MATEST®
INNOVATIVE. GLOBAL. MANUFACTURER.

MATERIAL TESTING EQUIPMENT

CATALOGUE '21

CATALOGUE 21

10th Edition

WHY WE HAVE NEVER STOPPED GROWING...

Matest is an Italian company founded in 1986 by the family that still run and manage operations. Thanks to its strong capital, the company is a forerunner in technological innovation and in continuous expansion.

With an increasingly wide and comprehensive range of products, Matest is both a global player and a leading manufacturer of material testing equipment for the building industry.

...Because of our ability to constantly adapt our future strategies to stay ahead of changing customer needs, new competitors and evolving technology, while remaining a family-run company focused on medium to long-term planning."

There is such a lot to discover in the **10th edition** of our general catalogue, due to the dedication of the Matest team, who are the driving force behind the new products to be found in each and every sector of our range.
The synergy created with **Pavetest** has resulted in a global partnership which offers the most complete and dependable range of pavement materials testing equipment; a position confirmed by the vast majority of the market, especially customers involved in R&D, with whom we continue to develop innovative solutions.

Our awareness of having become a global player with a strong brand identity has also allowed for greater product specialization. **Steeltest** is in fact the new brand that reflects the quality and functionality inherent in our wide range of equipment for steel testing. **Tecnotest**, the company recognizable by the "Elephant" in its logo that became a well-known brand in the material testing equipment industry, is now the property of Matest, evidence of our willingness to guarantee continuity with its customers.

Our manufacturing capacity and warehouse space have been further enlarged in 2017 in order to increase productivity and accommodate higher stock levels, so as to provide better and timelier customer service; convinced as we are that this is the way forward to satisfy the market expectations.
Matest have grown by capitalizing on lessons learned and relationships created, both inside and outside the company.

Many thanks to our collaborators, international partners, distributors and customers, to whom we are sincerely grateful for the contributions they have made, their allegiance and commitment in sustaining the values we all share that will allow us to face future challenges…and continue growing!

Paola Maestroni - Managing Director
Roberto Maestroni - President

WE CALL IT SIMPLY INNOVATION.

Since taking its first steps into the world of concrete testing right up to the most recent and complex solutions for dynamic pavement testing, Matest continues to invest strongly into the research and development of highly-advanced technology for a sector in continuous evolution.

Its team of engineers are committed to ensuring stringent compliance of products with the major international standards, starting at the original drawing board right through to assembly and testing, without losing sight of the importance of an ergonomic and appealing design.

APS

Dual blade concept for perfect parallel cutting. The next generation fully automated asphalt sawing system.

THE LATEST OUTCOMES OF OUR RESEARCH.

STS25

The most versatile static testing machine in the market today. A fully self-contained, precision engineered unit, able to perform Overlay, SCB, DCT, TSRST and DTT tests.

PRESSUREMATIC

The best solution for geotechnical laboratories demanding automatic pressure and volume control.

#GLOBALMANYTIMES

Matest brand's global presence encompasses all sectors of material testing, as witnessed by its widespread network of distributors and agents, ready to satisfy the requirements of every kind of customer on every continent.

#GLOBALCUSTOMERS

A wide variety of customers, from research centers to general contractors, geotechnical laboratories to asphalt, concrete and cement manufacturers, government authorities and ministries to professional consultants.

#GLOBALRANGE

More than 5,000 products, from basic equipment, strictly in compliance with the latest standards and security directives, to the most advanced system, in order to serve research entities and test all building industry materials.

#GLOBALPRESENCE

Strong participation in exhibitions, conferences and international events in over 150 countries.

#GLOBALSERVICE

A first class technical assistance provided by a team of Product Specialist, qualified in their specific field, and a solid network of experienced distributors, trained to locally serve our customers.

#GLOBALCOMMUNICATION

A renewed, interactive web site makes consultation of our complete on-line catalogue easier and quicker. In addition to the usual product search by code, description or Standard, the new release also allows catalogue consultation by test type.

MADE IN MATEST, MADE IN ITALY.

Matest's strength lies in a thorough control of the whole manufacturing process, from design to installation, according to strict quality criteria.

The year 2017 ended with further enlargement of the areas allocated for machine assembly and stocking so as to enhance quality, increase production capacity and provide faster deliveries.

Located in the province of Bergamo, Matest employees are dedicated to upholding the excellence of products Made in Italy.

A 32 YEARS JOURNEY INTO MANUFACTURING, QUALITY AND WORLDWIDE EXPERIENCE.

1

Company owned by a single family

8,000 m²

Manufacturing and storage facility

8 mln

Stock of finished goods for just in time deliveries

1,000

Compression machines made in Italy per year

5,000

Items comprise the widest range of testing equipment

GLOBAL QUALITY

A constant attention to quality during every stage of the manufacturing process, from the smallest basic equipment to the most technologically advanced system.

Quality assurance management is certified to ISO 9001. Matest is also accredited as Calibration Laboratory Lat No. 214 for force testing of compression machines and material testing equipment, in compliance with EN ISO/IEC 17025 and EA/ILAC requirements.

Accredited Calibration Laboratory n°214

LAT N. 214 Signatory of EA, IAF and ILAC Mutual Recognition Agreements

ISO 9001 certified manufacturer

Silent. Stilysh. Standout.

An inverter to enhance efficiency and reliability while further reducing energy consumption and noise during operation.

Proprietary technology.

In-house developed technology to perform sophisticated tests, such as elastic modulus, post failure and strain tests.

WORLDWIDE LEADING EXPERTS IN TESTING.

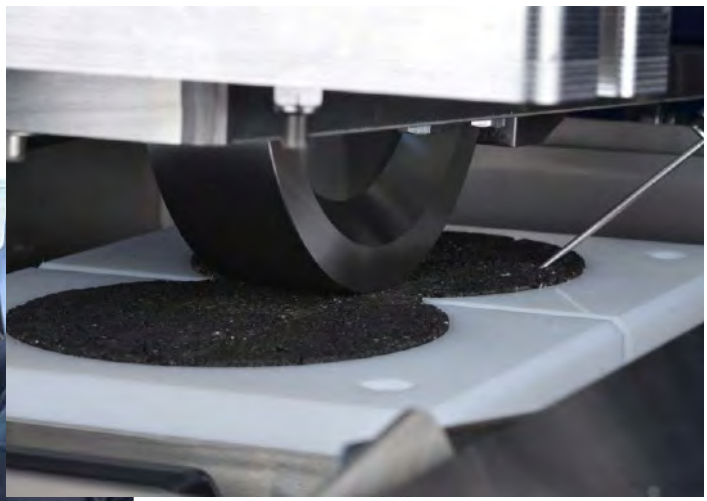
Matest is now recognized as a leader in the world of asphalt testing. Dominance of the patented Smartracker on the American market is an example of how the company's investment into the road pavement testing segment of the industry has given its just rewards.

Efforts in research have led to the development of machines for dynamic testing under the Pavetest brand. Pavetest proposes a range of hi-tech products suitable for both standard testing and for research purposes, while guaranteeing reliability and strong performance.

4PB

Stand-alone servo-pneumatic four point bending system

EMBRACING
A CULTURE OF TESTING.



GROWING LEADER IN SOIL AND STEEL TESTING.

Matest has enriched its range of products with machines for performing tests on steel and soil. We are proud to welcome Steeltest, a new division dedicated to our range of universal testing machines.

And recently acquired is the historic brand Tecnotest. The famous elephant has always been appreciated by the construction material industry for the quality and the durability of its products, especially its range for geotechnical testing.

From the 2000 kN tensile machines adaptable for universal usage to the automatic and cyclic triaxial testing machines, Matest has earned itself prominent position on the national and international markets with solutions that are at the vanguard while being competitively-priced.

STEELTEST
UNIVERSAL TESTING SYSTEMS

tecnotest®
MATERIAL TESTING EQUIPMENT

SHEARTRONIC

Digital shear testing machine, with incorporated data acquisition system and pneumatic vertical loading device.

Triaxlab Automated System

Cyclic Triaxlab Automated System

Complete range of universal testing machines

BUYER'S GUIDE

The 10th Edition of Matest catalogue contains a wide range of products, accessories and spare parts which are all identified by a specific code number and divided in sections.

1 Section Color

Each section is identified by a letter and a color.

2 Standards

The most important International Standards referring to the product are mentioned.

3 Main Features

This box describes the product and its main characteristics. All dimensions and weights mentioned in this catalogue are approximate and do not bind Matest company.

4 Product Codes

All item's codes have an initial letter, corresponding to the specific section, and a progressive number which identifies each product.

5 Electrical Specifications

Voltage, Phase, Frequency and Wattage information are specified at the end of the product description. Special voltages and Hz versions are available on request and have to be specified with the following codes:

Single Phase Power Supply

STANDARD:	**230 V 50 Hz**		(e.g. code B014 Centrifuge 230 V 1ph 50 Hz)
SPECIAL:	**115 V 60 Hz**	You have to add the letter **"Y"** at the end of the code	(e.g. code B014Y Centrifuge 115 V 1ph 60 Hz)
SPECIAL:	**230 V 60 Hz**	You have to add the letter **"X"** at the end of the code	(e.g. code B014X Centrifuge 230 V 1ph 60 Hz)
SPECIAL:	**115 V 50 Hz**	You have to add the letter **"G"** at the end of the code	(e.g. code B014G Centrifuge 115 V 1ph 50 Hz)

Three Phase Power Supply

STANDARD:	**400 V 50 Hz**		(e.g. code C164 Mixer 400 V 3ph 50 Hz)
SPECIAL:	**230 V 60 Hz**	You have to add the letter **"K"** at the end of the code	(e.g. code C164K Mixer 230 V 3ph 60 Hz)

INDEX

SMARTLAB, THE REVOLUTION IN SOFTWARE

INNOVATIVE SOFTWARE PLATFORM

SmartLab is an innovative software platform developed by MATEST for remote control and data acquisition of construction materials testing instruments.

Main Features

Remotely accessible from any device

SmartLab is installed on a local laboratory PC that acts as a server and, via the internet, can be easily and fully utilised remotely from an unlimited number of devices, including tablets and smartphones. The lab technician can monitor the progress of the tests, start or stop the machines, share data, start processing, etc. The remote connection also allows them to share selected test information with their customers, e.g. load vs. time diagrams, start/stop times, etc., even while the test is running, making it extremely easy to track results.

ERP-READY. Compatible with LIMS/ERP management software

Each laboratory has its own LIMS/ERP management software, parameterised according to its needs. SmartLab is set up to communicate with any LIMS/ERP via a dedicated module called SmartLab Gateway and data can flow automatically from/to SmartLab, thus increasing efficiency and preventing transcription errors.

Simultaneous connection of machines

SmartLab can simultaneously connect and efficiently control dozens of machines, independent of each other, becoming the central processing unit for the entire laboratory. The network of Matest machines that can be connected to SmartLab is virtually unlimited: PC installation, LAN connections, and the availability of multiple test modules, always expanded and updated, make it easy and safe to create a centralised network. The efficiency of the laboratory will increase astonishingly.

High reliability and safety

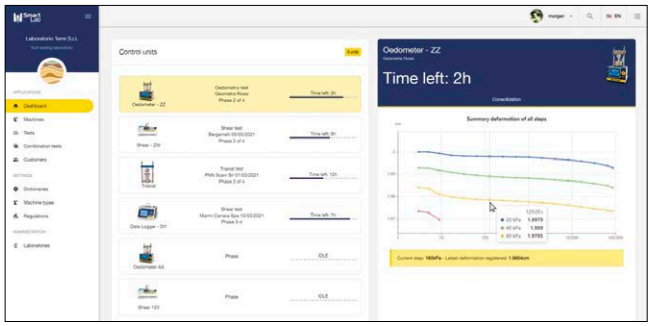
Data protection is guaranteed by strict access control and redundant data archiving. SmartLab is developed by experts, who are well aware of the increasing demand for data protection, so the archiving is particularly structured and the management of authorised login accounts adopts the latest security requirements.

Single screen with general overview

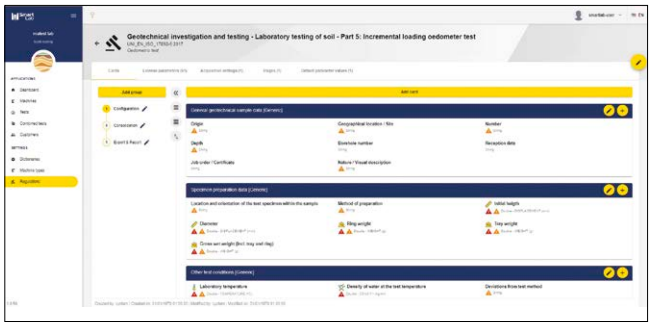
SmartLab's menus, screens and interface are extremely user-friendly and allow monitoring and access to all connected machines. Particular care has been taken to design a multi-level structure: a single general screen provides an ordered overview of all machines in the laboratory. Clicking on the individual machine gives access to very detailed and specific screens for each individual test. It is extremely easy to navigate between the many connected machines.

Secure and stable communications

We devised and implemented a completely new communication protocol, SmartLab MATWAY, to give SmartLab the ability to communicate with all Matest machines, operate them remotely, acquire data reliably, and closely monitor test execution. This protocol was validated after a series of rigorous tests under different conditions that proved its robustness/reliability.



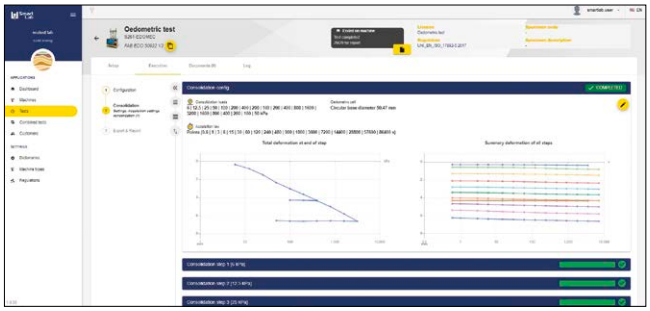
Dashboard



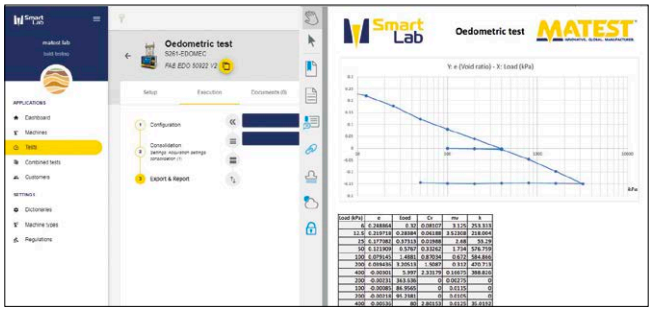
Sample configuration

Automatic compilation of test reports

SmartLab offers excellent reporting functions, including customisable test certificates, which are essential for a civil engineering laboratory. SmartLab offers a predefined report template according to standards, which assists the operator in interpreting the acquired data, while leaving the possibility to customise certain sections. The certificates are comprehensive, intuitive and easy to export.



Test results



Test report

One software for multiple tests

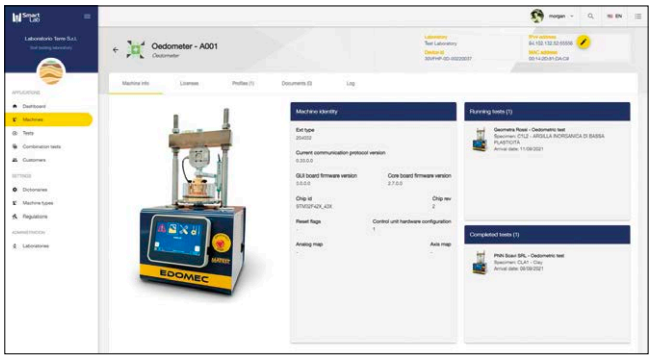
SmartLab was designed with a modular approach to allow each laboratory to configure the software to its specific needs.

The test modules are installed on a common platform and are grouped into three large groups:

- **SmartLab Soil**, includes modules for consolidation, triaxial, shear tests as well as data acquisition modules for general soil applications.
- **SmartLab Concrete**, includes several modules for compression/flexion/indirect traction tests, as well as advanced tests such as modulus of elasticity, displacement/energy absorption control, dynamic load application.
- **SmartLab Roads**, includes several modules for tests on asphalt and bitumen.

Below are the codes for each test module, compatible with the Cyber Plus Progress series.

CODE	DESCRIPTION
SSW-DAT	DATA ACQUISITION SOFTWARE
SSW-EDOM	SOFTWARE FOR MANUAL OEDOMETERS
SSW-EDOA	SOFTWARE FOR AUTOMATIC OEDOMETERS
SSW-SHEARM	SOFTWARE MANUAL SHEAR MACHINES
SSW-SHEARA	SOFTWARE AUTOMATIC SHEAR MACHINES
SSW-TRXM	SOFTWARE FOR TRIAXIAL TESTS
SSW-CEM1	SOFTWARE FOR COMPRESSION, FLEXURAL AND INDIRECT TENSILE TESTS ON CONCRETE AND CEMENT



SmartLab Soil

NEEDED ACCESSORIES

SSW-LINKA Unlock code for automatic instruments.

SSW-LINKM Unlock code for manual instruments.

ACCESSORIES

SSW-SMARLABPC High performance PC with SmartLab Software already installed.

Windows 11 64-bit: Home or Pro version 21H2 or higher, or Enterprise or Education version 21H2 or higher.

Windows 10 64-bit: Home or Pro 21H1 (build 19043) or higher, or Enterprise or Education 20H2 (build 19042) or higher.

SSW-GWAY SmartLab communication protocol for connection to LIMS and ERP


MATEST

SECTION A
AGGREGATES - ROCKS

Aggregates represent the main material used in the construction industry to produce concrete, bituminous conglomerates, plasters, road and railways subgrades, etc. International and EN European Standards require many tests on different aggregate properties, including mechanical, physical, geometrical, density, strength and degradability.
A special focus is placed on Rocks with the study of its mechanical characteristics, when subjected to stress conditions such as excavations, handlings, quarries and foundations.

GENERAL PURPOSE DRYING OVENS FORCED VENTILATION

A MORE UNIFORM TEMPERATURE WITH ON/OFF SWITCH OF THE FAN

Designed for drying, baking, conditioning and moisture determination. Sturdy manufacture, double walled with 60 mm thick glass fibre for thermal insulation.
Exterior front part is stainless steel made, while interior chamber, grid shelves and external walls are made of zinc coated steel.
Temperature from ambient to 200 °C is controlled by a **digital precision thermoregulator-indicator**. The ovens are equipped of a power switch industrial type, **dual safety thermostat** with higher thermic threshold to prevent accidental over-temperatures, and a solid-state relay (SSR) to ensure safe working conditions.
The oven is supplied complete with two grid shelves easily removable, which can be positioned at various heights, with pilot light, and exhaust holes for fast cooling.

Power supply: 230V 50-60Hz 1ph

A005-04 KIT

A005-04 KIT Detail of the fan

Model	Capacity litres	Inside dimensions mm L D H	Outside dimensions mm L D H	Doors n°	Wattage	Weight kg	Spare grid shelf
A007 *	50	350x360x390	590x460x620	1	750	34	**A006-01**
A005-01 KIT	100	400x420x600	680x685x790	1	1200	40	**A007-51**
A005-04 KIT	220	600x620x600	880x885x790	1	2000	60	**A007-52**
A005-08 KIT	440	900x690x820	1180x925x940	2	3600	85	**A007-53**

Note: ***A007** OVEN, 50 litres capacity is natural convection.

A005-08 KIT

ACCESSORY

A006-08 Mercury control thermometer 0-300 °C, div. 1 °C.

LABORATORY OVENS, FORCED VENTILATION, DIGITAL THERMOSTAT

HIGH TEMPERATURE UNIFORMITY AND PRECISION

STANDARDS: EN 932-5 I EN 1097-5 I BS 1924 :1
ASTM C127, C136, D558, D559, D560, D698, D1557, D1559

Especially suitable when high temperature uniformity and precision inside the chamber are required.
The temperature accuracy and uniformity meet the tolerances requested by the Standards.
The interior chamber, the grid shelves and the exterior front part are stainless steel made, while external walls are made of zinc coated steel.
Sturdy manufacture, double walled with 60 mm thick glass fibre for thermal insulation.
Temperature from ambient to 200 °C is controlled by a digital precision thermoregulator-indicator. The oven is equipped with a dual safety thermostat with higher thermic threshold to prevent accidental over-temperatures, and to ensure safe working conditions.
The oven is supplied complete with two grid shelves easily removable which can be positioned at various heights with pilot light and exhaust holes for fast cooling.

Power supply: 230V 50-60Hz 1ph

A008-07 KIT

Model	Capacity litres	Inside dimensions mm L D H	Outside dimensions mm L D H	Doors n°	Wattage	Weight kg	Spare grid shelf steel
A008-01 KIT	100	400x420x600	700x515x910	1	1250	45	**A008-51**
A008-03 KIT	220	600x610x600	900x725x910	1	2050	70	**A008-52**
A008-05 KIT	440	900x700x700	1250x760x1000	2	3700	95	**A008-53**
A008-07 KIT	750	900x640x1300	1250x700x1600	2	4950	140	**A008-54**

MAIN FEATURES

- Forced ventilation airflow.
- Digital temperature control system.
- Temperature precision and uniformity as requested by EN, BS Spec.
- Stainless steel chamber and trays.
- Insulation by 60 mm thick glass fibres.
- Dual thermostat ensuring safe working conditions.

A008-05 KIT

ACCESSORY

A006-08 MERCURY CONTROL THERMOMETER 0-300 °C div. 1 °C.

HIGH END LABORATORY OVENS. FORCED VENTILATION, DIGITAL THERMOSTAT

HIGH TEMPERATURE UNIFORMITY UP TO 300 °C

STANDARDS: EN 932-5 I EN 1097-5 I ASTM C127, C136, D558, D559, D560, D698, D1557, D1559 I BS 1377 :1, 1924 :1 I UNE 103300

NEW

A010-01

A010-02

Gasket detail

Fans detail

MAIN FEATURES

- Forced ventilation airflow.
- 300 °C maximum temperature.
- High temperature (uniformity ± 2% and precision ± 0.3 °C) fully compliant with Standards.
- Air outlet control by valves manually operated.
- Regulation of fan speed (0-100%).
- High quality thermoinsulation material.
- Double over heat protection system.
- Low power consumption.
- Stainless steel chamber and trays with silicone gasket.
- PID electronic regulator, double digital display.

