complete with test cup and tamper; both anodized aluminium made. Dimensions: 200x200x700 mm Weight: 8 Kg

E083

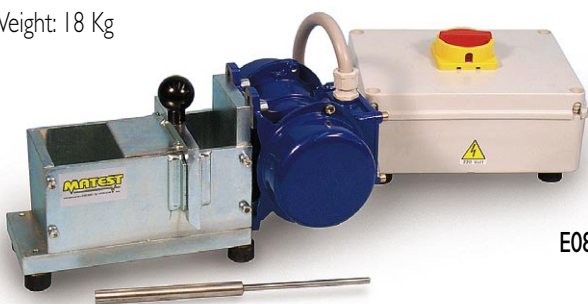


**E081**

## Mortar workability apparatus

STANDARDS: NF P18-452 - EN 413/2

Designed to test concrete mortar for dynamic workability and also to ensure optimum proportioning of mortar constituents (sand, water, cement, as well as cement/sand and water/cement ratios) compatible with given application. Suitable also for checking possible improvement when admixing a plastifier; or for comparing two mortar types. The unit consists of a prismatic receiver divided into two unequal volumes by a removable partition, and by an electric vibrator. The fresh mortar is poured in the large volume place, the separating partition is removed and the vibrator starts automatically. As a result of vibrations, mortar flows from the large volume to the small one, in a time which is a function of the workability of the mortar. Power supply: 220-240V 1ph 50 Hz 110W Dimensions: 400x200x200 mm Weight: 18 Kg



E081

**E080**

## Plaster extensometer

STANDARDS: UNI 6782 - BS 1191

Utilized to measure the linear expansion of a paste of standard consistence. The extensometer comprises an horizontal cradle 100 mm long x 60 mm wide x 25 mm deep closed at one end and open to the other. The open end is in contact with a dial gauge spindle, so that the lateral expansion of the specimen is measured. The dial gauge has 10 mm travel and 0,01 mm graduation. Dimensions: 250x80x80 mm Weight: 3 Kg



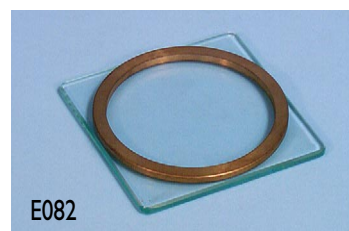
E080

**E082**

## Pat test

STANDARDS: EN 459/1 - BS 890, 1191

Utilized for the determination of the soundness of hydrated lime, gypsum and building plasters. Consisting of a brass ring mould, 100 mm diameter by 5 mm deep. The mould has an inside taper of 5°. Supplied complete with glass base plate. To carry out one test, three moulds are required.



E082

**E082-01**

## Water retention

STANDARDS: EN 413-2, 459-2

Brass chromed mould having dia. 100 mm by 25 mm deep, it is used for determining the water retention of masonry cements. Weight: 300 g approx.



E082-01



**E091**

## Bulk density of lime

STANDARDS: EN 459/2 - DIN 1060

The apparatus allows a sample to fall from a known height into a volumetric container. Consisting of a hopper, one litre cylindrical container and spring loaded trap. Weight: 5 Kg



E091

## Pull-off, bond strength

STANDARDS: EN 1542, EN 12399, EN 12618-2, EN 13279-2  
BS 1881: 207 - ISO 4624 - NF P34501, NF P 34601,  
NF P18-858 - EN 13687-1

This dynamometer provides you with information on both the adhesive force and the tensile strength of two layers of materials: lime, facing plasters, mortars, building plasters, cements, concrete and resistance of anchoring studs.

Compact, light (3,5 Kg), stand-alone.

Load is applied by turning the crank.

The reading is achieved through a digital display or a dial indicator's pointer which becomes blocked at the peak level of the testing.

Models of different capacities are available and adhesion metal discs having dia. 20 and 50 mm can be used, depending to the expected pull force. The instrument is supplied without accessories to be ordered separately.

To carry out the test a common electric drill is required.



E142-03

### E142

#### Pull-off tester with "digital dial" reading, 16 kN capacity

Recommended for concrete, cement and plasters, because the digital system ensures high accuracy also at low value measurements

MODELS WITH DIAL INDICATOR:

**E142-02 Pull-off tester 5 kN capacity**, recommended for cement and plasters

**E142-03 Pull-off tester 16 kN capacity**, recommended for concrete

**E142-04 Pull-off tester 25 kN capacity**

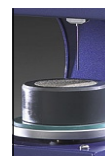


E142

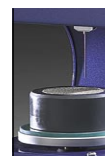


ACCESSORIES:

- E143** Adhesion metal disc 20 mm dia. (pack of 10 pcs.)
- E143-01** Adhesion metal disc 50 mm dia. (pack of 10 pcs.)
- E143-02** Tungsten carbide bit 20 mm dia.
- E143-03** Tungsten carbide bit 50 mm dia.
- E143-04** Adhesive metolux glue 1 Kg can







#### E142

### DIGITAL "PULL-OFF" (BOND) STRENGTH TESTER. CAPACITY: 16 kN

STANDARDS: EN 1542, EN 1015-12, EN 13687-2, NF P18-858, BS 1881:207, ISO 4624

Comparable to : EN 1348, PR en 13963, 14496

This dynamometer measures the adhesive force and the tensile strength of two layers of materials (concrete, facing plasters, mortars, building plasters, lime etc.) and is particularly suitable for applications concerning testing repairs of any structure where the bond strength between two layers is an essential factor.

Compact, light, for use in any location, this Pull-Off Tester is fitted with a load cell and high resolution large digital display unit; it is therefore suitable for measurements from low loads up to 16 kN, granting a wide working range and ideal for a large number of applications and materials. The direct tensile force is applied by rotating the hand wheel.

#### Specifications:

- Load capacity: 16 kN
- Resolution: 10 N
- Working range: 0,25 to 16 kN
- Accuracy and repeatability: better than +/- 1%
- Complete with traceable calibration certificate
- Battery operated
- Serial port for PC connection
- Hand wheel rounds: 60 with mechanical round/counter
- Graphic indication of the applied load rate
- Seat ball assuring axial/central load application

Supplied complete with carrying case, but "WITHOUT" accessories to perform the test, which have to be ordered separately.

To perform the test a common electric drill is required.

Dimensions: 410 x 210 x 270 mm

Weight : 3,5 kg approx.