This range of laboratory ovens is designed to perform demanding thermal treatment in compliance with Standards.
They are especially suitable when high temperature uniformity and precision inside the chamber are required.
A temperature accuracy of ± 0.3% and a uniformity of ± 2% make this oven the best on the market.
The interior chamber and the grid shelves are stainless steel made, while outside casing is in metal sheet, powder coated in gray.
A sturdy double walled structure with 60 mm thick rock wool (complete lack of asbestos) and silicone gasket assure a strong thermal insulation.
High-precision digital microprocessor temperature controllers fitted with self-tuning and manual PID setting allow a high temperature uniformity and accuracy reducing the energy consumption.
The oven is equipped with a thermomagnetic protection and OTP (over temperature protecion) to prevent accidental over-temperatures, and ensure safe working conditions.
The oven is supplied complete with two grid shelves easily removable and positionable at various heights, with a pilot light and exhaust holes for fast cooling.

Power supply: 230V 50Hz 1ph
400V 50Hz 3ph (for A010-02)

Model	Capacity litres	Inside dimensions mm L D H	Outside dimensions mm L D H	Doors number	Wattage kW	Weight kg	Spare grid shelf stainless steel
A010	120	550x400x580	750x780x880	1	2.2	70	**A010-11**
A010-01	220	730x500x620	930x880x915	1	4	102	**A010-12**
A010-02	420	1001x469x863	1248x890x1227	2	6.2	155	**A010-13**

A022
MUFFLE FURNACE 1100 °C

STANDARDS: EN 12697-1 clause C, EN 13108

Designed for high temperature heatings.
Structure composed of in sheet-steel, frontal furnace in diecasted steel to avoid the aggretion of the acid smokes. The thermic insulation in ceramic fibre avoids the smallest heating leakage saving energy accordingly. Electronic regulation of the temperature is obtained through a digital thermostat. This furnace is also used for the determination of residual mineral matter deriving the incineration of bituminous mixtures to (EN 12697-1 clause C Standard).
Max. temperature: 1100 °C
Chamber stability: ± 1 °C
Chamber uniformity: absolute
The chamber is made with refractory material and it is not suitable to test aggessive chemical samples.
Inside dimensions: 200 x 300 x (h) 140 mm
Useful volume: 8.4 litres
Outside dimensions: 500 x 700 x (h)650 mm

Power supply: 230V 1ph 50-60Hz 3.2kW
Weight: 60 kg approx.

A022-01: Identical to A022 but with max. temperature of 1200 °C

A024
CERAMIC FURNACE 1100 °C

STANDARDS: EN 196-2, 196-21, 459-2

Used to determine the loss on ignition of cement and lime; chloride, carbon dioxide, alkali content of cement.
Max. temperature: 1100 °C
Chamber stability: ± 1 °C
Chamber uniformity: absolute
The chamber, ceramic made, is resistant to aggressive chemical material samples.
Inside dimensions: 145 x 250 x (h) 100 mm
Useful volume: 3.6 litres
Outside dimensions: 400 x 580 x (h)540 mm

Power supply: 230V 1ph 50-60Hz 2kW
Weight: 35 kg approx.

A024-01: Identical to A024 but with max. temperature of 1200 °C

NEW

A024

NEW

A022

A023
MUFFLE FURNACE 1100 °C

This furnace is also suitable for the "Determination of resistance to thermal shock of aggregates according to EN 1367-5 Specification".
Max. temperature: 1100 °C
Chamber stability: ± 1 °C
Chamber uniformity: absolute
The chamber is made with refractory material and it is not suitable to test aggessive chemical samples.
Inside dimensions: 300 x 470 x (h) 180 mm
Useful volume: 25.4 litres
Outside dimensions: 580 x 920 x (h) 750 mm

Power supply: 230V 1ph 50-60Hz 5kW
Weight: 105 kg approx.

A023-01: Identical to A023 but with max. temperature of 1200 °C

NEW

A023-01

ACCESSORY for all Muffle Furnaces

A023-11 TEMPERATURE TO SET CYCLES PROGRAMMER.

CLIMATIC CABINETS

NEW

The climatic cabinet is available in two versions:

- **C313N** Temperature and humidity controlled from -30 to +70 °C and 20% to 95% respectively for testing concrete, cement, aggregates and many other applications.
- **C316N** Only temperature controlled from -30 to +70 °C for the determinations of the behavior and resultance to freezing and thawing of aggregates and different other applications on concrete and building materials.

MAIN FEATURES

- Real-Time display of temperature and humidity parameters.
- High quality thermal insulation material.
- Temperature control from -30 to +70 °C with high stability (± 0.15 °C).
- Humidity control from 20% to 95% with ± 5% stability and ± 1% accuracy (within temperature +10 to +70 °C).

C313N
TEMPERATURE AND HUMIDITY CONTROLLED CABINET 535 LITRES CAPACITY

STANDARDS: EN 196-1, EN 1367-1, EN 12390-9

Designed for all research and control laboratories to perform: cold and/or hot temperature measurement at controlled humidity conditions, any kind of freezing/thawing tests and accelerated curing tests. Used to cure concrete and cement specimens and analyze the behavior to freezing and thawing of aggregates and concrete.
Internal and external frame is made of stainless steel AISI 304.
Polyurethane insulation: 60 mm thick.
Internal ventilation.
Door with 180° opening angle, equipped magnetic gasket and integrated heater against freezing.
Shelves can be taken off and adjustable in height; adjustable feet.
Temperature and humidity sensors wall mounted inside cabinet
The cabinet is supplied with a two stage filter; mechanic and mixed ionic/cationic resins. It works with demineralized, softened waters, or tap water with hardness rate up to 300 ptm assuring an excellent functioning along the time.
Equipped with microprocessor temperature/humidity controller with integrated cycles multiple segments programmer.

- panel mount 144×130mm format
- 5" color graphic display
- 50 programs with 100 segments and real time clock
- Logging function with PC interface (optional)

Visual alarm for minimum and maximum temperature
Supplied complete with 3 adjustable shelves suitable to withstand weights up to 40 kg

Inside dimensions: 590x670x1360 mm
Overall dimensions: 710x820x2080 mm
Power supply: 230V 1ph 50-60Hz 2570W
Weight: 170 kg approx.

C313N

C313-01N
TEMPERATURE AND HUMIDITY CONTROLLED CABINET 1200 LITRES CAPACITY

Same as C313N model, but with an internal capacity of 1200 liters.
Internal ventilation. Door with 180° opening angle, equipped magnetic gasket and integrated heater against freezing.
Shelves can be taken off and adjustable in height; adjustable feet.
Temperature and humidity sensors wall mounted inside cabinet
Visual alarm for minimum and maximum temperature
Supplied complete with 6 adjustable shelves suitable to suitable to withstand weights up to 40kg.

Inside dimensions: 1300x670x1360 mm
Overall dimensions: 1500x820x2080 mm
Power supply: 230V 1ph 50-60Hz 2900W
Weight: 230 kg approx.

Note:
as far the C313N and C313-01N performances, the humidity range indicated in the product description may be narrower vs. the given interval depending on the selected temperature. Please contact our sales team to investigate the suitability for your requirements.

C316N
TEMPERATURE CONTROLLED CABINET
535 LITRES CAPACITY
STANDARDS: EN 1367-1

Technical specifications:
Same as mod. C313N, except for the humidity control that is not included.

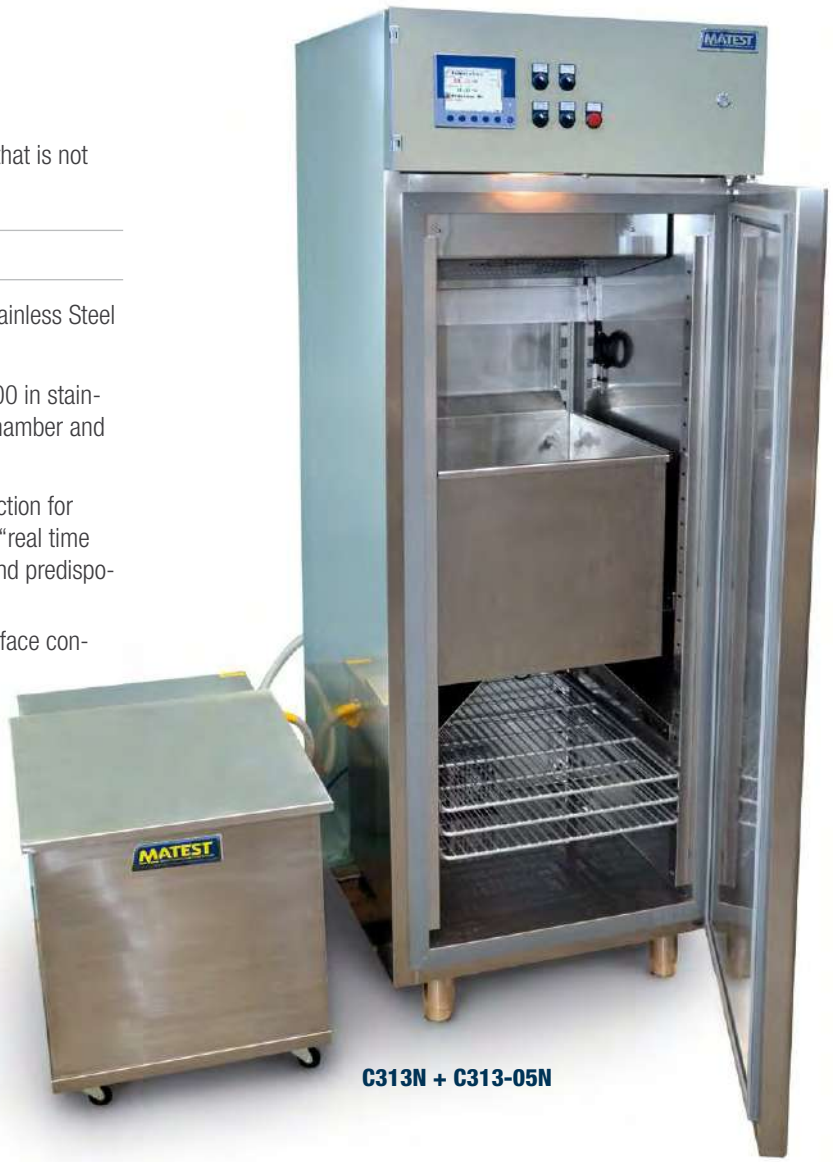
ACCESSORIES

C313-11N ADDITIONAL BASKET SHELVE : Made of Stainless Steel grid, suitable for loads up to 40 Kg.

C313-12N MOBILE TEMPERATURE PROBE: Type PT100 in stainless steel bulb for free positioning in the chamber and on the specimen.

C313-13N LOGGING FUNCTION: Logging upgrade function for on-board Jumo controller with enabling of "real time trend" and "Historical trend" of variables and predisposition of PC interface.

C313-15N PC INTERFACE: Consist of Cables, PC interface converter and Jumo software for editing and real-time view.



C313N + C313-05N

ADHESIVES FOR TILES NEW
DETERMINATION OF TENSILE ADHESION STRENGTH FOR CEMENTITIOUS ADHESIVES
STANDARDS: EN 1348 I EN 12004

C313-05N
INTERNAL FLOODING SYSTEM

Applicable only to temperature and humidity controlled cabinets C313N, C313-01N.
Used for the determination of tensile adhesion strength for cementitious adhesives.
It is composed of two stainless steel vessels and a discharging system for the water.
The system allows to empty and fill the inner vessel with water without opening the climatic cabinet.
Inner vessel water level is limited by a sensor.
Filling and drainage of water are regulated by a valve positioned on the bottom of both vessels.
Inner vessel volume is 150 l, while outer vessel volume is 170 l.
Water temperature range is from 10 °C to 40 °C, demineralized water must be used.
Temperature stability: ± 2 °C
Water pressure range is from 0.2 to 5 bar.
Flooding system can be installed also in C313 already supplied if returned in Matest factory.
System must work with no organic compounds.

Outer vessel dimensions:
816x588x600 mm
Weight: 50 kg approx.

Control panel


Two stage filter

A106T
MELTING POT NEW

Stainless steel cup with a capacity of approximately two litres, it is used to melt wax and other materials. Suitable also for general laboratory purposes.
Temperature range: from +45 °C to +320 °C
Capacity: 2 litres

Dimensions: 400x280x200(h) mm.
Power supply: 220V 50Hz 1ph 500W
Weight: 3.2 kg approx.

A106T

HOT PLATES, complete with thermoregulator

Power supply: 230V 1ph 50-60Hz

MODELS

V200	Round Ø 185 mm - 1500 W
V200-02	Round Ø 220 mm - 2000 W
B074	Round Ø 160 mm - 1000 W
V200-01N	Rectangular 200x300 mm - 1500 W
V200-03N	Square 380x380 mm - 2000 W
V200-05N	Rectangular 400x500 mm - 2000 W
V200-06N	Rectangular 400x600 mm - 2000 W

B073-01

B073-01
MAGNETIC STIRRER | HEATER

Used for titration and stirring of liquid and semi-solid materials.
Plate Ø 150 mm.
Electronic regulators for variable speed and temperature.
Supplied complete with magnetic teflon coated follower.

Power supply: 230V 1ph 50Hz 750W

A106
MELTING POT

Used to melt wax and other materials, it maintains heat from room temperature to max. 350 °C.
Complete with adjustable thermostat range +50 °C to +350 °C, accuracy ± 1.5 °C pilot lamp fully isolated to CE requirements.

Capacity: 5 litres
Internal dimensions: Ø 200x160 mm
Power supply: 230V 50-60Hz 1ph 800W
Weight: 3 kg

A106-01

A106

A106-01
MELTING POT NEW

Similar to the above A106 but with capacity of 12 litres.

Internal dimensions: Ø 270x200 mm
Power supply: 230V 50-60Hz 1ph 1400W
Weight: 8.2 kg approx.

ACCESSORY

V300-19 PARAFFIN WAX, for general laboratory use, having melting point at 50-54 °C. Pack of 5 kg

B074 **V200**

V200-05N

V200-01N

A009
MICROWAVE OVEN

Used for speed drying purposes, moisture determination and conditioning.

Power supply:
230V 50Hz 1ph 700W
Weight: 12 kg approx.

A009

A028
UNIVERSAL CARBIDE METER

For a rapid and accurate determination of moisture content in sand, gravel, aggregates, soil etc, based on the calcium carbide method.
It is possible to vary the sample weight from 3 to 100 g achieving a moisture range from 50% (3g) - 10% (20g) - 2% (100g).
The bottle is calibrated and equipped with a surface thermometer.
The glass ampoule containing the calcium carbide is broken when the bottle is closed and shaken, granting better accuracy to the test.
The instrument comprises the testing bottle with manometer, small balance, 25 ampoules of reagent, accessories, case.

Dimensions: 520x340x140 mm
Weight: 6 kg approx.

A028

A028 SP
UNIVERSAL CARBIDE METER

Same as mod. A028, but with a larger bottle suitable to use 20 g sample weight with a moisture content up to 20%.

A028-01
DIGITAL UNIVERSAL CARBIDE METER

Same as mod. A028, but with digital manometer for more accurate readings with pressure and temperature display.
Supplied complete.

A028-02
DIGITAL UNIVERSAL CARBIDE METER

Same as mod. A028-01, with protocol printer to obtain test certificate with up to 7 pressure / time logs.

Weight: 8 kg approx.

A028-02

A028-12
CALIBRATION KIT

For the universal carbide meters A028, complete with manometer and accessories.

SPARE

A028-11
Carbide Ampoules (pack of 100)

A028-11

SPEEDY MOISTURE TESTERS

For accurate moisture reading on field of soil, sand, aggregates. The test system uses the reaction between water and calcium carbide forming a gas. Complete with electronic balance, reagent tin, accessories; the whole contained in a portable moulded case.

MODELS

A025 KIT SPEEDY MOISTURE TESTER
6 GRAMS CAPACITY.
Moisture range: 0 - 20%
Weight: 6 kg approx.

A026 KIT SPEEDY MOISTURE TESTER
20 GRAMS CAPACITY.
Moisture range: 0 - 20%
Weight: 8 kg approx.

A025 KIT

SPARE

A027-01
Moisture tester reagent (one-pound tin)

ACCESSORY

A027-11
SPEEDY CALIBRATION KIT

A026 KIT

A028-01

A021-10N
MOISTURE, DIGITAL MICROWAVE PORTABLE METER

For an accurate, fast and easy determination of moisture content in sand, fine and coarse aggregates up to 25 mm diameter.
By using the latest microwave and microprocessor technology, and simply inserting the 5 prongs into the material to be measured, the unit displays the percentage of moisture content.

Measuring range: 0...20% with ± 0.2% accuracy.
Frequency: 50 MHz; USB data link; over 1000 readings storage.
Power: 2 AA batteries
Weight: 1800 g approx.

A021-10N

A021
MOISTURE METER MICROLANCE

This electronic tester directly measures and visualizes on the display the moisture percentage and temperature of sand and fine aggregates up to Ø 10 mm max by inserting the crucible tip. Suitable for both site and laboratory tests.

Moisture range: 0-35%, accuracy 0.5%
Measuring deep: 1000 mm
Temperature range: -20 °C to +60 °C accuracy 0.5 °C.
Battery: 4x1.5V AA cells
Dimensions: 120x120x1200 mm
Weight: 2 kg approx.


A021


A021 detail

A021-01
MOISTURE METER MICROLANCE

Similar to mod. A021, but with measuring deep up to 2000 mm.

Dimensions: 120x120x2200 mm
Weight: 3 kg approx.

A029
CHAPMAN FLASK

STANDARDS: ASTM C70
AASHTO T142

Used for field determination of the amount of surface moisture in fine aggregates. Graduated to 200 ml between the two bulbs and from 375 up to 450 ml above the second bulb.

Weight: 500 g

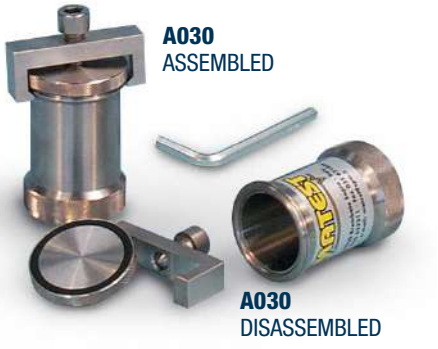

A029 **A039** **A035**

A030
REACTION CONTAINER

Standards: ASTM C289 | NF P94-048 | UNI 85209-22
UNI 8520-22

Used for the chemical determination of the potential reactivity of aggregates with alkalies in portland cement concrete.
Manufactured from stainless steel and fitted with an air-tight cover.
Capacity 60 ml approx.

Weight: 2 kg approx.


A030 ASSEMBLED

A030 DISASSEMBLED

DESICCATORS BOROSILICATE GLASS

Complete with perforated porcelain plate.

without vacuum		with vacuum	
A035	Ø 200 mm	**A039**	Ø 200 mm
A036	Ø. 250 mm	**A040**	Ø 250 mm
A036-01	Ø 300 mm	**A040-01**	Ø 300 mm

ACCESSORY

V300-15 DESICCATORS SALTS SILICA GEL BOX 1000 g

V023-01

V023-01
MOISTURE DETERMINATION BALANCE

See section " V " General Equipment p. 579

SAMPLE SPLITTERS (RIFFLE BOXES)

STANDARDS: EN 933-3 | ASTM C136, 702 | NF P18-553
UNI 8520 | AASHTO T27, T87
BS 812:1, 1377:2, 1924:1 | UNE 83120

Used for splitting materials such as aggregates, sand, gravel and similar into two representative portions. Painted or stainless steel made, they are supplied with two collecting pans.

A063

A062

Model	Material Steel	Slot width	Max. Size Sample mm	Slot Number	Weight kg	Spare collecting pan
A062	Stainless	1-4" - 6.3 mm	5	12	0.8	**A062-02**
A063	Stainless	1-2" - 12.7 mm	10	12	1.2	**A063-02**
A064	Painted	3-4" - 19 mm	13	12	11	**A064-02**
A065	"	1" - 25.4 mm	20	12	11	**A065-02**
A065-01	"	1 1-2" - 38 mm	25	8	11	**A065-02**
A065-03	"	= = - 45 mm	35	8	12	**A065-04**
A066	"	2" - 50.8 mm	40	8	13	**A066-02**
A067	"	2 1-2" - 63.5 mm	50	8	18	**A067-02**

A064 ... A067

A068
LARGE CAPACITY SAMPLE SPLITTER

STANDARDS: EN 933-3 | ASTM C136 | NF P18-553 | UNI 8520
AASHTO T27, T87 | BS 812:1, 1377:2, 1924:1
UNE 83120

Designed for the reduction of test samples which are too large in volume to be conveniently handled. Suitable for any material from sand sizes up to Ø 108 mm. Each chute bar is 12 mm wide to get openings of 12 - 24 - 36 - 48 - 60 - 72 - 84 - 96 - 108 mm. Complete with two collecting pans. Clam shell hopper: 30 litres capacity. Very sturdily constructed, it is totally galvanized for rust protection. **Weight:** 55 kg approx.

A068

NEW

A068-05

ACCESSORY

A068-05 SCOOP steel made to collect aggregates. Dimensions: 700x300x100 mm. Weight: 5 kg approx.

A068-11 WHEELS (Kit of 4) with brake for an easy displacement of the large splitter in the laboratory.

A068-11

SPARE

A068-01 Collecting pan for mod. A068

BULK DENSITY AND VOIDS MEASURES

STANDARDS: EN 1097:3 | ASTM C29-97 | BS 812
UNI 8520 :6 | ISO 6872 | CNR N. 62, 63, 64

Used to determine the loose bulk density and voids of aggregates. Stainless steel made, the 10, 20 and 50 litres models have handles.

A069-02

A069-01

A069 Measure 1 litre cap.
A069-01 Measure 5 litres cap.
A069-02 Measure 10 litres cap.
A069-03 Measure 20 litres cap.
A069-04 Measure 50 litres cap.

BAR (GRID) SIEVES

FOR AGGREGATE FLAKINESS INDEX AND PARTICLE SHAPE

STANDARDS: EN 933-3 | UNI 8520-18 | NF P18-561 | NLT 354

The frame is anodized aluminium made and the grids are **stainless steel rod bars having diameter from 5 to 15 mm** according to the slot widths.
Sieve sizes, slot width tolerances and rod bars diameter are checked one by one, and meet EN 933-3 Standard.
Each sieve is supplied complete with identification serial number label.