E142

#### ACCESSORIES:

**E143** Adhesion test aluminium disc 20 mm dia. by 20 mm thick (n° 10 pieces)

**E143-01** Adhesion test aluminium disc 50 mm dia. by 20 mm thick (n° 10 pieces)

**E143-10** Adhesion test stainless steel disc 50 mm dia. by 20 mm thick (n° 10 pieces)  
It conforms to EN 1015-12 Specification.

**E143-11** Cylindrical ring, having truncated cone shape, inside dia. 50 mm  
Standard: EN 1015-12

**E143-02** Drill bit with centering bit, 20 mm diameter; for the preparation of the test surface.

**E143-03** Drill bit with centering bit, 50 mm diameter; for the preparation of the test surface.

**E143-05** Acrylic adhesive, 2 tubes 50ml each with nozzle.

**E143-08** Squirt for use of the acrylic adhesive.

#### SPARE PART:

**E143-09** Tie rod with spheric head for Disc/Dynamometer coupling.



## FLOW TABLES

### For flow and workability tests of mortar and lime

STANDARDS: ASTM C230 - BS 4551:1 - EN 459/2 - EN 1015-3 - UNI 7044 • Also comparable to NF P18-585 - UNE 7205, 83258  
DIN 1060

To perform this test, a specimen contained in a cone mould is placed on a metal surface which is then raised and dropped from a known height, after releasing the specimen from the mould.

The equipment consists of a circular top table with spindle, tripod, bronze flow mould and tamper. The apparatuses to EN Standards are equipped also of a filling hopper. Motorized models foresee an automatic digital drop counter.

The flow tables mod. E090 KIT and E090-01 KIT meet to both the EN 459-2 and EN 1015-3 Specifications.

Power supply (motorized models): 230V 1ph 50 Hz 150W

Weight: 20÷50 Kg

section E



194



E090 KIT



E090-01 KIT

Model	Standard	Hand Operated	Motorized	Table dia. mm	Drop height mm	Spare mould	Spare tamper
<b>E084 KIT</b>	UNI 7044	•		300	10	<b>E085-05</b>	<b>E085-06</b>
<b>E085 KIT</b>	UNI 7044		•	300	10	<b>E085-05</b>	<b>E085-06</b>
<b>E086 KIT</b>	ASTM C230 BS4551	•		254	12,7	<b>E087-05</b>	<b>E087-06</b>
<b>E087 KIT</b>	ASTM C230 BS 4551		•	254	12,7	<b>E087-05</b>	<b>E087-06</b>
<b>E090 KIT</b>	EN 459-2 EN 1015-3	•		300	10	<b>E085-05</b>	<b>E085-06</b>
<b>E090-01 KIT</b>	EN 459-2 EN 1015-3		•	300	10	<b>E085-05</b>	<b>E085-06</b>





E086 KIT

ACCESSORIES :

**E087-01**

FLOW CALLIPER to ASTM and BS Standards, for measuring the diameter of the sample.

Brass made. Weight: 450 g.



E087-01



E090-11

**E090-11**

FLOW CALLIPER to EN 459-2 and EN 1015-3 Specifications.



E087 KIT



E085-07

SPARE PART:

**E085-07**

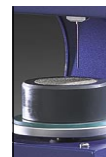
FILLING HOPPER to the mould.  
Standard: EN 459-2.



E085 KIT



E084 KIT



## MORTAR MIXERS

STANDARDS: EN 196/1, 196/3, 413/2, 459/2 - D.M. 3/6/68  
NF P15-413 - DIN 1164 - UNE 80801, 83258 - EN/ISO 679 - EN 480/1  
Equiparable also to ASTM C305 - AASHTO T162 - BS 3892

## E094

### Mortar mixer

Basically similar to mod. E093, but not equipped of automatic program, sand dispenser and safety door:

Two speeds can be selected. Supplied complete with stainless steel bowl, but **"without beater"** which has to be ordered separately.

This mixer can be supplied only to extra CEE markets

Dimensions: 340x460x500 mm

Weight: 40 Kg

E093 + E095-03



E094

MODELS:

## E093

### Automatic mortar mixer

This very robust mixer is expressly designed for the efficient mixing of cement pastes and mortar, with **"three"** automatic sequences of mixing cycle, in compliance with:

EN 196/1, EN 196/3 and EN 480/1 Specifications.

Bowl capacity is 4,7 litres

Two speeds can be selected:

140 or 285 rpm for the revolving action

62 or 125 rpm for the planetary action

It is possible to select the manual working, or one of the two automatic programs.

By operating automatically on changes of speed, stops and mixing sequences, outlined by acoustic signal, the unit performs the mixing cycle.

The unit is equipped of an automatic sand dispenser which fills the sand into the mixing bowl for a period of 30 seconds (only EN 196/1 program). Complete with safety door conforming to 89/392/CEE Directive; if opened it automatically stops the machine.

Supplied complete with stainless steel bowl, but **"without beater"** which has to be ordered separately.

Power supply: 220-240V 1ph 50 Hz

Dimensions: 340x460x700 mm

Weight: 45 Kg

## E095

### Mortar mixer

Basically similar to mod. E094, but complete with sand dispenser and safety door to 89/392/CE Directive.

Two speeds can be selected. Supplied complete with stainless steel bowl, but **"without beater"** which has to be ordered separately.

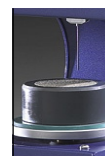
Dimensions: 340x460x500 mm Weight: 44 Kg



E095







ACCESSORIES FOR E093, E094, E095 MIXERS:

- E095-03** Stainless steel beater with bayonet fittings, to EN 196/1 Standard.
- E095-04** Stainless steel beater with bayonet fittings to EN 196/1. The beater is accurately polished to eliminate the porosities.
- E096-01** Dispenser with hopper, to ease the manual introduction of water; additives etc. into the bowl also during the mixing phase. Accessory to mod. E093 and E095 mixers.



- E097** Reference sand, size  $0,08 \div 2$  mm to EN 196/1 Standard. Bag of 1350 g.

SPARE PARTS FOR E093, E094, E095 MIXERS::

- E095-01** Stainless steel bowl
- E095-05** Bajonet coupling between beater and shaft



ACCESSORY FOR MIXMATIC MOD. E092 :

- E092-05** DISPENSER (supplementary) with hopper to ease the manual introduction of water; additives etc. into the bowl also during the mixing phase

SPARE PARTS FOR E092 :

- E092-10** BOWL, polished stainless steel , 4,7 litres capacity
- E095-04** BEATER, polished stainless steel

## E092

### MIXMATIC

#### Automatic programmable mortar mixer

STANDARDS: EN 196-1, EN 196-3, EN 480-1, EN/ISO 679, DIN 1164-5, DIN 1164-7, ASTM C305, NF P15-404, NF P15-314, NF P15-436

#### Design

- Very sturdy and durable construction for intensive laboratory use.
- Planetary transmission for silent and low maintenance operation
- Automatic sand dispenser having dimensions and geometry to grant the correct sand insertion, without residual and disaggregation between fine and coarse portions
- Transparent CE-conform protection of the mixing area, to allow the mixture checking during the test and to check the rotation speed through an optical revolution counter
- Complete with stainless steel polished mixing bowl and beater
- Easy and fast bowl insertion and removal

#### Firmware

- Different automatic programmable mixing cycles conforming to a.m. Standards
- The operator can also program up to 3 automatic personalized mixing cycles
- Synchronised acoustic signals with cycle steps
- Large high resolution and contrast LCD display (negative blue) visualizing the state of the different functions, relevant times etc.

Power supply: 220-240V 50Hz 1ph

Dimensions: 620 x 450 x 620 mm approx.

Weight : 80 kg approx.



E092

**E092**

## **MIXMATIC "HIGH PERFORMANCE"**

### **AUTOMATIC PROGRAMMABLE COMPUTERIZED MORTAR MIXER**

STANDARDS: EN 196-1, 196-3, 413-2, 459-2, 480, NF P15/314, NF P15/436, pr EN ISO 679

Comparable to: DIN 1164/5, DIN 1164/7, ASTM C305, ASTM C305/P, ASTM C305/M, AASHTOT162

Design :

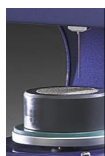
- Very sturdy and durable construction for intensive laboratory use.
- Planetary transmission for silent and low maintenance operation.
- Automatic sand dispenser having dimensions and geometry to grant the correct sand insertion, without residual and disaggregation between fine and coarse portions.
- Dispenser for additives (see accessory mod. E092-05).
- Dispenser for automatic water addition (see accessory mod. E092-06).
- Transparent CE-conform protection of the mixing area, to allow the mixture looking during the test and to check the rotation speed through a digital revolution counter.
- Complete with stainless steel polished beater and mixing bowl.
- Easy and fast bowl insertion and removal.
- Safety system of bowl presence and correct position to avoid dangerous working, with double sensor of removed bowl with load/unload sequential discrimination.

Firmware:

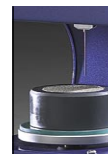
- Different automatic programmable mixing cycles conforming to the a.m. Standards.
- The operator can also program up to 5 automatic personalized mixing cycles through PC.
- Synchronised acoustic signals with cycle steps.
- Large high resolution and contrast LCD display (negative blue) visualizing the state of the different functions.
- Rotational motor feeded through inverter to grant the max. precision of the rotational speed, adjustable by the operator on the display.
- Possibility of manual mixing cycle.
- Possibility to store up to 100 tests and to transfer the data via RS232 to PC.
- Possibility to select different languages.



**E092**







E092-05

- Detailed indication of all the times (elapsed from the test start, residual to end test, elapsed from and test and bowl removal), state of cycle development with analogue bar, speed, active phase (sand, water), test state (correct execution or test interruption with lost results), type of current test.

Power supply: 220-240V 50Hz 1ph  
Dimensions: 530 x 620 xh 780 mm  
Weight : 85 kg

ACCESSORIES :

### E092-05

DISPENSER (supplementary) with hopper to ease the manual introduction of additives etc. into the bowl, also during the mixing phase.

### E092-06

DISPENSER (supplementary) with hopper for the automatic introduction (managed by the software) of water into the bowl, also during the mixing phase.



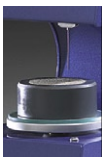
E092-06



SPARE PARTS:

**E092-10** BOWL, stainless steel 4,75 litre capacity.

**E095-04** BEATER, polished, stainless steel.



198

**E100**

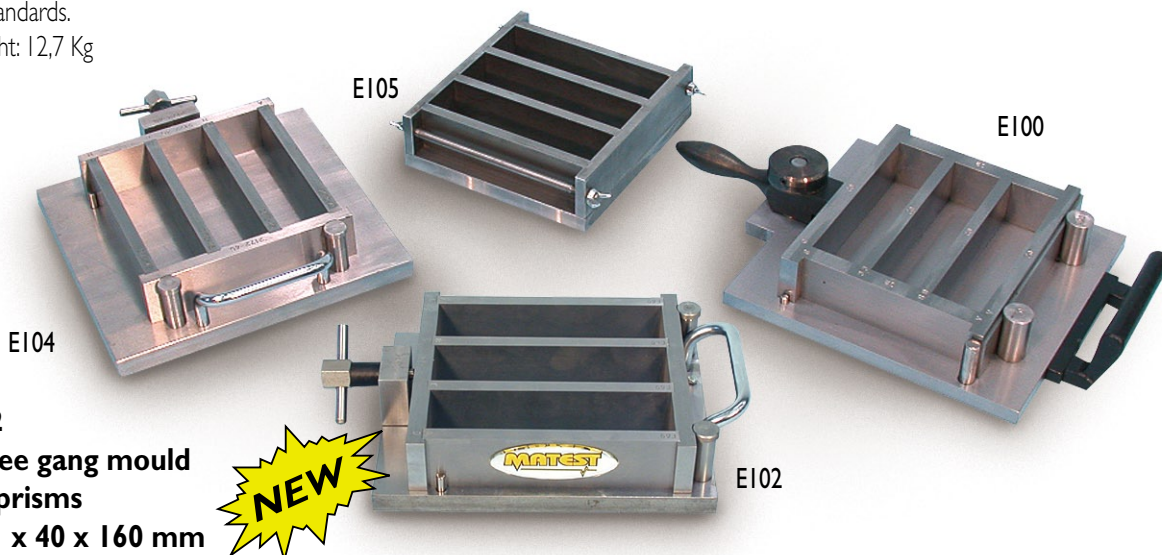
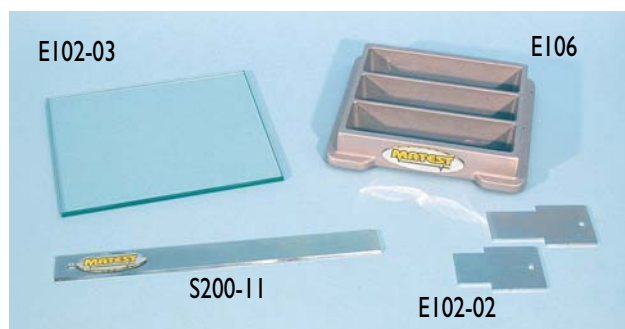
## Three gang mould for prisms 40x40x160 mm

STANDARDS: UNI 6009 - D.M. 3/6/68 - UNE 80101, 83258

Made from Cr/Ni steel, hardness 60 HRC.