Sieve dimensions: 275x275x475 mm
Weight: 2 kg each sieve.

A048N KIT

Model	Slot width mm
A048-01	2.50
A048-02	3.15
A048-03	4.00
A048-04	5.00
A048-05	6.30
A048-06	8.00
A048-07	10.00

Model	Slot width mm
A048-08	12.50
A048-09	16.00
A048-10	20.00
A048-11	25.00
A048-12	31.50
A048-13	40.00
A048-17	50.00

A048N KIT COMPLETE SET of 14 bar sieves from 2.5 (A048-01) to 50 mm (A048-17) slot width.

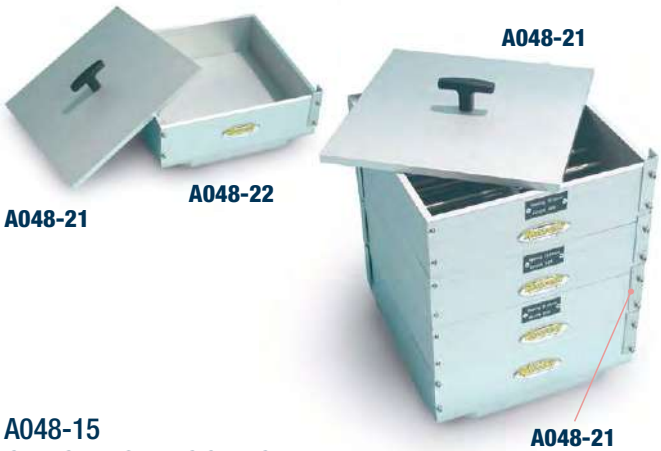
A048-14 BAR GRID SIEVE, slot width 9.5 mm. Used to check the wear of the spheres of the Micro-Deval having nominal size 10 mm.

ACCESSORIES for BAR (GRID) SIEVES

A048-20 KIT OF TWO DEVICES, anodized aluminium made, complete with stainless steel screws, to fix one bar sieve over another one, in order to get a cascade to be fitted on mechanical sieve shakers.

A048-21 COVER for Bar Sieves, anodized aluminium made.

A048-22 RECEIVER for Bar Sieves, anodized aluminium made, complete with coupling device to be fixed to the Matest shakers mod. A059-02 KIT | A059-03 KIT | A059-04 KIT A060-01



A048-15
GAUGE FOR AGGREGATE FLATNESS INDEX

STANDARD: UNI 8520 part. 18

Used to determine the volume of each circumscribed sphere.
Made of heavy brass sheet.

A048-15

FLAKINESS SIEVES

STANDARD: BS 812:105.1

Used to determine if aggregate is flaky; i.e. if thickness is less than 0.6 of nominal size. Manufactured from heavy steel sheet, they have dimensions as specified by Standards and are available in the following size openings:

Model	Slot width mm	Slot length mm
A049-01	4.9	30
A049-02	7.2	40
A049-03	10.2	50
A049-04	14.4	60
A049-05	19.7	80
A049-06	26.3	90
A049-07	33.9	100

A049 KIT

A049 KIT
COMPLETE SET of n°7 flakiness sieves.
Weight: 15 kg approx.

TEST SIEVES

STANDARDS: EN 933-2 | ISO 3310-1, ISO 3310-2, ISO 565 | ASTM E 11 | BS410 | NF X11-504 | UNI 2331, UNI 2333 | DIN 4187-1 | UNE 7050

All sieves are made with stainless steel woven wire and frame and meet International Specifications.
Perforated plates are made of tinned steel, both square and round holes.
The sieves are available in the following diameters: 200 - 250 - 300 - 315 - 400 - 450 mm and 8"-12".
Their apertures are clearly marked on the label, including the serial number for the identification and traceability of the sieve.
Each sieve is supplied complete with certificate of conformity.

HOW TO BUY WOVEN WIRE MESH SIEVES

STANDARDS: ISO 3310-1 | EN 933-2, | BS410 | UNE 7050
DIN 4187-1 | NF X11-504 | UNI 2331, 2333
ASTM E11

The available openings of the woven wire mesh sieves are listed in the next pages and are coded from n° 00 to 77.
The buyer has to add to this number:

A052-… for the frame Ø 200 mm
A051-… for the frame Ø 250 mm
A053-… for the frame Ø 300 mm
A054-… for the frame Ø 315 mm
A055-… for the frame Ø 400 mm
A050-… for the frame Ø 8"
A043-… for the frame Ø 12"

A052-...

Note: It is possible to test approx. 1000 g of material by using Ø 200 mm sieves; and 3000 g with Ø 300 mm sieves.

HOW TO BUY PERFORATED PLATE SIEVES

"Square Hole"

STANDARDS: EN 933-2 | ISO 3310-2 | BS 410 | DIN 4187-1

The available openings of the perforated plate square hole sieves are listed in the next page, and are coded from n° 01 to 37
The buyer has to add to this number:

A031-… for the frame Ø 200 mm
A032-… for the frame Ø 300 mm
A033-… for the frame Ø 400 mm

A031-...

A037-...

Note: EN 933-2 Standard specifies that "sieves with opening 4 mm and over shall be perforated plate square hole". Below 4 mm they shall be woven wire.

HOW TO BUY PERFORATED PLATE SIEVES

"Round Hole"

STANDARDS: UNI 2334

The available openings of the perforated plate round hole sieves are listed in the next page, and are coded from n° 01 to 38
The buyer has to add to this number:

A037-… for the frame Ø 200 mm
A038-… for the frame Ø 300 mm

TABLE OF THE WOVEN WIRE MESH SIEVES

STANDARDS: EN 933-2 | ISO 3310-1 | ASTM E11 | UNI 2331, UNI 2333 | UNE 7050 | BS 410 | DIN 4187-1 | NF X11-504

Aperture Size mm	ASTM Number	Frame Ø 200 mm	Frame Ø. 300 mm
0.020	635	**A052**	**A053**
0.025	500	**A052-00**	**A053-00**
0.038	400	**A052-01**	**A053-01**
0.040	-	**A052-02**	**A053-02**
0.045	325	**A052-03**	**A053-03**
0.050	-	**A052-04**	**A053-04**
0.053	270	**A052-05**	**A053-05**
0.063	230	**A052-06**	**A053-06**
0.075	200	**A052-07**	**A053-07**
0.080	-	**A052-08**	**A053-08**
0.090	170	**A052-09**	**A053-09**
0.100	-	**A052-10**	**A053-10**
0.106	140	**A052-11**	**A053-11**
0.125	120	**A052-12**	**A053-12**
0.150	100	**A052-13**	**A053-13**
0.160	-	**A052-14**	**A053-14**
0.180	80	**A052-15**	**A053-15**
0.200	-	**A052-16**	**A053-16**
0.212	70	**A052-17**	**A053-17**
0.250	60	**A052-18**	**A053-18**
0.300	50	**A052-19**	**A053-19**
0.315	-	**A052-20**	**A053-20**
0.355	45	**A052-22**	**A053-22**
0.400	-	**A052-23**	**A053-23**
0.425	40	**A052-24**	**A053-24**
0.500	35	**A052-25**	**A053-25**
0.600	30	**A052-26**	**A053-26**
0.630	-	**A052-27**	**A053-27**
0.710	25	**A052-28**	**A053-28**
0.800	-	**A052-29**	**A053-29**
0.850	20	**A052-30**	**A053-30**
1.000	18	**A052-31**	**A053-31**
1.180	16	**A052-32**	**A053-32**
1.250	-	**A052-33**	**A053-33**
1.400	14	**A052-34**	**A053-34**
1.600	-	**A052-35**	**A053-35**
1.700	12	**A052-36**	**A053-36**
2.000	10	**A052-37**	**A053-37**
2.360	8	**A052-38**	**A053-38**
2.500	-	**A052-39**	**A053-39**

Aperture Size mm	ASTM Number	Frame Ø 200 mm	Frame Ø 300 mm
2.800	7	**A052-40**	**A053-40**
3.150	-	**A052-41**	**A053-41**
3.350	6	**A052-42**	**A053-42**
4.000	5	**A052-43**	**A053-43**
4.750	4	**A052-44**	**A053-44**
5.000	-	**A052-45**	**A053-45**
5.600	3,5	**A052-46**	**A053-46**
6.300	1-4”	**A052-47**	**A053-47**
6.700	0.265”	**A052-48**	**A053-48**
7.100	-	**A052-49**	**A053-49**
8.000	5-16”	**A052-50**	**A053-50**
9.500	3-8”	**A052-51**	**A053-51**
10.0	-	**A052-52**	**A053-52**
11.2	7-16”	**A052-53**	**A053-53**
12.5	1-2”	**A052-54**	**A053-54**
13.2	0.530”	**A052-55**	**A053-55**
14.0	-	**A052-56**	**A053-56**
16.0	5-8”	**A052-57**	**A053-57**
19.0	3-4”	**A052-58**	**A053-58**
20.0	-	**A052-59**	**A053-59**
22.4	7-8”	**A052-60**	**A053-60**
25.0	-	**A052-61**	**A053-61**
25.4	1”	**A052-62**	**A053-62**
26.5	1.06”	**A052-63**	**A053-63**
28.0	-	**A052-64**	**A053-64**
31.5	1 1-4”	**A052-65**	**A053-65**
37.5	1 1-2”	**A052-66**	**A053-66**
40.0	-	**A052-67**	**A053-67**
45.0	1 3-4”	**A052-68**	**A053-68**
50.0	2”	**A052-69**	**A053-69**
53.0	2.12”	**A052-70**	**A053-70**
56.0	-	**A052-70S**	**A053-70S**
63.0	2 1-2”	**A052-71**	**A053-71**
75.0	3”	**A052-72**	**A053-72**
80.0	-	**A052-73**	**A053-73**
90.0	3 1-2”	**A052-74**	**A053-74**
100.0	4”	**A052-75**	**A053-75**
106.0	4.24”	**A052-76**	**A053-76**
125.0	5”	**A052-77**	**A053-77**

TABLE OF THE PERFORATED PLATE SIEVES, "SQUARE HOLES"

STANDARDS: ISO 3310-2 | EN 933-2 | BS 410 | DIN 4187-1

Aperture mm	Frame Ø 200 mm	Frame Ø 300 mm
4.00	**A031-01**	**A032-01**
4.75	**A031-02**	**A032-02**
5.00	**A031-03**	**A032-03**
5.60	**A031-04**	**A032-04**
6.30	**A031-05**	**A032-05**
6.70	**A031-06**	**A032-06**
7.10	**A031-07**	**A032-07**
8.00	**A031-08**	**A032-08**
9.00	**A031-34**	**A032-34**
9.50	**A031-09**	**A032-09**
10.00	**A031-10**	**A032-10**
11.20	**A031-11**	**A032-11**
12.50	**A031-12**	**A032-12**
13.20	**A031-13**	**A032-13**
14.00	**A031-14**	**A032-14**
16.00	**A031-15**	**A032-15**
18.00	**A031-35**	**A032-35**
19.00	**A031-16**	**A032-16**
20.00	**A031-17**	**A032-17**
22.40	**A031-18**	**A032-18**
25.00	**A031-19**	**A032-19**
26.50	**A031-20**	**A032-20**
28.00	**A031-21**	**A032-21**
31.50	**A031-22**	**A032-22**
37.50	**A031-23**	**A032-23**
40.00	**A031-33**	**A032-33**
45.00	**A031-24**	**A032-24**
50.00	**A031-25**	**A032-25**
53.00	**A031-26**	**A032-26**
56.00	**A031-36**	**A032-36**
63.00	**A031-27**	**A032-27**
75.00	**A031-28**	**A032-28**
80.00	**A031-37**	**A032-37**
90.00	**A031-29**	**A032-29**
100.00	**A031-30**	**A032-30**
106.00	**A031-31**	**A032-31**
125.00	**A031-32**	**A032-32**

TABLE OF THE PERFORATED PLATE SIEVES, "ROUND HOLES"

STANDARD: UNI 2334

Aperture mm	Frame Ø 200 mm	Frame Ø 300 mm
4.00	**A037-01**	**A038-01**
4.75	**A037-02**	**A038-02**
5.00	**A037-03**	**A038-03**
5.60	**A037-04**	**A038-04**
6.30	**A037-05**	**A038-05**
7.10	**A037-06**	**A038-06**
8.00	**A037-07**	**A038-07**
9.00	**A037-08**	**A038-08**
10.00	**A037-09**	**A038-09**
11.20	**A037-10**	**A038-10**
12.50	**A037-11**	**A038-11**
13.20	**A037-12**	**A038-12**
14.00	**A037-13**	**A038-13**
15.00	**A037-37**	**A038-37**
16.00	**A037-14**	**A038-14**
18.00	**A037-15**	**A038-15**
19.00	**A037-16**	**A038-16**
20.00	**A037-17**	**A038-17**
25.00	**A037-18**	**A038-18**
28.00	**A037-19**	**A038-19**
30.00	**A037-38**	**A038-38**
31.50	**A037-20**	**A038-20**
35.50	**A037-21**	**A038-21**
40.00	**A037-22**	**A038-22**
45.00	**A037-23**	**A038-23**
50.00	**A037-24**	**A038-24**
53.00	**A037-25**	**A038-25**
56.00	**A037-26**	**A038-26**
63.00	**A037-27**	**A038-27**
71.00	**A037-28**	**A038-28**
75.00	**A037-29**	**A038-29**
80.00	**A037-30**	**A038-30**
90.00	**A037-31**	**A038-31**
100.00	**A037-32**	**A038-32**
106.00	**A037-33**	**A038-33**
112.00	**A037-34**	**A038-34**
125.00	**A037-35**	**A038-35**

WET WASHING SIEVES

Used for wet testing of fine granuled materials.
Frame and woven wire cloth are stainless steel made.
Frame dimensions: Ø 200 mm by 100 or 200 mm height.

MODELS

A045 Cloth opening 0.074 mm by 200 mm height
A045-02 Cloth opening 0.063 mm by 200 mm height
A045-05 Cloth opening 0.074 mm by 100 mm height
A045-06 Cloth opening 0.063 mm by 100 mm height

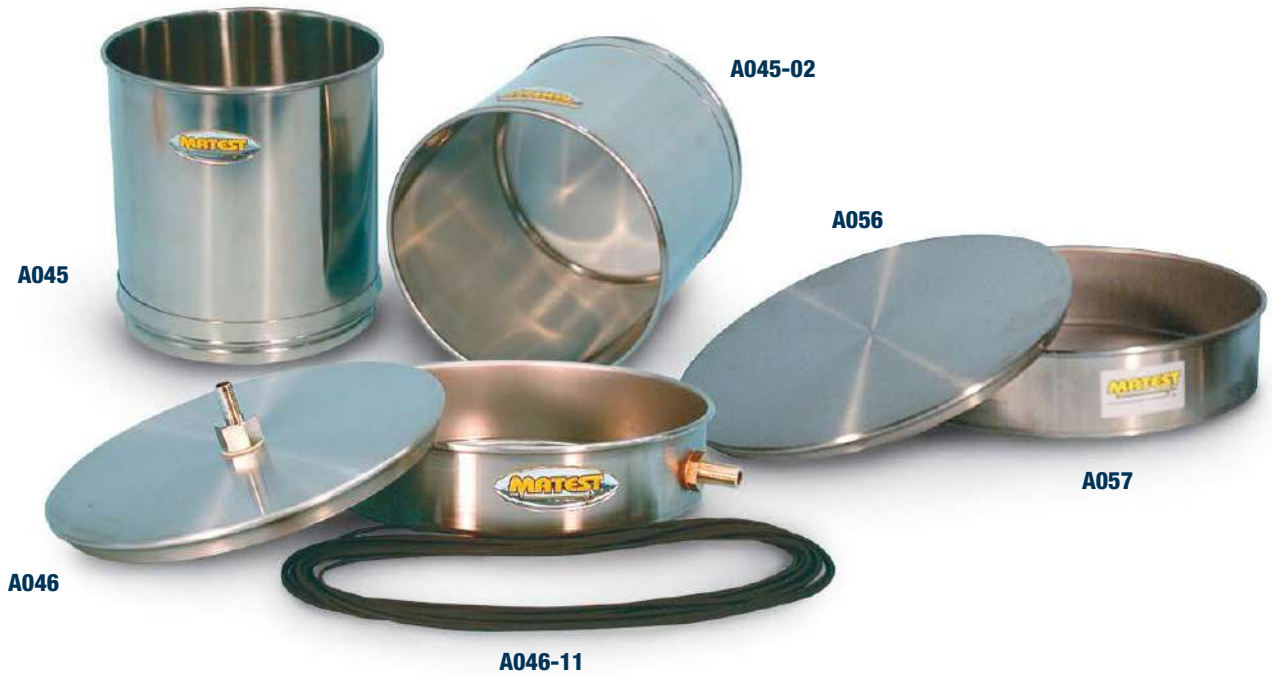
MODELS for ASTM E11 Standard

A045-07 Sieve Ø 8" by 4" height, opening 0.075 mm
A045-08 Sieve Ø 8" by 8" height, opening 0.075 mm

WET SIEVING PAN+LID STAINLESS STEEL

The water enters through the spray nozzle mounted on top of the lid and spill out of the pan with the finest granulated material.
Supplied complete with two watertight seals.

Model	Description	Set of 10 seals
A046	Pan + Lid, Ø 200 mm	A046-11
A046-02	Pan + Lid, Ø 8"	A046-11
A047	Pan + Lid, Ø 300 mm	A047-11
A047-02	Pan + Lid, Ø 400 mm	A047-12



	Ø 200 mm	Ø 300 mm	Ø 250 mm	Ø 315 mm	Ø 8"	Ø 450 mm	Ø 400 mm	Ø 12"
LID	A056	A056-01	A056-02	A056-03	A056-04	A056-05	A056-06	A056-07
RECEIVER	A057	A057-01	A057-02	A057-03	A057-04	A057-05	A057-06	A057-07

V179 Bristle brush, soft, Ø 35 mm
V179-02 Double ended, brass and nylon bristle
V179-03 Double ended soft/hard nylon
V179-05 Soft brush, Ø 3 mm BS 812
V179-06 Hard nylon sieve brush, flat 60 mm

A104N
ULTRASONIC CLEANSING BATH 10 LITRES

Used for a safe and valid cleaning of sieves and glassware, which could be damaged by ordinary cleaning methods.
It is particularly suitable for fine mesh sieves. The bath accepts sieves up to 200 mm and 8" diameter.
Supplied complete with timer 0 - 99 minutes.
Internal diameter: 260 mm, height 200 mm
Stainless steel made, with incorporated electronic generator, frequency 35 KHz.
Complete with lid and discharge cock.

Capacity: 7 litres
Power supply: 230V 50-60Hz 1ph 200W
Dimensions: 274x370 mm
Weight: 8 kg approx.

A104N

A104-01N

A104-01N
ULTRASONIC CLEANSING BATH 25 LITRES

Similar to mod. A104N but with inside dimensions: Ø 410x200 mm.
Ultrasonic frequence adjustable from 28 KHz to 40 KHz.
Water heating system, adjustable from ambient to +80 °C
It accept sieves up to 350 mm diameter.

Capacity: 25 litres
Power supply: 230V 50-60Hz 1ph 1700W
Dimensions: 510x510x450 mm
Weight: 35 kg approx.

ACCESSORY

A104-02 CLEANSING LIQUID for ultrasonic bath, 25 litre can.
A104-03 CLEANSING LIQUID for ultrasonic bath, 5 litre can.

A071-10
VOID CONTENT OF FINE AGGREGATE

NEW

STANDARDS: ASTM C1252 | AASHTO TP33

Used to determine the uncompacted void content of a fine aggregate sample. Indicates the angularity, spherically, and workability of fine aggregate in a mixture. Supplied complete.

Dimensions: 205x205x690 mm
Weight: 2 kg approx.

A071-10

A058-05N
AIR JET SIEVING MACHINE

STANDARD: EN 933-10

The Air Jet Machine is suitable for sieving powder and drying grain products in order to obtain sieving results between 5 to 4000 microns, through appropriate test sieves 200 mm diameter. Its working foundation is based on the use of air that tugs thin particles to make them pass through the sieve.

This effect is obtained with a vacuum machine that provokes a controlled decrease of pressure. It is equipped with an automatic cleaning system of the filter cartridge allowing **to perform many tests** (some tens) before being replaced.

The unit is supplied complete with aspirator device, plexiglass cover, filter cartridge, 5 collecting plastic bags, accessories.

Power supply: 230V 1ph 50-60Hz
Dimensions: 450x600x400 mm
Weight: 25 kg approx.

A058-06N
AIR JET SIEVING MACHINE

A version of air jet sieving machine with more basic model of aspirator device is also available, recommended for occasional usage only.

MAIN FEATURES

- Sieving time from 0 to 99 minutes.
- Vacuum range from 0 to 65 mbar.
- Adjustable calibration function.
- Sieving results from 5 to 4000 microns.
- Automatic cleaning system.

A058-14N

A058-15N

A058-05N with sieve

A058-53

SPARE

A058-14N Filter cartridge.

A058-15N Plastic bags (pack of 5 pcs).

TABLE OF THE SIEVES 200 MM DIAMETER FOR THE AIR JET SIEVING MACHINE

The frame is stainless steel made.

- Openings from 5 to 41 microns have **nylon mesh**
- Openings from 45 to 4000 microns have **stainless steel mesh**
- *The opening of 65 microns has **nylon mesh**

The sieves include airproof rubber seal.

A058-20...A058-96

Model	Aperture micron	Model	Aperture micron	Model	Aperture micron	Model	Aperture micron
A058-20	5	**A058-38**	71	**A058-65**	280	**A058-81**	1120
A058-21	10	**A058-50**	75	**A058-66**	300	**A058-82**	1180
A058-22	15	**A058-51**	80	**A058-67**	315	**A058-83**	1250
A058-23	20	**A058-52**	90	**A058-68**	355	**A058-84**	1400
A058-24	25	**A058-53**	100	**A058-69**	400	**A058-85**	1600
A058-25	28	**A058-54**	106	**A058-70**	425	**A058-86**	1700
A058-26	30	**A058-55**	112	**A058-71**	450	**A058-87**	1800
A058-27	37	**A058-56**	125	**A058-72**	500	**A058-88**	2000
A058-28	41	**A058-57**	140	**A058-73**	560	**A058-89**	2240
A058-97	45	**A058-58**	150	**A058-74**	600	**A058-90**	2360
A058-30	50	**A058-59**	160	**A058-75**	630	**A058-91**	2500
A058-31	53	**A058-60**	180	**A058-76**	710	**A058-92**	2800
A058-32	56	**A058-61**	200	**A058-77**	800	**A058-93**	3150
A058-35	63	**A058-62**	212	**A058-78**	850	**A058-94**	3350
A058-36*	65	**A058-63**	224	**A058-79**	900	**A058-95**	3550
A058-37	70	**A058-64**	250	**A058-80**	1000	**A058-96**	4000

ELECTROMAGNETIC SIEVE SHAKERS

STANDARDS: EN 932-5 I ISO 3310-1

These Sieve Shakers are activated by electromagnetic impulses and thanks to the triple vibrating action (vertical, lateral and rotational) they are recommended to perform sieving tests where high precision and performance are important, and where continual and intense uses are required. Therefore they are suggested for accurate sieving tests, on fine materials too.
These Electromagnetic Shakers are of simple and sturdy construction, they can hold up to 10 sieves and are also suitable for wet sieving tests (accessory mod. A046, A047).

Power supply: 230V 50Hz 1ph 450/750W

MAIN FEATURES

Triple vibrating action:

- Vertical
- Lateral
- Rotational

Digital microprocessor control panel can adjust:

- Timer 0-999 minutes
- Vibration intensity
- Continuous or intermittent vibrating action
- Pause between vibrations (indicated for fine material sieving)
- The control panel can be wall fixed or placed on a bench

A059-01 KIT

A059-02 KIT

Model	Dimensions sieves Ø	Dimensions mm	Weight kg
A059-01 KIT	200 mm - 8”	320x380x850	40 approx.
A059-02 KIT	200 - 250 - 300 - 315 mm - 8” - 12”	380x440x1080	65 ”
A059-03 KIT	200 - 250 - 300 - 315 - 350 - 400 mm - 8” - 12”	430x460x1150	80 ”
A059-04 KIT	200 - 250 - 300 - 315 - 400 - 450 mm - 8” - 12” - 18”	480x500x1150	85 ”

A059-03 KIT

A059-04 KIT

A058
NOISE REDUCTION CABINET

For the sieve shakers A059 serie and A060-01, lined internally with sound-proofing material for noise reduction in compliance with CE Directive.

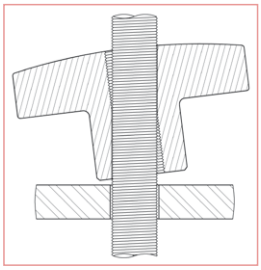
A058 + A059-03 KIT

A059-21

ACCESSORY

A059-21

KNOBS for fast clamping/release of the upper beam.
Useful for fast vertical displacement of the beam.
(Not usable with A059-01 KIT model)
Pack of 2 knobs with rods.



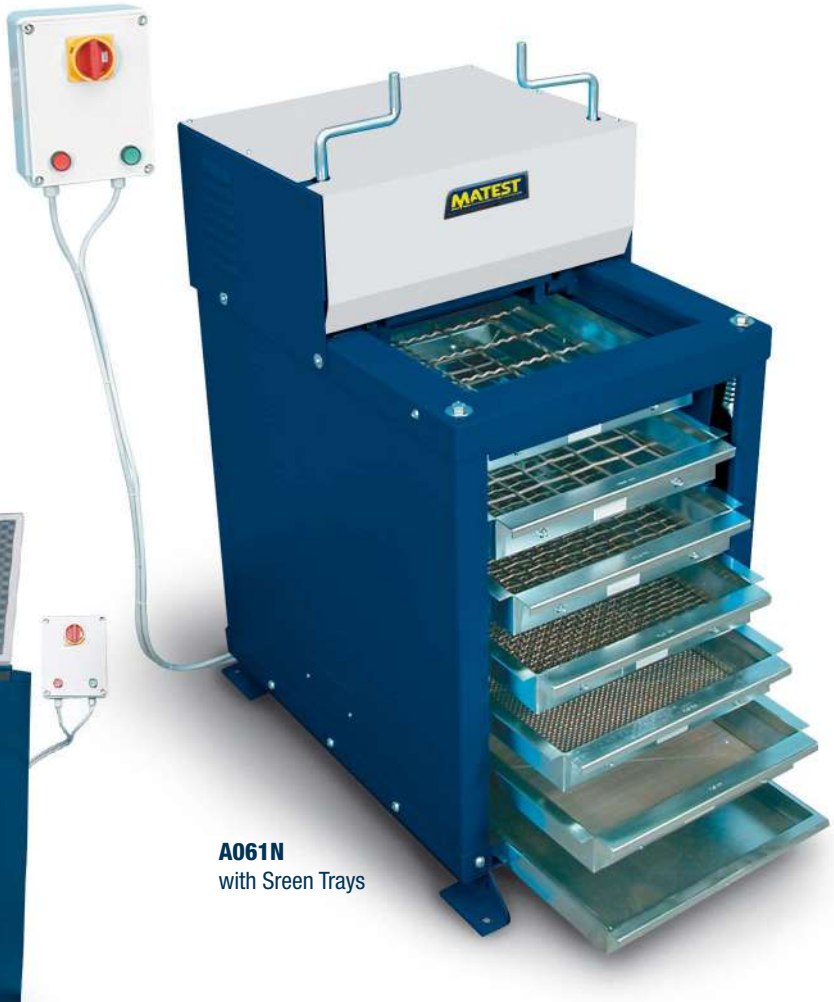
A059-21

A061N
HIGH CAPACITY SIEVE SHAKER

STANDARDS: EN 932-5 | ISO 3310-1

Designed for sieving considerable quantities of any material. The sieve shaker can hold six screen trays and dust pan. Supplied complete with dust pan, but **without** screen trays (to be ordered separately).
It cannot be sold in CE markets without protection (see accessories).

Power supply: 230V 50Hz 1ph 750W
Dimensions: 585x790x850 mm
Weight: 180 kg approx.



A061N
with Sreen Trays

A061N + A061-98

A061N + A061-97

ACCESSORIES

A061-97
SAFETY DOORS, upper and frontal, complete with microswitch, in compliance with to CE Safety Directive.
If the door is opened while the shaker is working, it automatically stops. The doors also protect from dust.

A061-98
SECURITY CABINET, steel made with microswitch, complying to CE Safety Directive, lined with sound-proofing material for noise reduction. If the door is opened while the shaker is working, it automatically stops.
The cabinet also protects from dust.
Overall dimensions: 920x1000x1400 mm

A061-03
TRAY ONLY, without mesh, size 457x660x75 mm, suitable for mesh openings from 125 to 6.3 mm.

A061-05
TRAY ONLY, without mesh, size 457x660x75 mm, suitable for mesh openings from 5.6 to 1 mm.

A061-06
TRAY ONLY, without mesh, size 457x660x75 mm, suitable for mesh openings from 0.850 to 0.063 mm.

SCREEN TRAYS FOR SIEVE SHAKER A061N, SIZE 457X660X75 MM, ROBUST STEEL GALVANIZED FRAME. STAINLESS STEEL WOVEN WIRE MESH.

STANDARDS: EN 933-2 | ASTM E11 | ISO 3310-1

Aperture size mm	ASTM number	Model
0.038	400	**A061-78**
0.045	325	**A061-79**
0.053	270	**A061-80**
0.063	230	**A061-81**
0.075	200	**A061-07**
0.080	-	**A061-08**
0.090	170	**A061-09**
0.100	-	**A061-10**
0.106	140	**A061-11**
0.125	120	**A061-12**
0.150	100	**A061-13**
0.160	-	**A061-14**
0.180	80	**A061-15**
0.200	-	**A061-16**
0.212	70	**A061-17**
0.250	60	**A061-18**
0.300	50	**A061-19**
0.315	-	**A061-20**
0.320	-	**A061-21**
0.355	45	**A061-22**
0.400	-	**A061-23**
0.425	40	**A061-24**
0.500	35	**A061-25**
0.600	30	**A061-26**
0.630	-	**A061-27**
0.710	25	**A061-28**

Aperture size mm	ASTM number	Model
0.800	-	**A061-29**
0.850	20	**A061-30**
1.000	18	**A061-31**
1.180	16	**A061-32**
1.25	-	**A061-33**
1.400	14	**A061-34**
1.600	-	**A061-35**
1.700	12	**A061-36**
2.000	10	**A061-37**
2.360	8	**A061-38**
2.500	-	**A061-39**
2.800	7	**A061-40**
3.150	-	**A061-41**
3.350	6	**A061-42**
4.000	5	**A061-43**
4.750	4	**A061-44**
5.000	-	**A061-45**
5.600	3.5	**A061-46**
6.300	1/4"	**A061-47**
6.700	0.265"	**A061-48**
7.100	-	**A061-49**
8.000	5/16"	**A061-50**
9.500	3/8"	**A061-51**
10.00	-	**A061-52**
11.20	7/16"	**A061-53**
12.50	½"	**A061-54**

Aperture size mm	ASTM number	Model
13.20	0.530"	**A061-55**
14.00	-	**A061-56**
16.00	5/8"	**A061-57**
19.00	¾"	**A061-58**
20.00	-	**A061-59**
22.40	7/8"	**A061-60**
25.00	-	**A061-61**
25.40	1"	**A061-62**
26.50	1.06"	**A061-63**
28.00	-	**A061-64**
31.50	1¼"	**A061-65**
37.50	1½"	**A061-66**
40.00	-	**A061-67**
45.00	1¾"	**A061-68**
50.00	2"	**A061-69**
53.00	2.12"	**A061-70**
56.00	-	**A061-70S**
63.00	2½"	**A061-71**
75.00	3"	**A061-72**
80.00	-	**A061-73**
90.00	3½"	**A061-74**
100.0	4"	**A061-75**
106.0	4.24"	**A061-76**
125.0	5"	**A061-77**

A061-96 SPARE collecting pan

SCREEN TRAYS WITH PERFORATED GALVANIZED PLATE, "SQUARE HOLES"

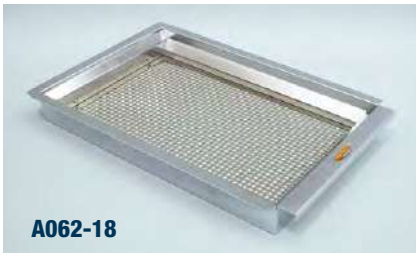
STANDARDS: EN 933-2 | ISO 3310-2

Aperture mm	Model
4.00	**A062-11**
4.75	**A062-12**
5.00	**A062-13**
5.60	**A062-14**
6.30	**A062-15**
6.70	**A062-16**
7.10	**A062-17**
8.00	**A062-18**
9.00	**A062-19**
9.50	**A062-20**
10.00	**A062-21**
11.20	**A062-22**
12.50	**A062-23**
13.20	**A062-24**
14.00	**A062-25**
16.00	**A062-26**
18.00	**A062-27**
19.00	**A062-29**

Aperture mm	Model
20.00	**A062-30**
22.40	**A062-31**
25.00	**A062-32**
26.50	**A062-33**
28.00	**A062-34**
31.50	**A062-35**
37.50	**A062-36**
40.00	**A062-37**
45.00	**A062-38**
50.00	**A062-39**

Aperture mm	Model
53.00	**A062-40**
56.00	**A062-41**
63.00	**A062-42**
75.00	**A062-43**
80.00	**A062-44**
90.00	**A062-45**
100.00	**A062-46**
106.00	**A062-47**
125.00	**A062-48**

A061-69



A062-18

A060-01
SIEVE SHAKER MOTOR OPERATED

It accepts sieves having diameter 200 - 250 - 300 - 315 mm, and 8"...12".
This simple and low cost Sieve Shaker is activated by an electric motor and can hold up to 8 Sieves Ø 200 mm or 7 Sieves Ø 300 mm plus pan and lid.
It is also possible to perform wet sieving tests (see accessories mod. A046 and A047)
Provided of timer 0 - 60 minutes.

Power supply: 230V 1ph 50Hz 110W
Dimensions: 350x400x950 mm
Weight: 24 kg approx.

CALIBRATION GLASS BEADS

Model	Ø range in mm of bead
A060-31	0.000 ... 0.050
A060-32	0.040 ... 0.070
A060-33	0.070 ... 0.110
A060-34	0.090 ... 0.150
A060-35	0.100 ... 0.200
A060-36	0.150 ... 0.250
A060-37	0.200 ... 0.300
A060-38	0.250 ... 0.500
A060-39	0.400 ... 0.600
A060-40	0.500 ... 0.750

Model	Ø range in mm of bead
A060-41	0.750 ... 1.000
A060-42	1.000 ... 1.250
A060-43	1.250 ... 1.550
A060-44	1.550 ... 1.850
A060-45	1.700 ... 2.000
A060-46	2.000 ... 2.400
A060-48	2.400 ... 2.900
A060-49	2.850 ... 3.300
A060-50	3.300 ... 3.600

Note: Cloth openings from 4 mm can be verified by using a precision vernier caliper.

A060-01

A058-01
SIEVE SHAKER HAND OPERATED FOR SIEVES Ø 200 MM AND 8"

Designed for tests on site or yard laboratory analysis when electricity is not available.
By rotating the crank, the shaker applies a vertical and rotational vibration action.
It can hold up to 6 sieves Ø 200 mm or 8" plus pan and lid.

Dimensions: 300x450x600 mm
Weight: 16 kg approx.

A058-01

GLASS MICROSPHERES WITH NIST CERTIFICATE FOR SIEVES CALIBRATION

The calibration of the sieves or the inspection of the wear conditions of the mesh can be performed by using glass microspheres.
These models are supplied with NIST Certificate (National Institute of Standard and Technology) in pack of 5 bottles.


A057-31... A057-44

Model	Sieve size (µm)	Weight per bottle (g)
A057-31	45	1
A057-32	63	1
A057-33	75	1
A057-34	90	1
A057-45	106	1
A057-35	125	1
A057-36	150	1.5
A057-37	250	2.5
A057-38	300	2.5
A057-39	425	2.5
A057-40	500	2.5
A057-41	600	2.5
A057-42	1000	7
A057-43	1180	10
A057-46	1600/1700	20
A057-44	2000	20

Other models for sieves sizes can be supplied upon request.

A070
FLAKINESS | THICKNESS GAUGE

STANDARD: BS 812:105.1

Suitable to verify if aggregate is flaky; i.e. if its thickness is less than 0.6 of its nominal size. Constructed of heavy gauge stainless steel sheet.

Weight: 600 g

A071

A070

A072

A071
LENGTH GAUGE

STANDARD: BS 812:105.1

Ideal to determine if aggregate is elongated; i.e. if length is more than 1.8 of nominal size. Mounted on a hardwood base.

Weight: 1 kg approx.

DETERMINATION OF THE LIGHTWEIGHT AGGREGATES CRUSHING RESISTANCE

STANDARD: EN 13055-1 method 1 and 2

MODELS

A081-01 METHOD 1

Apparatus for the determination of the crushing resistance of light-weight aggregates having diameter from 4 to 22 mm, and a volumic mass over 150kg/m^3. Composed of: upper and lower cylinder inside diameter 113 mm, ring with adjustable height, piston, base. Made of steel, plated against corrosion.

Dimensions: Ø 180 mm by 260 mm height
Weight: 15 kg approx.

A081-02 METHOD 2

Apparatus for the determination of the crushing resistance of lightweight aggregates having volumic mass lower than 150kg/m^3. Composed of: upper and lower cylinder inside diameter 76 mm, piston, base.
Made of steel, plated against corrosion.

Dimensions: Ø 100 mm by 200 mm height.
Weight: 6 kg approx.

Note: A Servoplus testing machine equipped with Servostrain (see p. 283) is needed to carry out this test.

A081-01

A072
SHAPE GAUGE - SHAPE INDEX

STANDARDS: EN 933-4, EN 933-5, EN 933-7
DIN 4226 | CNR N.95 | NLT 354

For measuring the length/thickness ratio of individual particles.

Weight: 500 g

A072-10
PROPORTIONAL CALIPER NEW

STANDARD: ASTM D4791

Used either for rapid determination of percentages of flat and elongated particles in coarse aggregate fractions of ⅜" (9.5 mm) or larger. Consisting of 8"x16" (203.2x406.4 mm) base plate with rubber feets, two fixed posts and a 12" (305 mm) pivoting arm, allowing ratios of 1:2, 1:3, 1:4, 1:5 to be obtained.

Weight: 3 kg approx.

A072-10

GEOMETRICAL PROPERTIES OF AGGREGATES
EFFLUX INDEX OF FINE AGGREGATES

STANDARDS: EN 933-6:2014 | NF P18-564 | CNR No. 113
ASTM C1252

A073N
EFFLUX INDEX APPARATUS NEW

Used to measure the efflux index of fine aggregates (shape and angularity). The efflux index of an aggregate is the required time in seconds of a known volume of aggregates to flow from a known opening.
The unit is basically formed by aluminium body, Ø 90 mm by 125 mm height, aluminium feed hopper Ø 100 mm by 170 mm height, control shutter, polycarbonate funnel having 85 mm height, 60° conical part, which end has Ø 12 mm, base support, valve, decanter.

Dimensions: 200x240x600 mm
Weight: 8 kg approx.

A073N

A075N
LOS ANGELES ABRASION MACHINE
DETERMINATION OF RESISTANCE TO FRAGMENTATION

STANDARDS: EN1097-2 | ASTM C131 | UNI 8520-19 | EN 12697-17 | EN 12697-43 | NF P18-573 | AASHTO T96 | CNR N° 34

Used to determine the resistance of aggregates to abrasion.
It comprises a heavy steel cylinder of 711 mm inside diameter x 508 mm inside length, mounted on a base frame.
The cylinder rotates at a speed of between 31 and 33 rpm.
The machine is fitted with an automatic digital counter which can be preset to the required number of revolutions of the drum.
The cylinder is counterbalanced so that the filling opening stays in position without tilting;
a push-button allows to position such opening for the loading/unloading operations.
The control panel can be wall fixed or placed on a bench.
Supplied **without** abrasive charges which have to be ordered separately according to the requested Standards. It cannot be sold on the CE markets without its protections (see accessories).

Power supply: 230V 50Hz 1ph 750W
Dimensions: 1000x800x1000 mm
Weight: 370 kg approx.

A075N

NEEDED ACCESSORY

A076-01 SET OF 12 ABRASIVE CHARGES, conforming to ASTM AASHTO | CNR | UNI | UNE | NLT Standards.

or:

A076-02 SET OF 12 ABRASIVE CHARGES, conforming to EN | NF Standards.


A075N + A075-12

UPGRADING ACCESSORIES

A075-11
SECURITY CABINET, manufactured from sheet steel, conforming to CE Safety Directive.
When opening the cabinet door during Los Angeles working, a microswitch automatically stops the rotation of the drum.

Dimensions: 980x1070x1190 mm
Weight: 150 kg approx.


A076-01

A076-11

A075-12
SECURITY CABINET, manufactured from sheet steel, internally lined with sound-proofing material for noise reduction, conforming to CE Safety Directive.
When opening the cabinet's door during Los Angeles working, a microswitch automatically stops the rotation of the drum.

Dimensions: 980x1070x1190 mm
Weight: 160 kg approx.

A076-11
DEVICE for an easy and fast clamping of the table to the drum.

A079
DEVAL TESTING MACHINE

STANDARDS: NF P18-577 | ASTM D2-33

Used to determine the quality of aggregates to abrasion both by dry and wet procedure. The machine essentially comprises a steel frame on which two cylinders are mounted. The machine is supplied complete with a separate control panel fitted with a digital automatic revolution counter and two collecting pans.
It cannot be sold on CE markets without security cabinet (see mod. A079-02).

Power supply: 230V 50Hz 1ph 750W
Dimensions: 1500x520x1280 mm
Weight: 140 kg approx.

A079

A079-02
DEVAL TESTING MACHINE

Same as mod. A079, but equipped with a security cabinet, manufactured from sheet steel, lined with sound-proofing material for noise reduction, conforming to CE Safety Directive.
When opening the cabinet door during Deval working, a microswitch automatically stops the machine.

Dimensions: 1650x650x1400 mm
Weight: 180 kg approx.

A079-02

A087

A080 KIT

A087
SCRATCH HARDNESS TEST APPARATUS

This device is used to determine the quantity of soft particles in coarse aggregates.
The apparatus consists of a metal sliding rod ended with a round point of 1.6 mm diameter, mounted in a suitable frame.
A load of 8.9 ± 0.4 N is applied to the test sample.

Dimensions: 160x200x350 mm
Weight: 8 kg approx.

AGGREGATE IMPACT VALUE APPARATUS

STANDARDS: BS 812 | NF P18-574

Used to determine the impact value of aggregates and select them for a given application. The machine has a trip-action hammer release, blow counter device and a built-in operator safety device. Manufactured in heavy duty form with hardened steel surfaces for minimum wear. The complete assembly is cadmium plated for corrosion protection.

Dimensions: 445x300x880 mm
Weight: 60 kg approx.

THE APPARATUS IS AVAILABLE IN TWO VERSIONS:
- one meeting BS812 Standard
- one meeting NF P18-574 Standard

A080KIT
AGGREGATE IMPACT VALUE APPARATUS. BS 812

Consisting of:
A080-04 TEST FRAME ASSEMBLY
A080-02 CYLINDRICAL MOULD, Ø 102x50 mm, cylindrical measure Ø 75x50 mm, tamping rod.

A080-01KIT
AGGREGATE IMPACT VALUE APPARATUS. NF P18-574

Consisting of:
A080-04 TEST FRAME ASSEMBLY
A080-03 CYLINDRICAL MOULD, Ø 102x52 mm.