It is supplied complete with base, stop lever and safety catch to avoid disengagement during the Jolting operation. All parts are marked with an identification number for a correct assembling; surfaces are grinded and tolerance is held within 0,1 mm. as requested by Standards.

Weight: 12,7 Kg



**E102**

## Three gang mould for prisms 40,1 x 40 x 160 mm

STANDARD: EN 196/1

Manufactured from steel with hardness over 200 HV, it meets the dimensional tolerances to EN 196/1 Standard. All surfaces are grinded and all parts are marked with an identification number for a correct assembling. A part-number is engraved on each mould and a Certificate of Conformity is supplied along with.

Weight: 8560 g.

**E103**

## Three gang verified mould for prisms 40,1 x 40 x 160 mm

STANDARD: EN 196/1

Made from steel "with hardness of inside walls over 500 HV" (EN196/1 Specifications recommend hardness 400HV). This high hardness value keeps the mould within the tolerances requested by Spec. for many tests, granting very long utilisation life.

All parts are marked with an identification number for a correct assembling. Each mould is individually verified in the dimensional tolerances, hardness, squareness, flatness and roughness with instruments periodically certified by Namas Centre or equivalent. A part-number is engraved on each mould, and a Certificate of Conformity is supplied along with.

Weight: 8560 g.



E103 DETAIL

**E103-02**

## Three gang mould 40,1 x 40 x 160 mm

Same to mod. E103, but supplied complete with Certificate of Verification and Conformity, issued by an Official Organisation like Namas or equivalent.

**E104**

## Three gang verified mould for prisms 40,1 x 40 x 160 mm "Italcementi model"

STANDARD: EN 196/1

Similar to mod E103, but with:

- Larger base 240 x 245 mm

- Weight: 11,850 Kg

Manufactured expressly for "Italcementi Group" cement factory.

**E105**

## Three gang mould for prisms 40x40x160 mm

STANDARDS: NF P15-413 - ASTM C348 - DIN 1164, 1060

Made from steel, hardness 55 HRB, it conforms to the above mentioned Specifications.

Weight: 8 Kg

ACCESSORIES:

**E106**

FEED HOPPER, used to fill the mould E100, E102, E103, E104, E105 when it is mounted on the Jolting machine E130.

Made from cast aluminium. Weight: 1 Kg.

**E102-02**

LARGE AND SMALL SCRAPER to EN 196/1

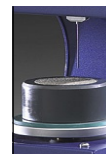
**S200-11**

STRAIGHT EDGE 300 mm. long

**E102-03**

GLASS PLATE 220x190x6 mm to cover the mould





## E112

### Three gang mould for prisms 70x70x280 mm

STANDARD: NF P18-401

Made from steel, it conforms to the above mentioned Specification.  
Weight: 17 Kg

## E111

### Briquette mould

STANDARDS: ASTM C190, C307 - AASHTO T132

Accurately machined it conforms to the above Specifications and is easily collapsible. Complete with base.

Weight: 3 Kg

## E110

### 50 mm three gang cube mould

STANDARDS: ASTM C109 - AASHTO T106

Made from steel, hardness 55 HRB, it can be also used for soil and other materials.

Weight: 7 Kg

## E130

### Jolting apparatus

STANDARDS: EN 196/1 - NF P15-413 - ISO 679 - BS 3892  
UNE 80101 - D.M. 3/6/68

Used to compact cement mortar prisms 40x40x160 mm in the three gang mould, as requested by the above Specifications. The apparatus, consists of a table holding the mould, seated on a rotating cam driven at 60 revolutions per minute.

The jolting group is connected to the table by bayonet joints for quick checking of the weights.

The drop height (15,0 mm) is adjustable to keep it correct also after intensive uses. The apparatus is supplied with separate control panel including main switch, automatic digital drop counter, start/stop push button.

Power supply: 220-240 V

Iph 50 Hz 500 W

Dimensions: 1000x380x420 mm

Weight: 65 Kg

## E133

### Cube mould 70,7 mm

STANDARD: BS 4550

Made from steel with dimensions as specified by above Standard.

Complete with base plate (three moulds required for each test).