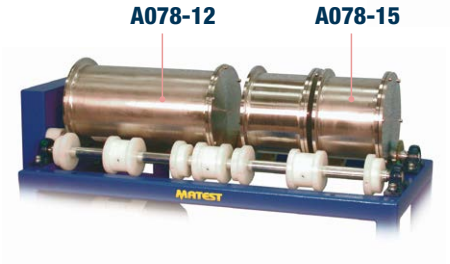
A077
MICRO-DEVAL TESTING MACHINE
DETERMINATION OF THE RESISTANCE TO WEAR

STANDARDS: EN 1097-1 | EN 13450 | **ASTM D6928**
ASTM D7428 | NF P18-576 | CNR N° 109

Used to determine the resistance of aggregates to abrasion.
The machine essentially comprises a heavy steel frame on which the following stainless steel cylinders can be mounted:
The Micro-Deval is supplied complete with separate control panel fitted with a digital automatic revolutions counter.
The control panel can be wall fixed or placed on a bench.
Supplied **without** stainless steel cylinders and without stainless steel spheres which have to be ordered separately (see needed accessories).
It cannot be sold on CE markets **without** security cabinet (see mod. A077-01)

Power supply: 230V 50Hz 1ph 1100W
Dimensions: 1000x450x920 mm
Weight: 150 kg approx.

A077 + A078-17



A077-01
MICRO-DEVAL TESTING MACHINE

Same as mod. A077, but equipped with a security cabinet, Manufactured from sheet steel, lined with sound-proofing material for noise reduction, conforming to CE Safety Directive.
When opening the cabinet's door during Micro-Deval working, a microswitch automatically stops the rotation of the cylinders.

Dimensions: 1150x600x1150 mm
Weight: 190 kg approx.

NEEDED ACCESSORIES ACCORDING TO EN STANDARD

A078-15 CYLINDER, standard, stainless steel, Ø 200 mm x 154 mm length (up to 4) EN 1097-1

A078-11N SPHERES, stainless steel Ø 10 mm **tolerance 0.05 mm** Pack of 20 kg EN 1097-1

NEEDED ACCESSORIES ACCORDING TO ASTM STANDARD

A078-17 CYLINDER, standard, stainless steel
NEW
Ext. diameter within 194 and 202 mm
Int. height within 170 and 177 mm
(up to 4) ASTM D6928/D7428

A078-02 SPHERES, stainless steel Ø 9.5 mm **tolerance 0.5 mm** Pack of 5.5 kg ASTM D6928/D7428


A078-11N + A048-14

UPGRADING ACCESSORIES

A078-12 CYLINDER, stainless steel, Ø 200 mm x 400 length. Conforming to EN 13450

A078-13 SPHERES, stainless steel, Ø 30 mm Pack of 12 pieces. NF P18-576

A078-14 SPHERES, stainless steel, Ø 18 mm Pack of 52 pieces. NF P18-576

A078-16 CYLINDER, "HIGH PERFORMANCE" stainless steel Ø 200 mm x 154 mm length EN 1097-1

A048-14 BAR GRID SIEVE, sloth width 9.5 mm Used to check the wear of the spheres of the having the Micro-Deval having nominal size of 10 mm

A078-03 MAGNET to remove abrasive charges.

A077-01 + A078-17

A078
MICRO-DEVAL APPARATUS NEW

STANDARDS: ASTM D6928, D7428 | AASHTO T237 | TEXAS 845-49-40 | ONTARIO LS-618

Used to determine the abrasion resistance and durability of mineral aggregates.
An aggregate sample is placed in a sealed stainless steel jar with an abrasive charge of up to 5000g of 9.5 mm diameter stainless steel balls and water, then rotated at 100 rpm for 2 hours. Percentage loss in gradation results at completion determines aggregate quality.
The machine has a sophisticated electronic controller with dedicated sensors to precisely track test time, total revolutions and rpm of jars; total revolutions are used to control test duration and jars stop within a fraction of one revolution at test termination.
Sample jars revolve protected by a polycarbonate door foreseen of safety interlocks. No moving parts are exposed to the user during test. A verification of machine performance may be given by both jar revolution and speed data.
The Micro-Deval is constituted of a sturdy steel frame which can receive 2 stainless jars together.
The jars are made of stainless steel with diameter and height according to standards (diameter within 194 and 202 mm and height within 170 and 177 mm) and are complete with cover and locking device.
An electric thermally protected motor, thanks to a mechanical transmission, supplies power to the rubber-covered rollers which move the jars.
The unit comes with 2 jars and 2 sets of abrasive charges, 5500 g.
After test completion, the worker can easily remove the abrasive charge thanks to the assistance of a magnet.

Power supply: 230V 1ph 50Hz 750W
(Available in 110V 60Hz with reference code: A078Y)
Dimensions: 570x340x1000 mm
Weight: 110 kg approx.

Closed

A078-01

Open

A078-02

A078

SPARES

A078-01 Jar with cover and locking stirrup, 5L
A078-02 Abrasive charges, 5500 g
A078-03 Magnet to remove abrasive charges

S158 KIT
SAND EQUIVALENT TEST SET

STANDARDS: ASTM D2419 | AASHTO T176

This complete set comprises:

S158-01N Plexiglass measuring cylinder engraved at 100 and 380 mm, with transparent adhesive label, graduated in mm and inch (5 pieces)
S158-02 Rubber stopper for cylinder (2 pieces)
V176-02 Graduated rule 500 mm, stainless steel
V136-01 Funnel, wide mouth
S158-04N Measuring can 85 ml capacity
V121 Plastic bottle, 5 litre capacity
S158-06 Irrigator tube with stopcock and syphon assembly
S158-07N Weighted foot assembly for sand level
A052-44 Sieve, Ø 200 mm, opening 4.75 mm
S158-09 Concentrated stock solution, 1000 ml
V170 Stop watch, digital
S158-11 Clamp stand set to hold the syphon assembly with bottle
S158-12 Portable carrying case, dimensions: 550x250x400 mm

Total Weight: 18 kg approx.

S158 KIT / S158-20 KIT

S158-20 KIT
SAND EQUIVALENT TEST SET (COMPLETE)

STANDARDS: EN 933-8 | NF XP18-598 | UNI 8520-15 | UNE 83131

The set is identical to mod. S158 KIT except for:

S158-03N Plexiglass measuring cylinder, engraved at 100 and 380 mm.
S158-05 Mesuring can 200 ml capacity
S158-13 Weighted foot assembly for sand level
A052-37 Sieve Ø 200 mm, opening 2 mm
S158-10 Irrigator tube with stopcock and syphon assembly

Note: each item can be ordered separately.

S159-01 KIT
SAND EQUIVALENT TEST SET (SIMPLE)

STANDARDS: EN 933-8 | NF XP18-598 | UNI 8520-15 | UNE 83131

The set comprises:

S158-03N Plexiglass measuring cylinder engraved at 100 and 380 mm (4 pieces)
S158-02 Rubber stopper for cylinder (2 pieces)
V176-02 Graduated rule 500 mm, stainless steel
V136-01 Funnel, wide mouth
S158-05 Measuring can 200 ml capacity
V121 Plastic bottle 5 litres capacity
S158-10 Irrigator tube with stopcock and syphon assembly
S158-13 Weighted foot assembly for sand level
S158-09 Concentrated stock solution, 1000 ml

Total Weight: 5 kg approx.

S159-11

S159-01 KIT

S159 KIT
SAND EQUIVALENT TEST SET (SIMPLE)

STANDARDS: ASTM D2419 | AASHTO T176

The set is identical to mod. S159-01 KIT except for:

S158-01N Plexiglass measuring cylinder, engraved at 100 and 380 mm, with transparent adhesive label, graduated in mm and inch.
S158-04N Mesuring can 85 ml capacity
S158-07N Weighted foot assembly for sand level
S158-06 Irrigator tube with stopcock and syphon assembly

ACCESSORIES

S158-08 METALLIC FUNNEL, conforming to EN, NF, UNI Specifications.
S159-11 CARRYING CASE, plastic, housing S159KIT or S159-01KIT, except the bottle V121.

S158-08

Note: each item can be ordered separately.

MEASURING CYLINDERS

Available Models :

S158-01N

STANDARDS: ASTM D2419 I AASHTO T176
PLEXIGLASS MEASURING CYLINDER, engraved at 100 and 380 mm, with transparent adhesive label graduated in mm and inches.

AS ALTERNATIVE:

S158-01GN

STANDARDS: ASTM D2419 I AASHTO T176
PLEXIGLASS MEASURING CYLINDER, engraved at 100 and 380 mm with additional **engraved scale from 0 to 380 mm**

S158-03N

STANDARDS: EN 933-8 I NF XP18-598
PLEXIGLASS MEASURING CYLINDER, engraved at 100 and 380 mm

S158-03N **S158-01GN** **S158-01N**

S160 N
MOTORIZED SAND EQUIVALENT SHAKER

STANDARDS: EN 933-8 I ASTM D2419 I AASHTO T176
NF XP18-598 I UNE 83131 I CNR N.27 I UNI 8520-15

The unit provides a constant uniform shaking with automatic cycle test. Oscillating excursion is 203 mm at 175...180 adjustable strokes/min. rate. Complete with digital timer that automatically stops the shaker at the end of the test. It cannot be sold in CE markets without security cabinet (see model S160-01 N)

Power supply: 230V 1ph 50Hz 250W
Dimensions: 700x360x350 mm
Weight: 30 kg approx.

S160N + S158-03N + S158-02

S161
SAND EQUIVALENT SHAKER HAND OPERATED

STANDARDS: EN 933-8 I ASTM D2419 I NF XP18-598
AASHTO T176 I UNI 8520-15 I UNE 83131

Hand operated working through handwheel.
Complete with mechanical strokes counter.

Dimensions: 700x350x420 mm approx.
Weight: 20 kg approx.

S161

S160-01N
MOTORIZED SAND EQUIVALENT SHAKER

Same as S160N, but equipped with steel Security Cabinet, conforming to CE Safety Directive. When opening cabinet's door during shaker working, a microswitch automatically stops the machine.

S160-01N + S158-03N + S158-02

ASSESSMENT OF FINES

GRADING OF FILLERS

STANDARD: EN 933-10

A058-05N
AIL JET SIEVE SHAKER

Suitable for sieving powder and dry grain products up to 5 microns.
Technical details: see p. 38

A058-05N

S157 KIT
BLUE METHYLENE TEST SET
ASSESSMENT OF FINES AGGREGATES

STANDARDS: EN 933-9 | NF P94-068 | UNI 8520-15 | UNE 83180

Utilized to determine the clay content in the fine portions of the aggregates. The set comprises:

S157-01 Electric stirrer adjustable from 400 to 700 rpm, complete with Ø 70 mm propeller. 230V 1ph 50Hz
S157-06 Support base for stirrer
S157-02 Burette 50 x 0.1 ml with stopcock
S157-07 Support base for burette
S157-08 Pan 200x150x80 mm
S157-03 Filter paper Ø 90 mm (pack of 100)
S157-04 Glass rod Ø 8x300 mm
S157-05 2000 ml capacity plastic beaker
V300-28 Methylene blue, 100 g
V300-29 Kaolinite, 500 g

Total Weight: 10 kg approx.

Note: Each item can be ordered separately.

ACCESSORY

S157-10 AUTOMATIC DISPENSER, 0-10 ml x 0.1 ml grad. Capacity 1000 ml
(as an alternative to the Burette S157-02+S157-07)

S157-20
AUTOMATIC METHYLENE BLUE TESTER

This instrument determines automatically the quantity of clay in sand. It grants accurate and repeatable test results, saving a lot of time (approx. 30 minutes each test).
The apparatus is composed by: precision pump, colorimeter, control unit, filters, liquids, powder, accessories.

Power supply: 230V 1ph 50Hz
Dimensions: 300x400x350 mm
Weight: 10 kg approx.


S157-20

B022T
BOTTLE-ROLLER WITH VARIABLE SPEED NEW

Suitable for mixing of liquids and, using the special jar, for grinding small specimens. Metal frame and rollers covered in rubber (second roller can be placed in various positions in order to accept different size bottles). 0,5 HP engine.
Variable roller speed: 0-95 rpm.

Power supply: 220V 1F 50Hz
Dimensions: 640x350x140 mm
Weight: 20 kg approx.

B022T

B022ST
BOTTLE ROLLER WITH FIX SPEED NEW

Same model as B022T, but with fix speed of the driving roller at 73 rpm.

B022 SP
BOTTLE ROLLER
DETERMINATION OF CLAY, SILT AND DUST IN FINE AND COARSE AGGREGATES TO BS SEDIMENTATION METHOD

STANDARDS: BS 812 | ASTM C117
To rotate one up to three bottles or jars simultaneously about their longitudinal axis with rotation speed, adjustable from 0 up to 85 rpm
Supplied complete with timer 0-99 hours

Power supply: 230V 50-60Hz 1ph
Dimensions: 385x295x160 mm
Weight: 10 kg approx.


S132-03
B022 SP

ACCESSORY

S132-03 BOTTLE, pyrex glass, 1 litre capacity, with airtight stopper.

S144
ANDREASEN PIPETTE,

25 ml capacity, glass made, used for an accurate and precise extraction of suspension material for analysis.

S144-01
PIPETTE STAND,

to accurately raise and lower the Andreasen pipette with no transmission of vibrations.

Weight: 10 kg approx.

A124
FILLER COMPACTION APPARATUS
DETERMINATION OF THE VOIDS CONTENT OF DRY COMPACTED FILLER.

STANDARDS: EN 1097-4 comparable to BS 812 | CNR N° 123 NLT 177

The apparatus consists of:
cylinder with an inside diameter of 25.4 mm; plunger freely sliding into the cylinder with max. lateral play of 0.20 ± 0.05 mm; four columns and metallic base holding the whole.
To perform the test a measuring device (vernier caliper with 0.01 mm accuracy) is required: see accessory.

Weight: 4 kg approx.

ACCESSORIES

A124-01 FILTER PAPER Ø 25 mm (pack of 100).

V175-03 DIGITAL VERNIER CALIPER 0 - 150 mm x 0.01 mm sens.

A084
SIPHON CAN APPARATUS

STANDARD: BS 812 - part 2

Used to determine the moisture content at known conditions.
Supplied complete with measuring cylinder, rubber pipes fitted with screw clips, stirring rod.

Weight: 5 kg approx.

A082
AGGREGATE CRUSHING VALUE APPARATUS
DIAMETER 150 MM

STANDARD: comparable to BS 812:110

Comprising 150 mm nominal diameter steel cylinder, plunger, base plate, tamping rod and measure 115 mm diameter x 180 mm deep.
Used for aggregate passing 12.7 mm and retained by 9.52 mm sieve.
The complete assembly is cadmium plated for corrosion protection.

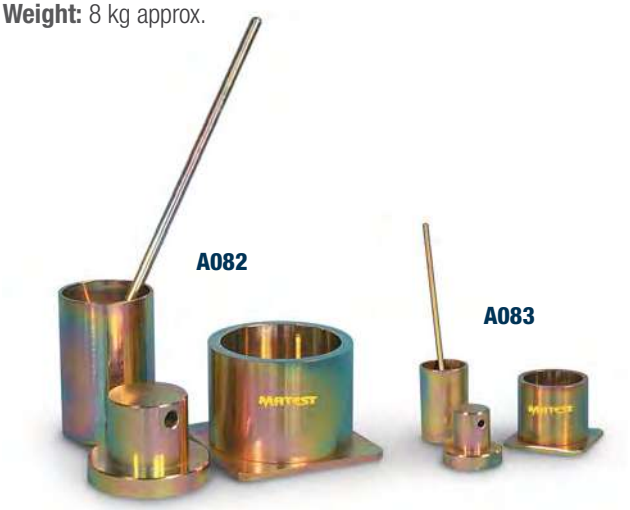
Weight: 20 kg approx.

A083
AGGREGATE CRUSHING VALUE APPARATUS
DIAMETER 75 MM

STANDARD: comparable to BS 812:110

Comprising 75 mm nominal diameter steel cylinder, plunger, base plate, tamping rod and measure 57 mm diameter x 90 mm deep.
Used for aggregate smaller than 9.52 mm
The complete assembly is cadmium plated for corrosion protection.

Weight: 8 kg approx.



A085
QUARTERING CANVAS (not illustrated)

STANDARD: ASTM C702 - Method B

Used in field for quartering soil and aggregates.
Size: 140x140 cm

A086
VOLUMETER FOR AGGREGATES

STANDARD: BS 812

Used to measure coarse aggregate density through water displacement method.
Formed by a cylindric metal container Ø 150x350 mm fitted with a siphon tube at 250 mm from bottom.

Weight: 3 kg approx.

ACCESSORY

V101-04 GRADUATED GLASS CYLINDER 250 ml capacity

DETERMINATION OF PARTICLE DENSITY AND WATER ABSORPTION OF AGGREGATES

STANDARDS: EN 12390-7 | EN 1097-6 | UNI 6394-2 | BS 812, 1881:14 | ASTM C127, C128 | AASHTO T84 | DIN 12039 | NLT 154

To perform this test, additional general purpose equipment are required, such as: oven, sieves, balances etc., and the following specific apparatus:

V041
DENSITY BASKET, Ø 200 mm by 200 mm heigh, mesh size 3.35 mm, all stainless steel made.

Other models of density baskets listed at p. 582

V085
SPECIFIC GRAVITY FRAME

Technical data: see Section "V" p. 582

PYKNOMETER,

pyrex glass, complete with stopper, capillary tube and funnel; used to determine the voids and bulk density of aggregates.

V103 Capacity 500 ml
V103-01 Capacity 1000 ml

PYKNOMETER,

pyrex glass, wide mouth Ø 50 mm, complete with capillary tube stopper, used to evaluate the volume density and voids of aggregates.

V105-04 Capacity 500 ml
V105-05 Capacity 1000 ml
V105-06 Capacity 2000 ml

S148
SAND ABSORPTION CONE AND TAMPER, used in determining the specific gravity and absorption of fine aggregates.

DETERMINATION OF THE PARTICLE DENSITY OF FILLER. PYKNOMETER METHOD

STANDARDS: EN 1097-7 | NF P18-558 | BS 812

To perform this test additional general purpose equipment are required such as: oven, sieves, balance etc., and the following specific apparatus:

SPECIFIC GRAVITY BOTTLE, GAY LUSSAC TYPE,

pyrex glass, complete with capillary tube stopper, to determine the particle density and specific gravity of filler in fine aggregates.

V108-01 Capacity 50 ml
V108-02 Capacity 100 ml
V108-03 Capacity 250 ml

E136
WATER BATH

Heating/circulating system, all stainless steel made. Equipped with cooling coil device for connection to water net.
Capacity: 40 litres. Digital thermostat
Temperature range: ambient to 60 °C.
Accuracy: ± 0.5 °C.

Inside dimensions:
510x350x230 mm
Overall dimensions:
680x420x420 mm
Power supply:
230V 50-60Hz 1ph 2000W
Weight: 28 kg approx.


E136

MAX. 10 MM SIZE DETERMINATION OF THE RELATIVE DENSITY AND WATER ABSORPTION OF AGGREGATES

STANDARDS:
BS 812:2, 1377:2 | ASTM D 854
AASHTO T100 | EN 1097-6


S147

S147
PYKNOMETER,

glass made, with aluminium cone and rubber seal.
Capacity: 1 kg

A092
LABORATORY JAWS CRUSHER

STANDARDS: ASTM C289 | UNE 83 120
Comparable to EN 933-3, EN 933-6

Designed to crush any sort of material, also the hardest.
The structure is made of cast iron, the shaft of rectified steel, and the jaws of manganese.
Jaws opening is regulated from 2 to 18 mm by a wedge.
Jaw size: 100x60 mm
The crusher is suitable to prepare the material to be reduced to powder with the jar mill A091 serie.
Complete with steel cabinet conforming to CE safety Directive, separate on/off switch and collecting pan.

Power supply: 230V 50Hz 1ph 1100W
Dimensions: 400x900x1170 mm
Weight: 130 kg approx.

A092
without cabinet

A092
with cabinet

A091-10
JAR MILL
CAPACITY 300 G | 1000 G

Designed to reduce from 5 mm to powder granulometric materials like: cement, stones, rocks, hard materials. Supplied **without** jar to be ordered separately (see needed accessory).
This mill can accept jars having capacity 300 cc. or capacity 1000 cc.
Jar is in prokorund material with relevant hard porcelain spheres.
The noise reduction steel cabinet and microswitch are conforming to CE safety Directive.
Built in timer. Rpm: about 400
It can be used only for wet tests.

Power supply: 230V 50Hz 1ph 750W
Dimensions: 350x710x410 mm
Weight: 50 kg approx.

A091-10 + A091-11

Jars Detail

NEEDED ACCESSORY

A091-11 JAR, 300 cc. capacity complete with spheres.

or:

A091-12 JAR, 1000 cc. capacity, complete with spheres.

A091-02
JAR MILL
CAPACITY 1500 CC.

Same as mod. A091-10, but with jar capacity of 1500 cc.
Supplied **complete** with jar and spheres.

A093
DRY MIXER

Designed to mix dry materials like: powders, cement, gypsum and granulometric materials. In a short time it assures a perfect and homogeneous mixture. The mixer consists of two opposite asymmetric cones and a pan for collecting the mixed material. Supplied complete with timer. The volume of the cone is 30 litres.
Mixing capacity: 10 kg of material
Speed rotation: 30 rpm
It cannot be sold on CE markets without security cabinet (see mod. A093-11)

Power supply: 230V 50Hz 1ph 750W
Dimensions: 700x700x1200 mm
Weight: 130 kg approx.

ACCESSORY

A093-11
SECURITY CABINET, manufactured from sheet steel, lined with sound proofing-material for noise reduction, conforming to CE Safety Directive.

Dimensions:
980x1070x1190 mm
Weight: 100 kg approx.

A093

A113
SKID RESISTANCE AND FRICTION TESTER

STANDARDS: EN 1097-8 | EN 1338, 1341, 1342, | EN 13036-4 | EN 1436 | BS 7976 | ASTM E303 (model A113-01)

MAIN FEATURES

- Suitable for both site and laboratory applications.
- Perfect for measuring pavement (road asphalt) surface frictional and skid resistance properties.
- Perfect for polished stone value tests on aggregates (curved specimens) from accelerated polishing tests.
- Suitable to perform tests on:
  Natural stones conforming to EN 1341, 1342.
  Concrete block pavers conforming to EN 1338.
- Accurate adjustement operations through an incorporated slider lifting device.
- Simple and reliable height adjusting system.
- High-precision results thanks to an extremely light pointer.

A113

The tester measures the energy loss when a rubber slider edge is propelled over the surface under test.
The release mechanism of the pendulum arm has an original solution reducing the friction to minimum for better accuracy.