Weight: 3 Kg

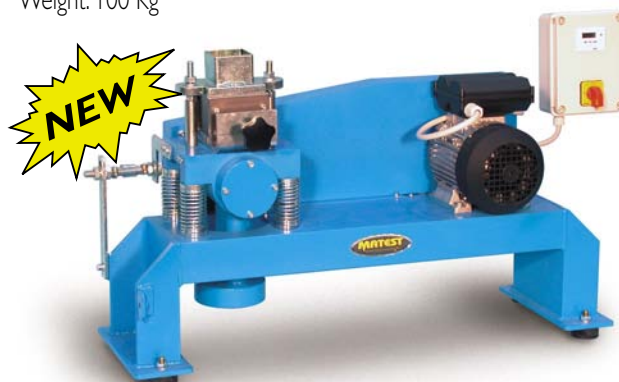


## E132

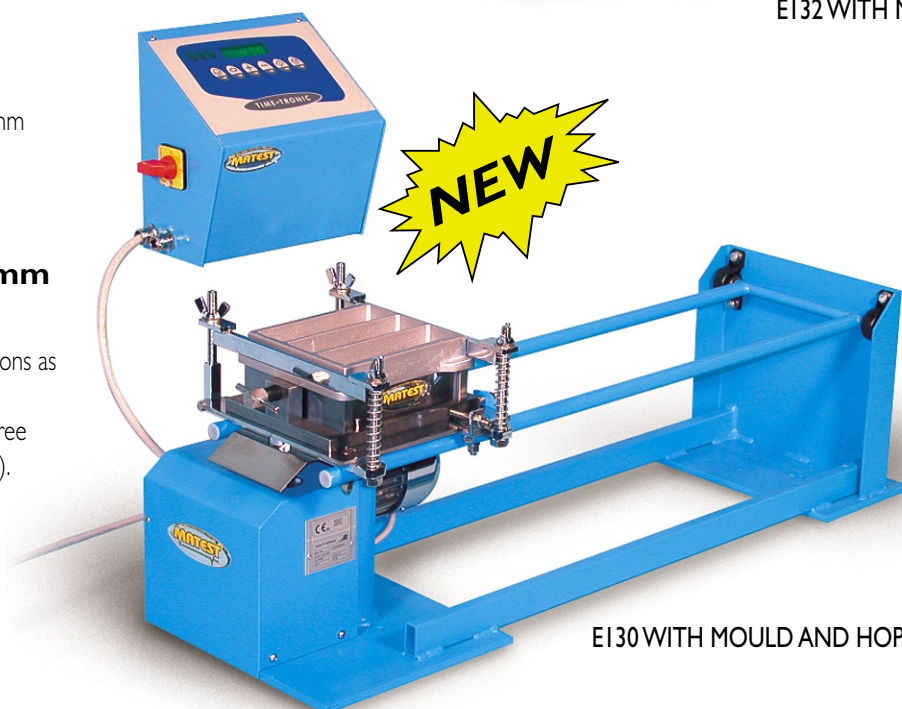
### Vibrating machine for 70,7 mm cube moulds

STANDARD: BS 4550

The mould is mounted on a vibration platform with excentric mechanism. The machine is supplied complete with separate control panel with timer, but "without cube moulds" to be ordered separately. Power supply: 220-240V Iph 50 Hz 250 W  
Weight: 100 Kg



E132 WITH MOULD



E130 WITH MOULD AND HOPPER

## EI31

### JOLTING APPARATUS "HIGH PERFORMANCE"

STANDARD: EN 196-1

Used to compact cement mortar prisms 40,1 x 40 x 160 mm in the three gang mould.

#### Mechanical Specifications:

- Frame, materials, oversized components and treatments manufactured to grant the top performance with intensive use in heavy conditions.
- Machining and couplings are extremely accurate.
- Articulated jolting group, strut lifting the table and cam shaft are on ball bearings.
- Table hammer and anvil are hardened over 500 HV.
- Cam hardness over 400 HV.



EI31

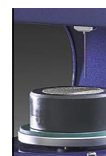
- Table holding the mould equipped with aluminium hopper to collect the material outcoming from the mould.
- Hammer/anvil and cam zone have a protection case to CE Safety Directive.
- The drop height (15,0 mm) and the table level are adjustable to keep them always correct also after intensive uses.
- **The table and the arms are quickly removable to easily inspect them.**
- Both table and arms have engraved effective weight (accurate for each single piece).

#### Working Specifications:

- Three-phase motor feeded by a single-phase 220V inverter for a perfect adjustment of the motor rotation speed also with different loads; this solutions **grants the keeping of 60 revolutions per minute in any condition.**
- Accurate and reliable control electronics to select and personalize the test cycles.
- The display and keyboard, protected against powder and sprays, set the operator interface.
- A sensitive and sturdy sensor surveys the table position counting the revolutions without any error possibility.

The use of top quality components, the accurate machinings with strict tolerances, the oversized components get the Matest EI31 Jolting Apparatus in the "HIGH PERFORMANCE" range of the testing equipment.

Power supply: 230V 1ph 50Hz 500W  
Dimensions: 1070 x 380 x 510 mm  
Weight: 93 Kg





## WATER BATHS FOR CEMENT CURING

AND GENERAL LABORATORY PURPOSE

STANDARDS: EN 196/1 - 196/8 - ASTM C109, C511, ISO/EN 679

Double walled all stainless steel made with wool insulation the bath ensures a constant and uniform temperature at 20 °C with accuracy of  $\pm 0,4$  °C.

Equipped with digital thermostat and electric stirrer.

The specimens are held by a shelf spaced from the bottom.



E136

section E

MODELS:

**E136**

### Water curing bath

Temperature range: from ambient to +99 °C with accuracy of  $\pm 0,4$  °C at 20 °C.

The bath is equipped with a cooling coil device to be connected to the water net; to be used when room temperature exceeds the requested one with the possibility to reduce the bath temperature according to the room and water net temperatures.

Capacity of the bath: 40 litres and over 60 specimens  
40,1x40x160 mm

Inside dimensions: 510x350x230 mm

Outside dimensions: 680x420x420 mm

Power supply: 220-240V 1ph 50/60 Hz 2000 W

Weight: 28 Kg



200

**B052-02**

### Water curing bath with cooling device

Similar to mod. E136, but with temperature range: +10 to +99 °C. Accuracy of  $\pm 0,4$  °C at 20 °C.

The cooling unit is housed under the water bath.

Outside dimensions: 680x420x950 mm

Weight: 60 Kg



B052-02

**E139**

### Curing cabinet

STANDARDS: EN 196/1 - ASTM C87, C109, C190, C191

Both external and internal walls are stainless steel made, and insulated by a 50 mm. thick glass wool.

The cabinet has an inner inspection glass door.

Temperature range: from ambient to 70 °C

Humidity range: 90% to saturation

Power supply: 220/240V 1ph 50/60 Hz 1000 W

Inside dimensions: 620x440x400 mm

Overall dimensions: 900x700x800 mm

Weight: 60 Kg

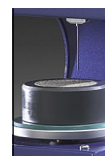


E139

ACCESSORY:

**E136-10**

Mercury control thermometer range 0-50 °C. div. 0,5 °C.



## E138

### Large capacity curing cabinet

STANDARDS: EN 196/1 - ASTM C87, C109, C190, C191 - UNE 80102

For curing large quantities of mortar and concrete specimens. Aluminium and polycarbonate made, it is complete with precision digital thermostat and four shelves.

The humidity from 90% to saturation is maintained through water nebulizers activated by compressed air, and the temperature by an immersion heater and refrigerator unit (accessory)

Temperature range: from ambient to +30 °C, accuracy  $\pm 1$  °C.

The cabinet requires a compressed air source. (see accessory)

Inside dimensions: 1090x470x1200 mm

Overall dimensions: 1370x540x1490 mm

Power supply 220-240 V 1ph 50 Hz 2000 W

Weight: 100 Kg



E138

ACCESSORY for mod. E138:

**V206** Air Compressor; air displacement: 240 litres/min.  
Tank capacity : 50 litres  
Suggested for daily use

**V206-01** Air Compressor; air displacement: 250 litres/min.  
Tank capacity : 100 litres  
Recommended for intensive use

**V206-02** Air Compressor; air displacement: 400 litres/min.  
Tank capacity : 200 litres  
Recommended for continuous use

## E134-II

Pan, 240 x 300 x 70 mm, polythene made, it accepts up to six 40,1x40x160 mm prisms for curing in water.

ACCESSORY for mod. E136, E138, E139:

## E141

### Water refrigerator

It cools the water from room temperature up to +10°C. with supply capacity of 2 litre/minute.

Stainless steel made, complete with motor pump, digital thermostat sens. 0.1 °C., it is connected to water baths and tanks where a lower temperature than the room one is required.

Power supply: 220/240V 1ph 50Hz 750W

Dimensions: 550 x 500 x 880 mm

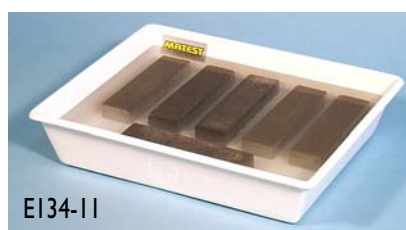
Weight: 55 Kg



E141



V206



E134-II





## COMPRESSION AND FLEXURAL TESTING MACHINES

**For cement, bricks, rock, refractories and any kind of low resistance material**

STANDARDS: EN 196/1 - BS 3892 - ASTM C109 - NF P18-411  
DIN 1164 - UNE 80101 - AS 2350 - pr EN/ISO 679

Designed for compression tests portions of prism 40,1x40x160 mm and cubes side 40, 50, 70, 100 mm and 2"; cores with height max. 180 mm and flexural tests on prisms 40,1x40x160 mm by using suitable devices (see accessories mod. E170÷E172-02 described in the next pages).

Max. vertical light between platens: 185 mm.

Ram travel: 45 mm. approx.

Platens diameter: 153 mm:

Gauges dia. 200 mm:

- Range 0-300 kN subdiv. 2,5 kN

- Range 0-50 kN subdiv. 0,5 kN

Calibration accuracy: grade 1.0

Supplied complete with lower compression platen, coupling piece to easily fix the compression/flexural devices mod. E170 ÷ E172-02.

Power supply (motorized models): 220-240V 1ph 50 Hz 750 W

Weight: 300÷330 Kg

MODELS:

### E151

MACHINE HAND OPERATED CAPACITY 300 kN, ONE GAUGE

### E152

MACHINE HAND OPERATED CAPACITY 300 kN, TWO GAUGES: 0-300 kN and 0-50 kN

### E155

MACHINE MOTORIZED CAPACITY 300 kN, ONE GAUGE complete with power control electric pump and flow control valve

### E156

MACHINE MOTORIZED CAPACITY 300 kN, TWO GAUGES: 0-300 kN and 0-50 kN. Complete with power control electric pump and flow control valve

### E158

MACHINE, CAPACITY 500 kN, motorized, with ELECTRONIC DIGITAL measuring system using the unit "DIGITRONIC" mod. C108 (see section concrete pag. 97).

### E158-01

MACHINE, CAPACITY 250 kN with digital "DIGITRONIC" measuring system (see pag. 97)

Same to mod. E158, but with capacity: 250 kN.

### E159

MACHINE, CAPACITY 500 kN, motorized, with ELECTRONIC DIGITAL measuring system using the unit "CYBERTRONIC" mod. C109 (see section concrete pag. 90).

### E159-01

MACHINE, CAPACITY 250 kN, with digital "CYBERTRONIC" measuring system (see pag. 90).

Same to mod. E159, but with capacity: 250 kN.



E156 + E170



E158



E159 + C127 + E170 + E161-11



EI60 + CI27 + EI61-I2

## EI60

MACHINE, DUAL RANGE: 500 kN and 15 kN, motorized with electronic digital measuring system unit "CYBERTRONIC" (mod. CI09, see pag. 90). The machine is equipped with **"two suitable pressure transducers"** for the two measuring ranges 0-500kN and 0-15kN.

Recommended for compression tests (by utilizing the range 0-500kN) and flexural tests on prism 40,1x40x160 mm (by utilizing the range 0-15kN)

## EI60-01

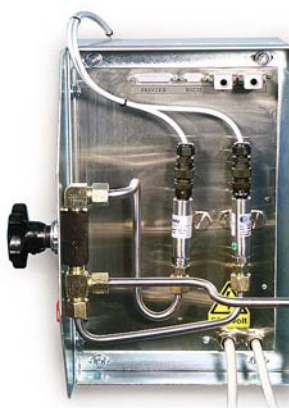
MACHINE, DUAL RANGE, same to mod. EI60, with "Cybertronic" unit mod. CI09, but with measuring ranges: **0 – 250 kN and 0 – 15 kN**

## EI61

MACHINE, capacity 250 kN, motorized, connected to the automatic servocontrolled system "SERVOTRONIC" mod. CI04 (see pag. 94), it provides fully automatic testing through all phases, with automatic control of load and pace rate, and the software to print out results and certificates.

## EI61-01

MACHINE, DUAL RANGE: 250KN and 15KN, motorized, connected to the automatic servocontrolled system "SERVOTRONIC" mod. CI04 (see pag. 94), equipped with two measuring ranges: 0 - 250 kN and 0 - 15 kN by utilizing **"two suitable pressure transducers"**. Recommended for compression and flexure tests, it provides fully automatic testing through all test phases.