The skid tester is supplied complete with:

- Additional incorporated scale for tests on Polished Stone Value specimens.
- Rule, made of plexiglass, for sliding length verification.
- Thermometer range –10 to +110 °C for surface temperature measurement.
- Stool, wash bottle, bristle and tool set for machine use.
- Carrying case.
- Calibration Certificate conforming to EN 1097-8 or ASTM E303 (model A113-01).

The tester is supplied **without** rubber sliders that have to be ordered separately (see accessories).

Case dimensions: 730x730x330 mm
Weight: 32 kg approx.

Note:

The tester is supplied calibrated to meet EN Specifications.
On request the skid tester can be supplied to meet ASTM 303 Spec. (model A113-01)

A113-01
SKID RESISTANCE AND FRICTION TESTER

STANDARD: ASTM E303
As above, but calibrated to meet ASTM 303 Specifications.

ACCESSORIES

A110-03 MOUNTED RUBBER SLIDER, TRL rubber, 76 mm width for site use (road surface), complete with conformity certificate.

A110-01 MOUNTED RUBBER SLIDER, TRL rubber, 32 mm width for Polished Stone Value tests (laboratory), complete with conformity certificate.

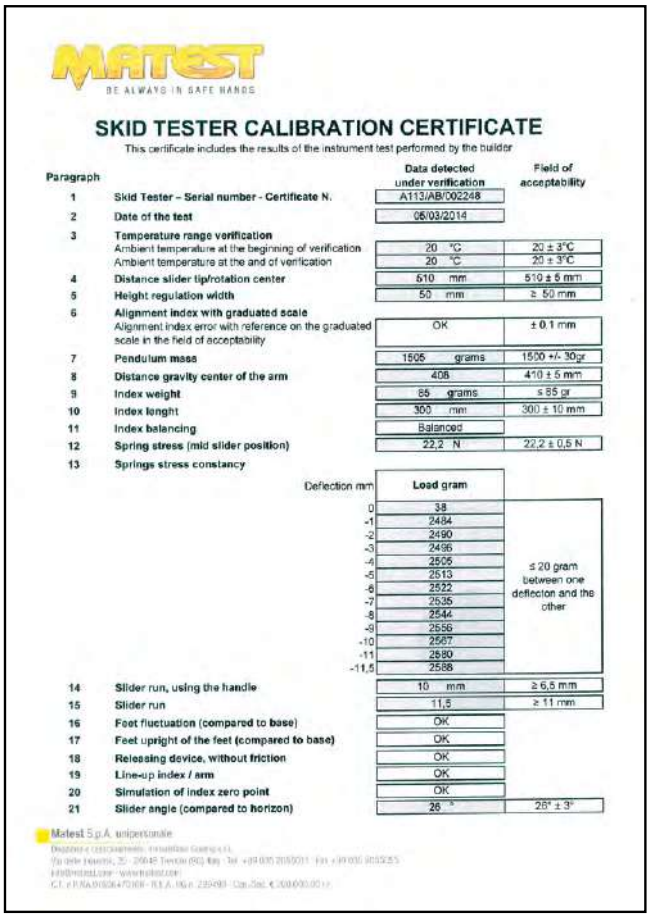
A110-05 NEW MOUNTED RUBBER SLIDER, 4S rubber, 76 mm width (ceramics, marbles, paving tiles, sidewalk surface) complete with conformity certificate.
Standards: EN 13036-4 | BS 7976

A110-11 METAL BASE PLATE for Polished Stone Value tests in laboratory, and for tests on natural stones and concrete block pavers. Supplied **without** specimen clamping devices, to be ordered separately.

A110-12 CLAMPING DEVICE for Polished Stone Value tests in laboratory.

A110-13 CLAMPING DEVICE for tests on natural stones (EN 1341, 1342); for concrete block pavers (EN 1338) and skidding tests on wooden floor (EN 1339).

A110-20 PINK LAPPING FILM (10 sheets) for Skid Calibration.



MATEST
BE ALWAYS IN SAFE HANDS

SKID TESTER CALIBRATION CERTIFICATE

This certificate includes the results of the instrument test performed by the builder

Paragraph		Data detected under verification	Field of acceptability
1	Skid Tester – Serial number - Certificate N.	A113/AB/002248	
2	Date of the test	06/03/2014	
3	Temperature range verification Ambient temperature at the beginning of verification Ambient temperature at the and of verification	 20 °C 20 °C	 20 ± 3°C 20 ± 3°C
4	Distance slider tip/rotation center	510 mm	510 ± 5 mm
5	Height regulation width	50 mm	≥ 50 mm
6	Alignment index with graduated scale Alignment index error with reference on the graduated scale in the field of acceptability	OK	± 0,1 mm
7	Pendulum mass	1505 grams	1500 +/- 30gr
8	Distance gravity center of the arm	408	410 ± 5 mm
9	Index weight	85 grams	≤ 85 gr
10	Index lenght	305 mm	300 ± 10 mm
11	Index balancing	Balanced	
12	Spring stress (mid slider position)	22,2 N	22,2 ± 0,5 N
13	Springs stress constancy		

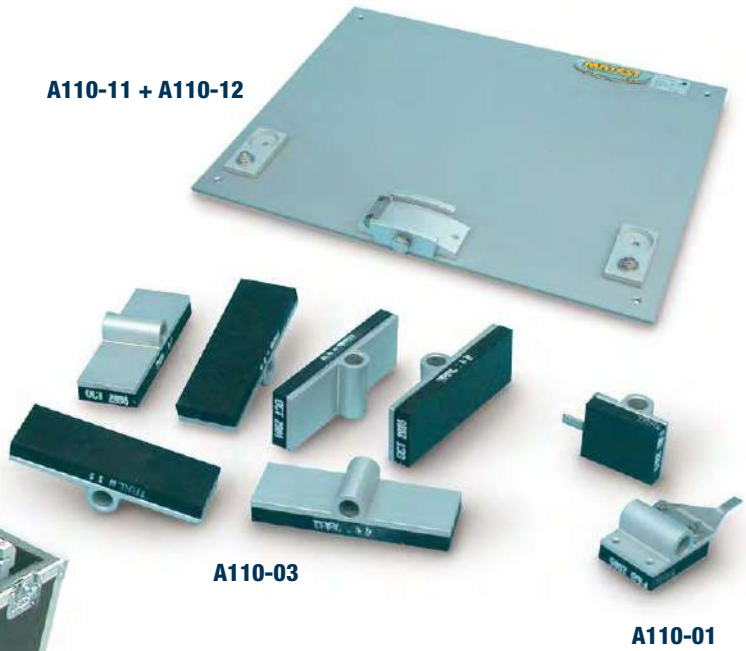
Deflection mm	Load gram	
0	38	≤ 20 gram between one deflection and the other
-1	2484	
-2	2490	
-3	2496	
-4	2505	
-5	2513	
-6	2522	
-7	2535	
-8	2544	
-9	2556	
-10	2567	
-11	2580	
-11,5	2588	

14	Slider run, using the handle	10 mm	≥ 6,5 mm
15	Slider run	11,5	≥ 11 mm
16	Feet fluctuation (compared to base)	OK	
17	Feet upright of the feet (compared to base)	OK	
18	Releasing device, without friction	OK	
19	Line-up index / arm	OK	
20	Simulation of index zero point	OK	
21	Slider angle (compared to horizon)	26 °	26° ± 3°

Matest S.p.A. unipersonale

Calibration certificate to EN 1097-8

A113
in carrying case



A110-11 + A110-12

A110-03

A110-01

A128N
ACCELERATED POLISHING MACHINE
DETERMINATION OF THE POLISHED STONE VALUE

STANDARDS: EN 1097-8, EN 1341, 1342, 1343 | BS 812:114 | NF P18-575 | CNR N.105

MAIN FEATURES

- Up to 14 specimens simultaneously.
- Road wheel speed, from 310 to 330 RPM.
- Digital control panel for an easy test execution.
- Resultant specimens perfectly suitable for the skid resistance tester.

A128N

It measures the resistance of road aggregates, paving stones and paving blocks to the polishing action of vehicle tyres on a road surface.
The specimens are manufactured with suitable moulds and located on the Road Wheel.
The wheel is now rotated and enters in contact with solid rubber tyre, spring loaded. Abrasive charges are continuously introduced by two automatic mechanical feeders (hoppers).
The feeders are held by a suitable support disjoined from the machine body; this solution saveguards feeding calibration and realiability/life of the hoppers from the influence of test execution vibrations.
The water is supplied at a controlled rate through a water container equipped with flow regulator.
During the test execution the display shows the remaining time and the speed rotation of the wheel holding the specimens.
Supplied complete with 2 rubber wheels (one for corn and one for flour emery), set of 4 specimen moulds and 2 mould covers, while control stone, corn and flour emery have to be ordered separately (see accessories).

Power supply: 230V 50Hz 1ph 750W
Dimensions: 1800x820x600 mm
Weight: 175 kg approx.

ACCESSORIES

A128-02 CORN EMERY, 25 kg pack
A128-03 FLOUR EMERY, 5 kg pack
A128-13 FLOUR EMERY "Original", 5 kg pack
A128-04 CONTROL STONES, ungraded, 25 kg bag, PSV 49
A128-04N CONTROL STONES, ungraded, 5 kg bag, PSV 50-60
A128-05 FRICTION TESTER REFERENCE STONE (Criggion Stone), ungraded, 25 kg bag.
A049-02 FLAKINESS SIEVE, slot 7.2 by 40 mm, used to retain the road aggregates.

SPARES

A128-11 Mould (without cover) to prepare the specimen.
A128-12 Cover for the mould.

C129
ABRASION BÖHME TESTER

STANDARDS: EN 1338:2004 | EN 1339, 1340, 13892-3
EN 14157 | EN 13748-2 | DIN 52108

Used to measure volume loss in a specimen under abrasion stress in tests, such as:

- Paving stones
- Concrete slabs
- Slabs made of natural rocks
- Natural stone slabs

See section "C" Concrete pag. 324

C129

A111N
ABRASION MACHINE
AGGREGATE ABRASION VALUE (AAV) DETERMINATION

STANDARDS: EN 1097-8 | Comparable to BS 812-113

The test measures the resistance of aggregates to surface wear by abrasion. Inadequate abrasion of road-surfacing aggregates leads to an early loss of the texture depth required to keep high-speed skidding resistance.
The machine consists of a heavy duty mainframe on adjustable feet, steel lap wheel 615 mm diameter, which rotates in a horizontal plane at 28/31 r.p.m., precision machined steel shaft and sealed bearings, resilient mounted electric gearmotor, scraper blades for sand removal, revolution counter.
The control panel can be wall fixed or placed on a bench.
Supplied complete with two specimen moulds, two trays, weights and fixing device.

Power supply: 230V 1ph 50-60Hz
Dimensions: 1130x710x1100 mm
Weight: 200 kg approx.

A111N

ACCESSORIES

A111-11 GRADED SILICA SAND. Pack of 25 kg.
V179-05 SOFT HAIR BRUSH Ø 3 mm BS 812

SPARE

A111-12
Two specimen moulds.


A111-12

A112
ABRASION TESTER FOR NATURAL STONES AND CONCRETE
ABRASION RESISTANCE OF NATURAL STONES AND CONCRETE TILES FOR PAVING

STANDARDS: EN 1338, 1339, 1340, 1341, 1342, 1343 | EN 14157
CEN ISO-TC 178 | UNI 10532 | BS 6717:2001

Used to determine the resistance to abrasion and wear of concrete products and natural stones, by measuring the length of a groove produced on the specimen surface through a disc with thickness of 70 mm that rotates at controlled speed and makes a constant pressure on the specimen. A charge of abrasive material must be interposed between the disc and the specimen. The instrument is supplied with an electronic speed controller and shutting off device after the set number of revolutions, 1 kg of abrasive material, a calibration plate comparable to boulonnaise marble, accessories and cabinet conforming to CE Safety Directive.

Power supply: 230V 50-60Hz 1ph 500W
Dimensions: 450x420x800 mm
Weight: 85 kg approx.

A112-05

A112 ... A112-10

A112-10
ABRASION TESTER FOR BRICKS AND TILES

STANDARDS: EN 102 | EN 12808-2 | EN 1344, 10545-6, 14617-4
CEN ISO-TC 178 | ISO 10545-6 | UNE 127024

Same as mod. A112 but with disc thickness of 10 mm.
Suitable for bricks and ceramic glazed tiles.

A112-11
CONVERSION KIT

Used to convert the abrasion tester mod. A112 into mod. A112-10. It comprises abrasion disc Ø 200 mm x 10 mm thick, counter weight and hopper.

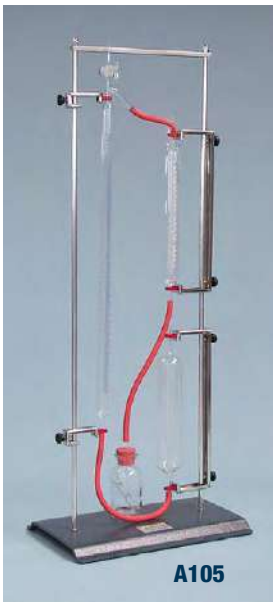
SPARES

A112-01 Abrasive white corundum sand 80 grade. Pack of 5 kg.
A112-05 Calibration plate comparable to boulonnaise marble.

A105
CALCIMETER, (GASOMETER) DIETRICH-FRÜHLING
CARBONATE CONTENT OF AGGREGATES

Used for the determination of calcium carbonate ($CaCo^3$) in certain products such as limestone and lime marl. It mainly consists of a glass container in which the reaction between the calcium carbonate present in the product and a solution of hydrocloridric acid takes place.
The gased product is collected and measured by a device connected to the container.
As the volume of the produced gas (Co^2) is in relation to the $CaCo^2$ amount contained in the material, it is possible to calculate the percentage of $CaCo^3$

Dimensions: 400x200x1100 mm
Weight: 13 kg approx.


A105


C279-02

A117 + A116-11 + A116-12

A117
END-OVER-END SHAKER

STANDARDS: EN 1997-2 | BS 1377:2

Used to determine the specific gravity of soils, it rotates two gas jars at approx. 50 rpm to satisfy BS Standard.
The shaker is equipped with an original friction device conforming the unit to CE Safety Directive.
Supplied **without** gas jars to be ordered separately

Power supply: 230V 50Hz 1ph 150W
Dimensions: 550x430x500 mm
Weight: 20 kg approx.

ACCESSORIES

A116-11
GAS JAR to determine the specific gravity of soils.
Complete with glass cover.
Diameter 75 mm by 300 mm height
Weight: 1.3 kg

A116-12
RUBBER BUNG for the gas jar A116-11

C279-02
SEPARATE CONTROL PANEL,
complete with ON/OFF switch, timer, fuse, electric protections.

A108
CRUSHING COEFFICIENT MACHINE

STANDARD: CNR N°4
Composed of a metallic guide 500 mm long and 140 mm wide, suitable to contain 500 gr. of testing aggregates.
The guide is slided lengthwise and transversalwise through handwheels.
In the center of the table a metallic wheel of 400 kg weight with band of 50 mm wide is placed.
The test is performed by passing the wheel on the aggregates contained into the guide for twelve times.

Dimensions:
1200x500x1850 mm
Weight: 640 kg approx.


A108

S132N
COLOUR STANDARD GLASS SCALE

STANDARDS: ASTM C40-11 Method D | AASHTO T21 | UNI 8020-14

For the determination of organic impurities in soils and fine aggregates. Chart with 5 glass reference scales.

S132-01 Graduated impurities test bottle, stopper, pyrex glass, 500 ml - ASTM C40
S132-02 Graduated impurities test bottle, stopper, pyrex glass, 500 ml, marked at 130 and 200 ml - UNI 8020-14
S132-03 Graduated impurities test bottle, stopper, pyrex glass, 1000 ml - ASTM C40
V300-24 Sodium Hydroxide, pack of 1000 g

TESTS FOR THERMAL AND WEATHERING PROPERTIES OF AGGREGATES

DETERMINATION OF RESISTANCE TO FREEZING AND THAWING

STANDARDS: EN 1367-1 | EN 932-5

It provides the needed informations on aggregates subject to freeze and thaw test cycles.
The cold stress on aggregates depends on the water saturation degree and the freeze percentage. The test can be performed on aggregates having dimensions from 4 to 63 mm.

A103-10 CONTAINER, stainless steel made, having nominal capacity of 2000 ml.
Supplied complete with stainless steel cover.
Weight: 600 g approx.

A103-11 BALLAST for the test container, plated steel made, used for tests on lightweight aggregates.
Weight: 2 kg approx.

Note: To perform the test sieves with different openings according to the dimensions of the aggregates are also requested.

MAGNESIUM SULPHATE TEST

Tests for thermal and weathering properties of aggregates.

STANDARDS: EN 1367-2, also comparable to ASTM C88
UNE 7136 | UNI 8520-10

A103 BASKET, stainless steel mesh, Ø 120 mm x 160 mm high, 3.35 mm opening

A103-01 BASKET, stainless steel mesh, Ø 95 mm x 120 mm high, 1.18 mm opening

A103-02 BASKET, stainless steel mesh, Ø 95 mm x 120 mm high, 0.600 mm opening

A103-03 BASKET, stainless steel mesh, Ø 65 mm x 80 mm high, 0.150 mm opening

V172-05 HYDROMETER, calibrated at 20 °C, range 1200 – 1300 g/ml, accuracy 0.001 g/ml

V125-03 CONTAINER, tinned steel with airtight lid, Ø 200 mm x 200 mm high.

DETERMINATION OF THE BEHAVIOUR AND RESISTANCE TO FREEZING AND THAWING OF AGGREGATES

STANDARDS: EN 1367-1 | CNR N° 80 | UNI 8520-20
BS 812:124 | ASTM C671, C682

C316N
CLIMATIC CHAMBER,
535 LITRES CAPACITY

Temperature range -30 +70 °C.
Technical details and other models described in section Aggregates p. 26 or Concrete p. 348

C348T *
ROCK AND MASONRY SAW

It accepts blades up to Ø 400 mm.
Useful cutting height: 130 mm

ACCESSORIES:

C350-14
DIAMOND BLADE Ø 400 mm

C352
DEVICE to clamp cylinders and cores

C353
DEVICE to clamp irregular shaped specimens

*** Note:** Technical details and other saw models described in Section “C” Concrete p. 358

DETERMINATION OF DRYING SHRINKAGE
TESTS OF THERMAL AND WEATHERING PROPERTIES

STANDARDS: EN 1367-4 | BS 812:102

A107
PRISM MOULD 50x50x200 mm, three gangs, complete with steel inserts, to determine the thermal properties and the weathering of aggregates in drying shrinkage of concrete.
The test is developed on concretes of fixed mix proportions and aggregates of 20 mm max. size.

Weight: 8 kg approx.

SPARE

A107-11 Inserts for A107 mould. Pack of 12 pieces

DETERMINATION OF POTENTIAL REACTIVITY OF ALKALI IN AGGREGATES FOR USE IN CONCRETE

STANDARD: UNI 11604 NEW

A101N
PRISM MOULD ONE GANG, 75x75x285 mm, complete with inserts and handles to determine the dimensional variations of the specimen.
Steel made, Vickers hardness HV 400 approx.

Weight: 3 kg approx.

A101-01N
PRISM MOULD, same as A101N but **two gangs**, complete with inserts.

Weight: 5 kg approx.

A101-05N
CONTAINER, stainless steel made, complete with specimen holder.

Weight: 5 kg approx.

ACCESSORIES

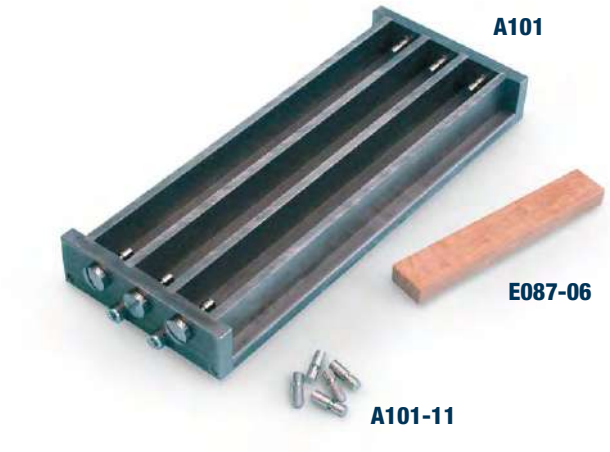
A101-03N REFERENCE ROD 295 mm long UNI 11604.
A101-11N SPARE STEEL INSERTS. Pack of 12 pieces.
E087-06 TAMPER, hard wood made, to compact the specimen.

DETERMINATION OF POTENTIAL REACTIVITY OF ALKALI IN AGGREGATES FOR USE IN CONCRETE

STANDARD: UNI 8520-22

A101
PRISM MOULD, 25x25x280 mm, three gangs, complete with six steel inserts to determine the dimensional variations of the specimen.
Steel made, Vickers hardness HV 400 approx.

Dimensions: 120x300x35 mm
Weight: 4.5 kg approx.



E078 KIT
LENGTH COMPARATOR with digital dial indicator mod. S382-01, 12 mm travel by 0.001 mm divisions, complete with battery and RS232 connection to PC.
For more details and other models: see p. 397

S382-13 CABLE to connect S382-01 and S383 to PC through USB port for direct visualization and recording of the measurement.
E078-01 Reference rod for A101 mould (UNI 8520-22)
E078-06 Reference rod for A107 mould (UNI EN 1367-4)

E078 KIT + E078-06 E067-05

E067-05
MORTAR BAR CONTAINER
STANDARD: ASTM C227
Technical details: see p. 399

DETERMINATION OF RESISTANCE TO THERMAL SHOCK

A023-01N
MUFFLE FURNACE 1100 °C HIGH CAPACITY

STANDARD: EN 1367-5

Used for the determination of resistance to thermal shock of aggregates subject to heating and drying, in the production of hot bituminous mixtures.
The test is applied to heated and soaked aggregates at 700 °C for 180 seconds, and comparing the strength loss and loss in fines, obtained as per EN 1097-2 Spec. before and after the heating test.
The furnace is also suitable for general purpose laboratory tests
Technical data: see p. 25

Power supply: 400V 3ph 50-60Hz 6Kw

A023-01N

ACCESSORIES

A107-20 TEST PLATE, metal, 440x240x4 mm with 12 mm rim

A107-21 SUPPORT FRAME, for metal test plate.