EI60 DETAIL

## ACCESSORIES:

**EI61-I1** Bench, to hold the testing machine

**EI61-I2** Safety guards to CE Directive, polycarbonate made, complete with hinges and lock.

**CI27** Graphic printer on thermal paper

**EI63** Software UTM2\* (Universal Testing Machine 2)  
Developed for the managing and the remote control of Matest testing machines from a PC.  
License for COMPRESSION tests on mortar according to EN 196,1 - ASTM C109 Spec.  
To be used with machines equipped with Cybertronic (CI09)



**EI64** Software UTM2\* (Universal Testing Machine 2)  
License for FLEXURE tests on mortar according to EN 196,1 - ASTM C348 Spec.  
To be used with machines equipped with Cybertronic (CI09)



**CI23** Software UTM2\* (Universal Testing Machine 2)  
"SERVONET" license, for the managing and the remote control through PC of the machines equipped with "Servotronic" (CI04). The licenses for compression and flexure tests mod. EI63 and EI64 are included.



\* Technical details of Software UTM2: see page 14

**H009-01** Personal Computer; complete with LCD monitor 17", keyboard, mouse, connection cables. The supply of the PC includes the installation of the purchased Software.

**H009-02** Software for on line technical support. It allows maintaining the software without physical intervention of an After Sale specialist. Also gives the possibility to the customer to receive programs upgrading.



EI61-01 + EI72-01





## COMPRESSION / FLEXURAL TESTING MACHINES

STANDARDS: EN 196/1 – ASTM C109 – BS 3892 – DIN 1164  
NF P18-411 – UNE 80101 – AS 2350 – prEN/ISO 679

MODELS:

**E181**

**Dual piston load frame 250kN and 15kN capacity for compression and flexural tests**

Technical specifications:

Upper and lower compression platens have dia. 165 mm

The vertical daylight between platens is 189 mm

Dual loading chamber:

0 - 250 kN (for compression tests)

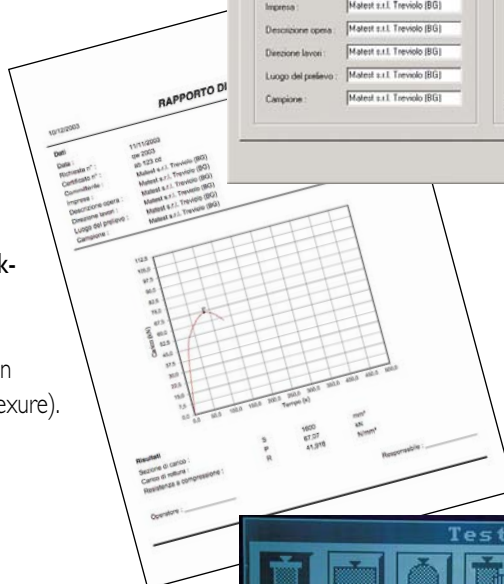
0 - 15 kN (for flexure tests)

The applied load is measured by two strain gage load cells (15kN and 250 kN) at high accuracy. This solution eliminates the weights of the piston and lower compression platen, packing set frictions etc., granting very high precision (max error within  $\pm 0,5\%$ )

The low capacity piston (15kN) permits very accurate tests on specimens having low strength (both in compression and in flexure).  
Max piston's stroke: 35 mm approx.



E164 flexure test profile



E163 graphic with report of compression test



Menu of a test starting with automatic execution



E181 + E170 + E172-01

Applied load is visualized through the multichannel computerized digital display system "Cybertronic" mod C109 (technical details at page 90)

Safety guards to CE Directive, polycarbonate made, with hinges. Two columns rigid frame, fitted on a steel base, complete with container for broken specimens collection.

Calibration accuracy: Grade 1.0

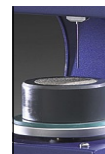
The machine is supplied complete with lower compression platen and coupling piece to easily fix the compression/flexural devices mod. E170 – E172-02 (which are not included and have to be ordered separately).

Power supply: 230V 1ph 50Hz 750W

Dimensions: 700 x 400 x 1500 mm

Weight : 250 kg approx.





## E183

### Dual piston load frame 250kN and 15kN capacity for compression and flexural tests

Connected to the automatic servocontrolled power system "Servotronic" mod. C104, it performs a fully automatic test procedure, including speed rate and software for Certificate printing.

Upper and lower compression platens dia. 165 mm

The vertical daylight between platens is 189 mm

Dual loading chamber:

0 - 250 kN (for compression tests)

0 - 15 kN (for flexure tests)

The low capacity piston (15kN) permits very accurate tests on specimens having low strength (both in compression and in flexure).

Max piston's stroke: 35 mm approx.

Safety guards to CE Directive, polycarbonate made with hinges.

Two columns rigid frame fitted on a steel base, complete with container for broken specimens collection.

Calibration and Accuracy: Grade 1.0

Technical specifications of "Servotronic" mod C104 (see page 94)

The machine is supplied complete with lower compression platen and coupling piece to easily fix the compression/flexural devices mod. E170 - E172-02 (accessories; see next pages).

Power supply: 220-240V 1ph 50z 750W

Dimensions: 700 x 400 x 1500 mm approx.

Weight : 310 kg approx.

## ACCESSORIES:

**C127** Graphic printer on thermal paper for mod. E181, E183

**E163** Software UTM2\* (Universal Testing Machine 2)  
License for COMPRESSION tests on mortar according to EN 196,1 - ASTM C109 Spec. To be used with machines equipped with Cybertronic (C109)



**E164** Software UTM2\* (Universal Testing Machine 2)  
License for FLEXURE tests on mortar according to EN 196,1 - ASTM C348 Spec.  
To be used with machines equipped with Cybertronic (C109)



**C123** Software UTM2\* (Universal Testing Machine 2)  
"SERVONET" License, for the managing and the remote control through PC of the machines equipped with "Servotronic" (C104). The licenses for compression and flexure tests mod. E163 and E164 are included.



\* Technical details of Software UTM2: see page 14

**H009-01** Personal Computer; complete with LCD monitor 17", keyboard, mouse, connection cables. The supply of the PC includes the installation of the purchased Software.

**H009-02** Software for on line technical support. It allows maintaining the software without physical intervention of an After Sale specialist. Also gives the possibility to the customer to receive programs upgrading.

**C128** Table printer; size A4 for test graphics or Certificate printing.



C128



E183 + E170 + E172-01 + H009-01 + C123







## COMPRESSION/FLEXURAL DEVICES

To be positioned between the compression platens of the machine; they fit perfectly without removing anything and without adding any distance piece.

MODELS:

### E170

#### Compression device for portions of 40,1x40x160 mm prism broken in flexure

STANDARDS: EN 196/01 - ASTM C349 - NF P15-451 - pr EN/ISO 679

The compression platens have hardness 60 HRC and upper platen is seat ball assembled. Cadmium plated for rust protection.

Weight: 12 Kg



E170

### E170-01

#### Compression device for portions of 40,1x40x160mm prism broken in flexure

STANDARD: DIN 1164

Identical to mod. E170 but with compression platens having 40x62,5 mm size, as requested by DIN Standards.

Weight: 12 Kg



E170-01

### E171

#### Compression device for cube 50 mm and 2" side

STANDARD: ASTM C109

Platens diameter: 75 mm and upper platen is seat ball assembled.

This device can be used also to test cores max. 50 mm height.

Weight: 12 Kg



E171

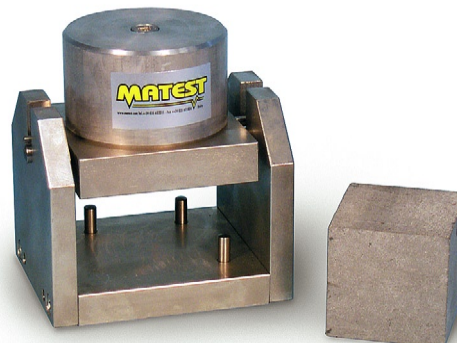
### E171-01

#### Compression device for cube 70,7 mm side

STANDARD: BS 4550

It can be used also to test cores max. 70 mm height

Weight: 12 Kg



E171-01

### E172-01

#### Flexure device for 40,1x40x160 mm prisms

STANDARDS: EN 196/01 - NF P15-451 - DIN 1164 - pr EN/ISO 679

Upper bearer is seat ball assembled.

The distance between lower bearers is 100 mm and one of them has a spherical seat. Cadmium plated for rust protection.

Weight: 8 Kg



E172-01

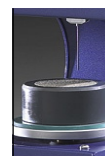
### E172-02

#### Flexure device for 40x40x160 mm prisms

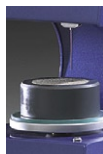
STANDARD: ASTM C348

Identical to mod. E172-01 but lower bearers have distance of 119 mm as requested by ASTM Standard.

Weight: 8 Kg







**NEW**



EI90

EI90 + EI83 + H009-01

## Determination of MODULUS OF ELASTICITY

in compression of products and systems for the protection and repair of concrete structures (Mortars)

**System: Automatic with pace rate control also when releasing the load**

STANDARD : EN 13412

It can be used with a MATEST testing machine to be selected among the Servotronic models (ref. CI04).

The appliance includes:

- **Hydraulic system**

It is an hydraulic installation and has a high performance valve directly controlled by the digital unit that grants the automatic control of the pace rate increasing the load, keeps a certain load and then controls the pace rate decreasing the load.

The setting of the pace rate is made by a very sensitive valve controlled by a step by step motor and it allows a micrometric action on the pace rate granting excellent results.

A laser position detector allows a rapid positioning of the piston. This grants a touching sensitivity of test starting of about 0,1 per thousand of the maximum capacity.

- **Electronic measuring system**

The high performance control and data processing unit controlled by a 32 bit microprocessor, can manage up to 4 high resolution channels for the control of load cells or transducers with strain gages bridge and other 4 channels for the management of



the signals coming from single use extensometers (strain gauges). The unit contains two Analogical/Digital last generation converters with 24 bits resolution. The system processes the signals coming from the load cells and from the extensometers giving all the results required for a further processing on the Personal Computer following the most updated International Standards for this application.

The single use extensometer must be interfaced using a specific module that makes the automatic calibration of the zero and of the measuring range after a special thermal compensation. This grants a five times better precision than the one required by the Standards.

The single use extensometer must be interfaced using a specific module that makes the automatic calibration of the zero and of the measuring range after a special thermal compensation. This grants a five times better precision than the one required by the Standards.

- **Data acquisition and processing software UTM2**

(for feature and general applications of the UTM2 see page 14) with License for Elastic Modulus to EN 13412.

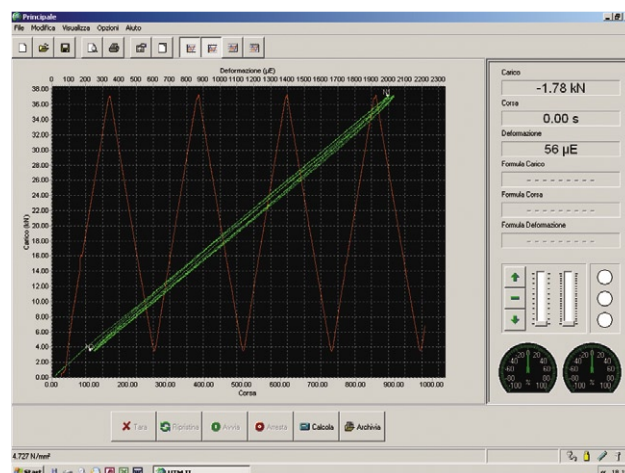
The software has been developed on the working line of the already known software UTM-2 (windows menu). It contains the profiles of the main Standards used, but the user can modify as he likes and personalise the test profile, that will be effected in a completely automatic way by the testing machine.



The user can introduce a list of dates concerning the specimen that will be tested and the kind of test that he wants to make: shape of the specimen, dimensions, age of the specimen, average expected breaking value, etc... The appliance allows verifying the proper reading of the extensometers and, if everything is within the expected tolerances, it manages the average deformation value read by the transducers and processed by the digital unit, than it transmits by means of the serial communication port (RS232) to a Personal Computer, that can be already by the end user or supplied separately (not included with the Software), all the dates of the test. These dates will be processed by the software and transformed in a graph load/deformation and load/time, following the International Standards.

The software gives the possibility to print on a standard printer a test certificate reporting all the dates concerning the test and the specimen and the graph of the test.

- Extensometer-Digital unit kit.
- Package of 10 extensometers (strain gages) single use, base length 60 mm (CI25-13)
- Kit for the applications of extensometers composed by glue, welder; solder; cleaning liquid, accessories, everything in its transportable case.



Screen during a test and marker indicating any change.

Personalisation of the test certificate.

Selection of a test profile (EN 13412)

## SPARE PARTS:

**CI25-13** Electric single use extensometers, base length 60 mm.  
Pack of 10 pieces.

**CI25-16** Welder

**CI25-17** Glue

**CI25-18** Cleaning liquid

**CI25-19** Solder

Personalisation and composition of a test profile.