A107-22 PLATE, fire proof, 445x250x10 mm

A107-23 FABRIC, stainless steel, size 445x250 mm, 2 mm cloth aperture

A115
MOHS HARDNESS SCALE SET

STANDARD: EN 101

Used for determining the hardness of the surface of the materials.
Composed by a case containing 9 minerals of the Moh's hardness scale, copper strip, small glass and magnet bar.

Weight: 500 g


A115

INDEX OF VELOCITY OF ROCKS:

Ultrasonic pulse velocity tester.
See section "C" concrete mod. C369N...C372N p. 371...372

C372N

A122
BARTON COMB (PROFILOMETER) 300 MM LENGTH

Used for the evaluation of the surface roughness of rock samples.
This simple device allows very thin steel wires to perfectly lay to the outline of the sample under test, in order to allow its analysis.

Dimensions: 300x120 mm
Weight: 1 kg approx.

A122

A122-01
BARTON COMB (PROFILOMETER) 150 MM LENGTH

Same as mod. A122 but 150 mm long.

A122-01

A109
ABRASIMETER

STANDARDS: EN 154 | EN ISO 10545-7

Suitable to determine the abrasion resistance of glazed tiles and other materials.
The instrument has three stations, and it can work either with wet (PEI) or dry (MCC) abrasive charges.
Eccentricy is 22.5 mm
Revolutions per minute are 300
Complete with cabinet conforming to CE Safety Directive.

Power supply: 230V 50-60Hz 1ph 300W
Dimensions: 400x700x500 mm
Weight: 38 kg approx.

A109


A132

A132-01

A132
GEOLOGICAL HAMMER, pointed tip, for preliminary rock identification. **Weight:** 600 g approx

A132-01
GEOLOGICAL HAMMER, chisel edge, for preliminary rock identification. **Weight:** 600 g approx

A125N
DIGITAL POINT LOAD TESTER 56 KN (ROCK STRENGTH INDEX)

STANDARDS: ASTM D5731 | ISRM

MAIN FEATURES

- High precision electric load cell.
- Capacity 56 kN.
- Core specimens up to 4" (101.6 mm).
- Easy reading of the distance between the conical points thanks to a graduated scale.

A125N

A125-02

Used to determine the strength values of a rock specimen both in the field and in the laboratory.
It consists of a load frame for applying loads, on which a manual hydraulic jack is mounted.
The applied load is measured by a high precision electric load cell with a digital display unit range 0-56 kN proving:

- 65.000 divisions
- 0.001 kN resolution
- Linearity: 0.05%
- Hysteresis: 0.03%
- Repeatability: 0.02%

The strength index (IS) is got by the formula P : D^2 where P is the strength and D the space between the two conical points.
Supplied complete with wooden carrying case, goggles, accessories.

Dimensions: 400x530x720 mm **Weight:** 25 kg approx.

A126
DIGITAL POINT LOAD TESTER 100 KN (ROCK STRENGTH INDEX)

NEW

Capacity: 100 kN

Same as mod. A125N, but having load capacity up to 100 kN.

ACCESSORY for A125N and A126

A125-02 LOWER AND UPPER PLATE with seat ball to modify the Point Load Tester into a portable compression tester (see section "C" concrete, mod. C094) p. 323

SPARE

A125-01 Set of two hardened conical points.

C390

A095
POLISHER - GRINDER

Used for the preparation of rock and metallurgical specimens from lapping to final polishing. The disc is 200 mm diameter and the rotation speed is 300 rpm.
The machine is supplied complete with bakelite working disc and set of 25 abrasive silicon carbide discs.

Power supply: 230V 50 Hz 1ph 200W
Dimensions: 370x500x300 mm
Weight: 31 kg approx.

SPARE

A095-01
Abrasive silicon carbide disc.
Pack of 25.

A095

C381
ROCK CLASSIFICATION HAMMER
LOW IMPACT ENERGY MODEL

STANDARDS: ASTM D5873 | ISRM

This impact hammer is used for rock classification test. The core rock specimen normally NX 54.7 mm diameter is held on a special cradle (accessory) in horizontal position, and the hammer tests the same in all its length, to obtain an average of the readings.

Impact energy: 0.74 Nm
Measuring range: 10...60 N/mm^2
Weight: 2 kg

C381

A121

ACCESSORIES

A121 ROCK CRADLE STANDARD: ASTM D5873
To locate EX to NX core rock specimens during the classification tests by the Rock Hammer mod. C381. **Weight:** 20 kg

C390 CALIBRATION ANVIL
STANDARDS: EN 12504-2 | ASTM D5873, C805
Used for periodical obligatory verification of the test hammers, as specified by EN Standards.
Technical data: see Section "C" Concrete p. 368
Dimensions: Ø 150x230 mm. **Weight:** 16 kg

C299
AUTOMATIC SPECIMEN GRINDING MACHINE

STANDARDS: EN 12390-2 | ASTM D4543

Designed to grind and polish cubic and cylindrical specimens of concrete, rocks, natural stones etc. having 380 mm. as max height. The specimens are fixed to the table by proper bolts, ensuring perfect coupling and blocking. The revolving abrasive head is radially and alternatively moved in both direction through an electric motor actuated by a push button.
The vertical mouvement of the grinding head has an accuracy of 0.05 mm.
The grinding machine is supplied complete with a collecting and water decantation tank, a motorpump, a large protection waterproof carter, eight abrasive charges. Supplied **without** locking stirrups and diamond grinding sectors to be ordered separately (see accessories).

Working base surface: 775x280 mm
Grinding wheel: Ø 330 mm
Vertical span width: min. 95 mm max. 380 mm
Power supply: 400V 3ph 50Hz 4500W
Dimensions: 1220x1080x1730 mm
Weight: 410 kg approx.

C299

ACCESSORY

C300-02 DIAMOND GRINDING SECTOR (required quantity: 8 pieces), "particularly recommended" because of their long duration and good grinding action.

Additional accessories listed in Section "C" Concrete p. 352

C300-08
CORE FACE PREPARATION DEVICE

Used in conjunction with the Grinding Machine, it prepares parallel and flat core faces of rock samples. The device accepts up to 4 core samples from 20 to 55 mm diameter and can be mounted on most grinding machines.

Weight: 7 kg approx.

C300-08

A130
SLAKE DURABILITY APPARATUS

STANDARD: ASTM D4644

This equipment has been developed to assess the durability of rock to weakening and disintegration when subjected to the simulated effects of climatic slaking.
The rock samples are dried and then submitted to wear stress inside a drum which is rotated into water.
The test is performed different times and the wear is given by the loss in weight of the sample.
The system incorporates a motor drive unit mounted on a baseplate which revolves two (or up to four) stainless steel drums manufactured from 2 mm mesh, 140 mm diameter x 100 mm long.
The tanks are filled with water to a level 20 mm below the drum axis.
A digital timer automatically stops the motor after the preset time.
The equipment is supplied complete with two drums with tanks, and it can accept two additional drums (see accessory).

Power supply: 230V 1ph 50Hz 250W
Dimensions: 350x740x300 mm approx.
Weight: 30 kg approx.

A130

ACCESSORY

A130-11
MESH DRUM, complete with tank, base and accessories, to be connected to A130 unit.

A130-11

C377
MICRO-CORING EQUIPMENT

STANDARD: UNI 10766

Extract a micro-core samples from a rock is an extremely valid non-destructive method, as it allows analysis and accurate evaluations (compression resistance, ecc.) without causing any damages, considering the dimension of the hole that can be eventually clogged with mortar.
Micro-coring system is ulteriorly valid and reliable if combined with ultrasonic tester and concrete hammer.
Micro-core extraction is easy, correct and requires the presence of one operator only.
The equipment comprises:
- Suitable electric drill. 230V 1F 50Hz
- Flanged guide assembly
- Drilling mask
- Impregnated diamond bit for cores with Ø 28x100 mm
- Impregnated diamond bit for cores with Ø 28x200 mm
- 2 Self-blocking pincers to fit the flanged guide assembly to the surface

Set of accessories comprising: anchors, bits, wrenches and screws.
Carrying case.

Dimensions: 550x400x200 mm approx
Weight: 10 kg approx

ACCESSORIES

C377-01 WATER TANK WITH FOOT PUMP, that leaves the hands of the operators free for coring

AS ALTERNATIVE:

C377-02 AIR-WATER PRESSURE TANK, 10 litres capacity


C377-02

C377-05
TRIMMING/CUT-OFF MACHINE FOR CORES

Suitable to cut and trim cores to be prepared for compression tests, where the flatness of both surfaces is a basic condition to obtain correct results.
The equipment is made of stainless steel and aluminum and it is supplied complete with diamond blade diameter 180 mm.
For this purpose it must be used the drill mod. C377-10 (enclosed into micro-coring equipment) and the water tank with foot pump mod. C377-01.


C377-05

Note:
The maximum values expected for compression tests on micro-cores are usually lower than 60 kN. Portable compression machine mod. C094 (see p. 323), or a cement compression tester (see p. 422) may be conveniently used.
Trimming of cores may be even obtained with the grinding machine mod. C298 + device mod. C300-08 (see p. 65)

SPARES

C377-10 Electric drill, suitable for the microcoring purposes.
C377-15 Diamond bit, Ø 28x100 mm
C377-16 Diamond bit, Ø 28x200 mm


A122-10

A122-10
TILT TEST

The instrument measures the roughness coefficient of a rock specimen or of a joint. The sample is usually a rock core cut in half lengthwise, or a core placed on another two.
The unit is also designed to test the possible fluage tendency of bituminous mixtures covering a slope of a dam subject to high sun radiations. The fluage tendency is the permanent viscous deformation of a material. The apparatus consists of an inclined adjustable plane on which the sample is placed.
Inclination angle: 0 - 75°
Max. sample diameter: 100 mm
The plane is slowly tilted until sliding of the upper surface of specimen on the lower one occurs. The roughness index can be evaluated from the measured inclination angle.

Dimensions: 270x175x265 mm
Weight: 5 kg approx.

A129
ROCK SHEAR BOX APPARATUS

STANDARDS: ASTM D5607* | ISRM

Used to determine the strength and slope stability of rock size max 115x125 mm or cores max. diameter 102 mm, both in the field and in the laboratory.
Complete with two horizontal rams for shear in two directions, vertical loading ram, two bourdon tube load gauges diameter 150 mm with quick release couplings, calibrated 50 kN x 1 kN division, two hand pumps with hydraulic connections and dial gauge 25x0.01 mm.

Dimensions: 600x250x460 mm
Weight: 46 kg approx.

A129

ACCESSORY

A129-03*
SET OF 4 DIAL GAUGES 10 mm stroke x 0.002 mm division, complete with supports for vertical displacement measure, conforming to ASTM D5607 Standard.

A129-01

A129-03

A129-02

A131 + A131-01

A131
ROCK SHEAR BOX APPARATUS iT TECH
CYBER-PLUS 8 EVOLUTION ACQUISITION SYSTEM

STANDARDS: ASTM D5607* | ISRM
Same mechanical design as basic model A129, but equipped with:
n° 2 Pressure transducers for load acquisition, connected to the pumps.
n° 1 Linear displacement transducer for shear measurement.

C405-15N Cyber-Plus 8 Evolution "Touch-Screen" for data acquisition, visualization, processing and storing, directly connected to PC or printer.
Technical details: see p. 377

S224-21N Software for test data processing.

Weight: 50 kg approx.

ACCESSORY

A131-01*
SET OF 4 LINEAR DISPLACEMENT TRANSDUCERS, complete with supports, for vertical displacement measure, conforming to ASTM D5607 Standard.

ACCESSORIES for A129 and A131

A129-01 MOULD FORMER, to prepare the specimen in the dimensions and geometry as requested by the shear box.

A129-02 PRESSURE MAINTAINER, complete with pump, to absorb volume changes of the specimen and to allow a constant load to be maintained during the test.

A129-04 BRITISH GYPSUM CRYSTACAL PLASTER, for casting specimens into mould assembly, 25 kg bag.

A150N
ELASTIC MODULUS OF ROCK SPECIMENS IN UNIAXIAL AND TRIAXIAL TESTS

IT TECH

A150N + C089-04N

AUTOMATIC SYSTEM WITH PACE RATE CONTROL ALSO WHEN RELEASING THE LOAD

STANDARDS: EN 14580 | EN 1926 | ASTM D7012 | ASTM D2664 ASTM D3148 | ASTM D5407 | ISRM

It can be used with a MATEST high stability frame with capacity of 2000 or 3000 kN coupled to the Automatic Servo-controlled system "Servo-Plus Evolution" (mod. C104N).

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 than controls the pace rate decreasing the load.
  The setting of the pace rate is regulated by a very sensitive valve controlled by a step by step motor that allows a micrometric action on the pace rate granting excellent results in the control of the load.
  A laser position detector allows a rapid positioning of the piston and a very accurate touch point. This grants a touching sensitivity of test starting of about 0.1 per thousand of the maximum capacity. When used in conjunction with the C104NLP (see p. 70) for the application of the side pressure, the hydraulic system permits to maintain the pre-load level with extremely high accuracy.

- **Electronic measuring system**
  The high performance control and data processing unit controlled by a 32 bit microprocessor can manage up to 8 high resolution channels for the control of load cells or transducers with strain gages bridge.
  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 following the most updated standards for this application.

- **Data acquisition and processing software UTM2 (Universal Testing machine 2) with License for Elastic Modulus on Rocks**
  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 and personalise the test profile, which will be effected in a completely automatic way by the testing machine.

The user must enter data concerning the specimen that will be tested and the kind of test that he wants to make: shape of the specimen (cylinder-cube-block), 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 all tests data throught a serial communication port RJ45 (Network Connection) to a Personal Computer, that can already belong to the end user or be supplied separately (not included with the Software).
This data will be processed by the software and transformed in a graph load/deformation and load/time, following the specific Standards.

The software gives the possibility to print on a standard printer a test certificate reporting all data and graphs concerning the test and the specimen. The software includes the license "Servonet" mod. C123N. The extensometers (proposed in two versions: **A** and **B**) are not included in the supply and must be ordered separately (see accessories).

ACCESSORY

A150-01N
STANDARDS: UNI 6556 | ASTM C469 | ISO 6784 | DIN 1048

SOFTWARE to make Secant Compression Elastic Modulus tests on concrete

Note:
The Elastic Modulus of Rocks mod. A150N must be used together with:

A) Extensometers (strain gages), single use, electric (obliged model to perform tests with Hoek cells), available in different sizes,

or:

B) Extensometers/Compressometers, electronic, universal, mechanical frame,

which are not included in the standard supply and must be ordered separately (see accessories)

ACCESSORIES

A) ELECTRIC SINGLE USE EXTENSOMETERS, pack of 10 pieces

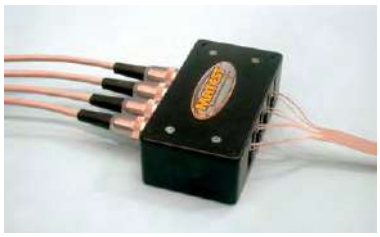
AVAILABLE MODELS

C125-10 Electric extensometer, base length 10 mm.
C125-11 Electric extensometer, base length 20 mm.
C125-12 Electric extensometer, base length 30 mm.
C125-13 Electric extensometer, base length 60 mm.
C125-14 Electric extensometer, base length 120 mm.


C125-10...C125-14

C125-15
KIT for the application of single use extensometers composed by: glue, welder, solder, cleaning liquid, accessories, the whole in carrying case

C125-09
INTERFACE MODULE, "needed accessory" to connect up to 4 electric single use extensometers . This module allows also the automatic calibration of the zero and of the measuring range after a special thermal compensation. This grants a five times better accuracy than the one requested by the Standards.

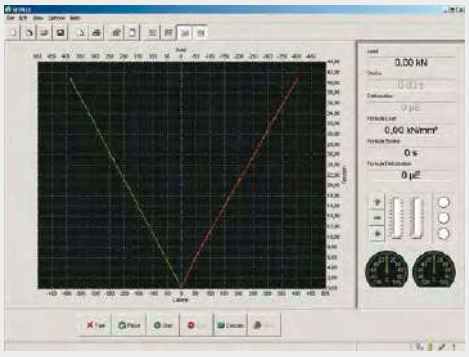


AS AN ALTERNATIVE:

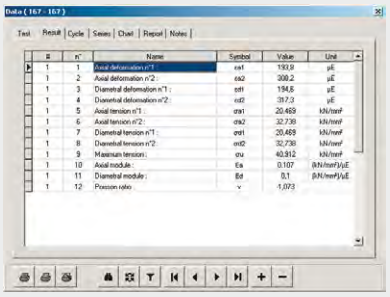
B) **C134**
EXTENSOMETER / COMPRESSOMETER, electronic, universal, mechanical frame.
Technical details: see p. 286


C134

C134-10
TEMPLATE, to regulate and calibrate the base length of the C134 extensometer



Typical screen representing the longitudinal and transversal deformations.



Test data

TRIAXIAL TESTS ON ROCK SPECIMENS

STANDARDS: EN 1926, EN 14580 | ASTM D7012 | ASTM D2664 | ASTM D3148 | ASTM D5407

MAIN FEATURES

- Axial load and constant isotropic pressure, from 5 to 6 Mpa.
- Real time reading of:
  - poisson value
  - stress value
  - max. or breaking value.
- Specimen breaking between 5 and 10 minutes.

The triaxial test is made on a rock specimen placed into a container (Hoek cell), closed into a latex membrane .

The electric extensometers are directly applied on the surface of the rock specimen and they are used for the automatic reading in real time of the different parameters and find different information such as:

- Radial deformation combined with the axial deformation to obtain the Poisson value.
- Stress value in relation with the axial and radial deformation.
- The maximum or breaking value.
- Tangent and secant Young's modulus measured on the axial deformation curve.
- Maximum stress value in triaxial conditions.

Standards require that during the compression test the load on the rock specimen is applied in a continue way in order to obtain the breaking of the specimen within a time included between 5 and 10 minutes, with a constant increase of the load included between 0.5 and 10 Mpa/second.

For this reason it is recommended the use of a compression load frame with capacity of 1500, 2000 or 3000 kN (see concrete sector) combined with the automatic servo-controlled system "Servo-Plus Evolution", model C104N, and with the automatic system for the Elastic Modulus on rocks model A150N, that includes the data acquisition and processing software.

The side pressure set by the user, is kept constant between ± 1% using:

C104MLPP

Automatic servo-controlled system "Servo-Plus Progress" that grants a setting of the pressure up to 70 MPa. C104MLPP gives the possibility to perform a multi-stage triaxial test (multiple failure states test) manually. This is an excellent alternative to a series of single-stage triaxial test, necessary to determine the engineering material parameters of rocks. One multi-stage triaxial test may give the complete failure envelope. This is very important especially with a limited number of specimens or limited testing time or the budget for testing program.

C089-04N + A150N + A139 + C104MLPP

HOEK CELLS FOR ROCK TRIAXIAL TESTS

The basic Hoek cell consists of the following parts:
Cell body complete with two screwed end caps and two self-sealing couplings, two spherical seats and pistons, hardened and ground, one specimen jacket.

MAIN FEATURES

- Perfect with pressure up to 70 MPa.
- Suitable for specimens from 30.10 to 63.5
- Used to measure the strength of cylindrical rock specimens which are subjected to triaxial compression.

Models	Specimen Ø x height	Size	Load spreader pads (pair)	Spare spherical seat + piston	Spare Jacket	Core drilling barrel 200 mm long	Adaptors set for extruder
A135 NEW	63.5x127 mm	HQ	**A136-01**	**A135-02**	**A135-03**	**A135-04**	**A141-05**
A136	30.10x60 mm	AX	**A136-01**	**A136-02**	**A136-03**	**A136-04**	**A141-01**
A137	38.10x75 mm	1,5"	**A136-01**	**A137-02**	**A137-03**	**A137-04**	**A141-02**
A138	42.04x85 mm	BX	**A136-01**	**A138-02**	**A138-03**	**A138-04**	**A141-03**
A139	54.74x100 mm	NX	**A136-01**	**A139-02**	**A139-03**	**A139-04**	**A141-04**

Note: The load spreaders A136-01 are used to avoid the cell's pistons engrave the platens of the compression machine.
One set of extruder adaptors is formed by back plate, tamper and cell body support.

A147
COMPRESSION DEVICE FOR ROCK CORES

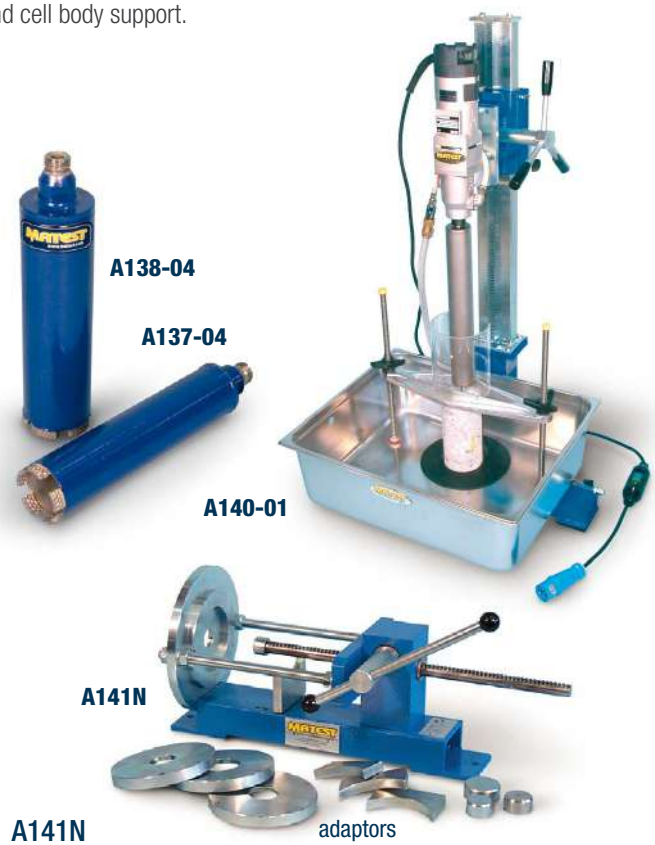
STANDARD: ASTM D2938
Used to perform compression tests on rock core specimens having max. diameter 55 mm and height between 95 and 110 mm.
The loading piston is sustained by two springs; the upper compression platen is fitted with a spherical seat; the lower platen is fitted to the base.
Maximum load capacity: 100 kN
Piston's stroke: 20 mm - Platens diameter: 55 mm
Vertical daylight: max. 112 mm, min. 92 mm
Platens hardness: 60 HRC

Overall dimensions: Ø 151 by height 249 mm
Weight: 10 kg approx.

A140-01
CORING MACHINE

Used in the laboratory to obtain cores from irregular rock samples.
To be used with the Core Drilling Barrels (accessory A136-04... A139-04).
The 2 speed electric motor 1140/2040 rpm at free load and 730/1340 rpm at max load, is equipped with friction device and double safe isolation to CE Directive.
Complete with specimen's clamp device, water cooling system and water tank.

Power supply: 230V 50-60Hz 1ph 1800W
Weight: 60 kg approx.



A141N
EXTRUDER

Used to eject the rock sample from the rubber jacket, avoiding to empty the confining fluid.
Supplied without adaptors to be ordered separately (see table).

Weight: 12 kg approx.

A142N
HYDRAULIC CONSTANT ISOTROPIC CELL PRESSURE SYSTEM

The unit consists of a hand operated pump, complete with precision pressure gauge supplying pressures up to 35 MPa, complete with reservoir and connections, providing all round pressure source to the Hoek Cell.

Weight: 18 kg approx.

ACCESSORY

A129-02
PRESSURE MAINTAINER, complete with pump, to allow a costant load to be maintained during the test.

A142N + A129-02

A138-05 A137-05

A144
PERMEABILITY CONSTANT OIL/WATER PRESSURE SYSTEM

Providing an infinitely variable constant pressure from 0 to 3500 kPa. To be used with the Hoek Cell equipped with Permeability End Caps and Permeability Attachment.
The system consists of a motor hydraulic pump, oil/water vessel, piston/spring device, 10 litres of viscosity oil.
The unit is supplied complete with precision pressure gauge 0 - 3500 kPa range.

Power supply: 230V 50Hz 1ph
Weight: 20 kg approx.

S275
PERMEABILITY ATTACHMENT

Mounted on tripod, to be connected to the End Cap of the Hoek Cell. Burette 50 ml capacity and 0.1 ml div.

ACCESSORY

S325 NYLON OPAQUE TUBING. Pack of 25 m

S275
A137-05
A137
A144

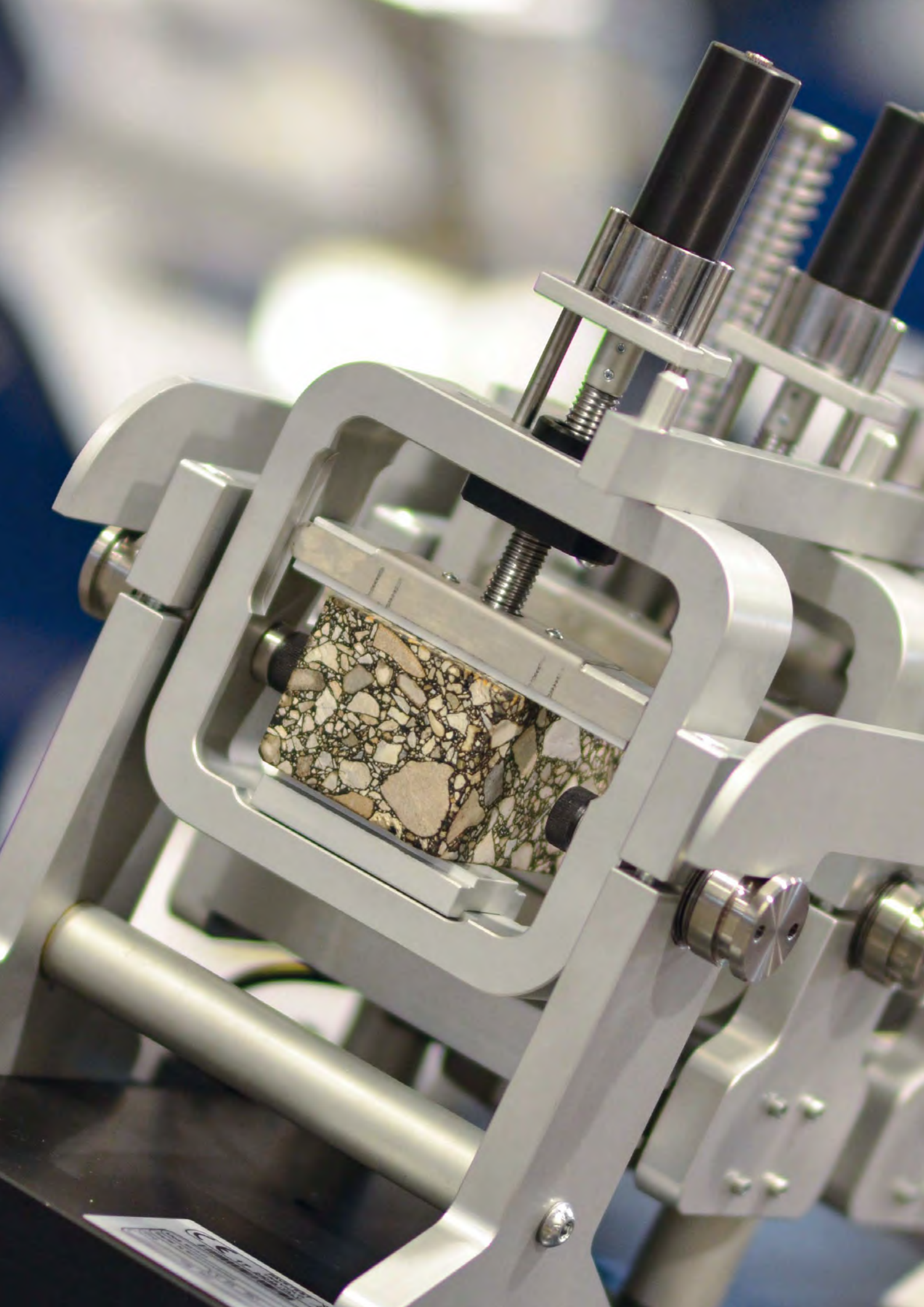
PERMEABILITY OF ROCK WITH HOEK CELLS

To measure the permeability or flow of water through a rock specimen with a controlled water pressure system.
The Hoek Cells can be equipped with the (optional) End Caps, screwed to the body.
The set consists of the upper and lower End Cap, complete with distance block.

MODELS

A135-05 Specimen Ø 63.5 mm NEW
A136-05 Specimen Ø 30.10 mm
A137-05 Specimen Ø 38.10 mm
A138-05 Specimen Ø 42.04 mm
A139-05 Specimen Ø 54.74 mm

OUR CLIENTS ARE OUR BEST ADVERTISEMENT.



SECTION B

ASPHALT | BITUMEN | PAVETEST

Bituminous mixture, also known as asphalt mixture, is mainly composed by aggregates and bitumen, an infinite variety of mixtures being possible. This section is divided into three parts and shows the whole range of equipment for analyzing each component of the bituminous mixture.

ASPHALT. The first part is dedicated to the asphalt testing machines used to provide a solution for the whole "asphaltic path": mixing, compacting, modelling and testing. The equipment meets the needs of those who want to perform quality control or experimentation of new asphalt mixtures.

BITUMEN. This section shows equipment required for bitumen testing: these include machines to study the rheological properties of bitumen as well as the features of bituminous emulsion. The last part of this section provides better solutions to perform field tests on road surface.

PAVETEST**.** Pavetest's range of pavement dynamic testing systems both complements and completes Matest's Asphalt and Bitumen business unit. All our products comply with the principal international standards.

B003
AMA
ASPHALT MIX ANALYZER NEW
AUTOMATIC CLOSED-LOOP SYSTEM

STANDARDS: ASTM D8159 | EN 12697-1

The Asphalt Mix Analyzer (AMA) is an innovative device capable of combining all the processes associated with bitumen extraction and recovery.

The unit has been designed for the purpose of determining the bitumen content in asphalt mixture and it is the best solution to analyse and characterize the properties of the reclaimed asphalt pavement (RAP).

Through the use of solvent selectable from perchloroethylene or trichloroethylene or methylene chloride*, the final result of the process is the separation of aggregates and filler from bitumen in order to verify the quality of the recovered granular materials and determine the mineral skeleton of the mixture. On the other hand, the bitumen can be separated from the remaining solvent solution by rotary evaporation in order to make the binder available for further analysis such as DSR, DTT and BBR according to Performance Grade and conventional bitumen tests such as penetration, ductility, softening point among others.

Note*: The unit is supplied without the solvent that has to be purchased independently.

MAIN FEATURES

- "All in one" automatic cycle.
- Fast analysis reducing extraction costs and time.
- Combination of ultrasonic impulses and heating effect to a complete bitumen extraction.
- Complete extraction in less than 50 minutes (depending from the material tested).
- Complete close cycle avoiding toxic fumes for healthy environment.
- Automatic solvent distillation during extraction.
- Integrated 7' colour touch-screen controller.
- Customizable cycle: selectable pre-wash phase, number of washing and drying cycles.
- Optional direct connection with rotary evaporation apparatus.
- Optional integrated balance for automatic determination of the bitumen content.

Mesh drum into the washing chamber

Cup into the centrifuge, up to 8000 revolutions per minute

Integrated balance for automatic weight record

Fully automatic and closed cycle

Sturdy frame and small footprint

B003

The unit consists in a **stainless-steel washing chamber** where the user introduces the asphalt sample up to 3.5 kg. Subsequently, thanks to an accurate centrifugation process, the filler is separated and collected into the centrifuge cup while the bitumen solution is drained off to the solvent recovery chamber. Most of the solvent is recovered by condensation and it can be used for other extractions. The remaining part of the bitumen solution can be collected in an extraction flask after distillation, available for further analysis.

In order to perform this cycle, the unit is equipped with a **multi-layer mash washing drum** available with different openings (0.063, 0.075, and 0.090) to contain the aggregates, a **centrifuge cup** to collect the recovered filler and an extraction flask to collect the remaining bitumen solution.

Before starting washing, the unit allows to add a pre-wash phase in order to improve the process of separation and extraction of bitumen.

The unit presents a **7" colour touch-screen controller** with front panel user interface with easy to use step-thru operation. The user-friendly software allows the operator to set up:

- number and duration of the prewash cycles;
- number and duration of the washing cycles;
- number and duration of the drying cycles.

The asphalt mix analyzer can incorporate an optional balance into the worktop, for an easier weighting process at each phase.
The machine **automatically determines the bitumen content** through a guided procedure in accordance with the standards.
The door is locked during all test phases to provide a safe environment. Furthermore, the test stops automatically in case of anomalies or malfunctions, showing the type of alarm on the display in real time.
The solvent mode extraction has to be selected before supplying the unit, and the machine will be calibrated accordingly.

TECHNICAL SPECIFICATION

- Maximum sample weight: 3.5 kg
- Centrifuge rotation speed: 8000 r.p.m.
- Scale: 10 kg, 0.1 g res.
- Cup dimensions: Ø120 mm x 200 mm height
- Extraction time: Less than 1 hour depending on the mix tested (including drying time)
- Solvent per extraction reused for several tests

Power supply: 380V 50Hz 3Ph
Dimensions: 1400x750x1500 mm approx.
Weight: 240 kg approx.

NEEDED ACCESSORIES

B003-01 Perchlorethylene operation mode
or
B003-02 Trichloroethylene operation mode
or
B003-21 Methylen chloride operation mode

B003-03 Washing drum, mesh with opening 0.063 mm
or
B003-04 Washing drum, mesh with opening 0.075 mm
or
B003-05 Washing drum, mesh with opening 0.090 mm

B003-06 Closing lid for washing drums
B003-07 Centrifuge cup, Ø120 mm, up to 200 g of filler
or
B003-22 Centrifuge cup, Ø120 mm, up to 300 g of filler

B008-11 Lining paper for centrifuge cup. Pack of 100

RECOMMENDED ACCESSORIES

B003-12 Testing device for recycled tetrachloroethene analysis
B003-13 Worktop balance for an easy and automatic determination of the bitumen content, 10 kg
B003-14 Solvent stabilizator, for recycled tetrachloroethene
B003-15 Solvent pumping device for safe solvent filling
B003-16 Water cooling system high end
B003-17 Device for the extraction of the centrifuge cup
B003-18 Fast connection for rotary evaporator flask, for bitumen solution sampling
B003-19 Water cooling system
B003-20 External balance, 15 kg

B008
AUTOMATIC BINDER EXTRACTION UNIT

STANDARDS: EN 12697-1 I ASTM D2172
Used to perform reliable analysis on bituminous mixtures utilizing the perchloroethylene (PCE) or tetrachloroethylene solvent which is classified: R40 (not cancer producing*), for quantitative determination of binder or bitumen contained in pavement samples and hot mixed mixtures.

The system performs in only one complete automatic cycle:
- the washing, disaggregation and separation of the bituminous mixture;
- the separation of the filler from the solution formed by solvent, bitumen and filler;
- the recovery and distillation of solvent material allowing a further utilization.

The unit comprises:
- An electromagnetic sieving unit, insuring high quality double vibrating action (vertical/rotational), with solvent spraying cover for washing and disaggregation of the sample.
- A continuous flow filterless centrifuge having rotation speed of 11000 rpm equipped with a stainless steel beaker Ø 120 mm, filler capacity approx. 400 g.
- A solvent recovery unit having reclaiming capacity of 50 l/h, equipped with cooling system switching ON and OFF the unit to automatically perform the test.
- A separate control panel allows to program all these functions in a fully automatic system. It is also possible to select the manual control.

This unit is supplied complete with:
- Two stainless steel beakers Ø 120 mm
- Four stainless steel sieves Ø 200 mm openings: 0.063 - 0.250 - 0.800 - 2 mm
- Sieve Frame only Ø 200 mm to improve the capacity of the first sieve.
- Set of O ring gaskets for sieves.

Power supply: 400V 3ph 50Hz 5.5kW
Overall dimensions: 1400x680x1820 mm
Total weight: 185 kg approx.

MAIN FEATURES

- "All in one" automatic cycle.
- Fast analysis reducing extraction costs and time.
- Complete extraction in approx 25 minutes (3500 g mixture per extaction).

B008

Note: * it is possible to use also the Trichloroethylene (CHC1:CC12), but as per 2001/59/CE Directive, it is classified "R45", and therefore considered a dangerous solvent. (Toxic and cancer-producing)

SPARES

B008-01 Beaker, Ø 120 mm, stainless steel AISI 304 made, with solution heat-treatment
B008-02 Sieve Ø 200 mm water seal with O ring gasket (when ordering please specify mesh opening).
B008-05 Sieve frame only, Ø 200 mm
B008-06 Seal rings, for the Sieves. Pack of 10 pieces.

ACCESSORY

B008-11 LINING PAPER for centrifuge cup.
Dimensions: 370x200 mm. Pack of 100 pcs.

B008-10
CABINET WITH ASPIRATOR


B008-10

It allows housing the automatic bitumen extraction unit, to minimize the diffusion of vapours and toxic solvents in the laboratory.
The structure is anodized aluminium made and safety glass walls.
The unit is supplied with 4 front doors, aspirator centrifugal electric vapour, and appropriate filter group to activated charcoal.
A room with internal height at least 3 m is required.

Power supply: 380V 3ph 1100W
Overall dimensions: 1950x980x2630 mm
Weight: 140 kg approx.

Note: It cannot be sold in CE markets

B005N
BITUMEN CONTENT FURNACE BY IGNITION METHOD

STANDARDS: AASHTO T308-10 I ASTM D6307-10 I BS EN 12697-39:2012

B005N

The binder content of bituminous mixtures is one of the major properties related to pavement performance. In particular, it affects the pavement's tendency to permanent deformation, fatigue life and susceptibility to moisture damage. Therefore, the measurement of this property is fundamentally important for **quality control (QC), quality assurance (QA) and research purposes**. In this context the ignition method can determine the binder content with high precision, offering a valid alternative to the solvent extraction methods.

Matest apparatus combines a sophisticated furnace and weighing system to continuously measure weight loss during combustion. It then **automatically calculates binder content at the end of the test**. Moreover, the method can be used for evaluation of mixture composition because the remaining aggregate can be used for determining aggregate gradation and density.

The unit presents a **7'' colour Touch screen controller** with front panel user interface and easy to use step-thru operation. The user-friendly software allows the operator to set up the test with the possibility of introducing data of the mix design for a greater accuracy of the results.

Considering the high temperatures involved (the furnace may reach a temperature of 750° C) the apparatus is equipped with suitable safety systems to ensure that the furnace door is kept closed during the test and that the heating elements are deactivated any time the door is opened. Analysis can be made on a sample weighing maximum 5 kg and most tests are completed in 20 to 45 minutes. Average test times are from 20 mins (for 6 mm aggregates), to 45 mins (for 40 mm aggregates).

MAIN FEATURES

- Fully automatic and customizable test cycle, real-time display of test parameters and results
- Possibility of introducing data of the mix design for a greater accuracy of the results up to 0.11%
- Ignition method reduces testing time and costs.
- 7" touch-screen display with smart interface.
- Integral balance measures loss on ignition to 0.1 g resolution.
- Rapid heating of main chamber with robust Ø 1 mm wire elements
- Integral fan-assisted high-temperature afterburner greatly reduces emissions
- Direct access to the scale to facilitate inspection and maintenance
- Unlimited memory storage with: 2 USB ports, 1 SD card slot, RS232/485 serial port
- On-board graphic printer

An independently controlled afterburner with exhaust fan and vent reduces emissions so low that no aspiration hood is needed.

The machine is supplied complete with 2 sample baskets with stands, hot sample safety guard, sample basket loading handle, printer paper rolls, calibration plate and protective mask. Gloves to be ordered separately.

Outer dimensions: 635x825x1214 mm
Inner dimensions: 350x445x260 mm
Power supply: 400V 3ph 50/60Hz 8500W
Max Temperature: 750 °C
Weight: 70 kg approx.

TECHNICAL SPECIFICATIONS

- Samples weight up to 5000g
- Precise weight measurements displayed to 0.1 g resolution
- Test duration of 20-45 minutes
- Scale: 15,000 g capacity, 0.1 g res., ±0.1 g repeatability
- Closed-loop PID thermo-regulation
- Afterburner temperature is controlled independently from the main chamber
- Failsafe door interlock keeps the door locked during a test
- No need for filters

ACCESSORY

B005-10 METAL STAND to hold the furnace.

B011
ROTAREX
CENTRIFUGE EXTRACTOR
1500 / 3000 g CAPACITY

STANDARDS: EN 12697-1 | ASTM D2172 | AASHTO T164A
Used for the determination of bitumen percentage in bituminous mixtures.
It consists of a removable, precision machined aluminium rotor bowl, placed into a cylindrical aluminium box.
The separate control panel incorporates an electronic card fitted with AC drive which automatically drives the bowl speed rotation ramp from 0 to 3600 rpm as requested by Standards, with fast stop bowl rotation at the end of the test.
Supplied complete with speed regulator and digital display monitoring the frequency.
The centrifuge is supplied **without** aluminium bowl+cover and **without** filter discs to be ordered separately (see accessories)
The unit cannot be sold in CE markets (see mod. B011-10)

B011

Power supply: 230V 1ph 50-60Hz 600W
Dimensions: 480x330x530 mm
Weight: 50 kg approx.

B010T
CENTRIFUGE EXTRACTOR EXPLOSION PROOF
1500 G CAPACITY

STANDARDS: ASTM D2172 | AASHTO T164 | CNR 38 | EN 12697-1
EN 12697-2

This instrument uses non-flammable trichloroethylene for the cold extraction of bitumen so that its percentage can be calculated.
It consists of a rotating bowl protected by a removable cover, a steel structure and a variable speed driving unit (electric induction motor, 3000 rpm). Capacity of bowl: 1500 g of mixture. The centrifuge's electronic control unit, which has an automatic braking system, is housed in a separate case and safety device.
The motor is flameproof.
Supplied with 100 filter papers.

Power supply: 220V, 50Hz, 1pH, 400W
Dimensions: 450x410x590(h) mm
Weight: 50 kg approx.

NEW
B010T

NEEDED ACCESSORIES

B010-11 BOWL AND COVER 1500 g capacity.
Made of precision machined cast aluminium.
Weight: 3.6 kg

B010-15 FILTER DISC, 1500 g capacity. Pack of 100 pieces.

or:

B010-12 BOWL AND COVER 3000 G. CAPACITY.
Made of precision machined cast aluminium.
Weight: 4.6 kg

B010-16 FILTER DISC, 3000 g capacity. Pack of 100 pieces.

UPGRADING OPTION

B011-10
SAFETY ELECTROMAGNETIC MICRO-SWITCH SYSTEM to prevent the opening of the cover when the Centrifuge is working, or during the bowl rotation. Conforming to CE Safety Directive. Not applicable to the Centrifuge explosion proof version mod. B010T.

B014
CONTINUOUS FLOW FILTERLESS CENTRIFUGE

STANDARDS: EN 12697-1 | ASTM D1856

Designed for quick filterless separation of filler from binder solution or other mixtures containing sediments (cement, soil, clay), in suspension. The solution is poured into the top funnel and falls into the rotating test container with Ø 70x200 mm. Because of the centrifugal effect, the liquid rises vertically leaving the filler and mineral particles inside the beaker. The centrifuge is supplied complete with aluminium beaker, two sieves 2 mm and 0.063 mm mesh respectively. The rotation speed is 11500 rpm, with automatic ramp and preset speed control.
Extraction capacity is up to 100 g of filler per test.

Power supply: 230V 1ph 50Hz 600W
Dimensions: 350x600x720 mm
Weight: 60 kg approx.

MAIN FEATURES

- Filler recovery with filterless system.
- Continuous flow at 11500 rpm.
- Automatic speed ramp.
- Highest accuracy thanks to no dispersion of material.

B014-01

B014

SPARE

B014-01 Aluminium beaker Ø 70x200 mm high.

B021
SOLVENT RECOVERY STILL - 10 LITRE/HOUR

This unit, is provided with two tanks: one for the clean solvent and one for the dirty solvent and of a water coolant system which only needs to be connected to a tap. A safety cut out is also supplied, being activated when the solvent level becomes too low or once the process is completed.
Fully stainless steel very high quality (AISI 316) made.
Supplied complete with funnel/tank with sieve insert and 10 m plastic tube.

Power supply: 230V 1ph 50-60Hz 1300W
Dimensions: 320x400x650 mm
Weight: 17 kg approx.

MAIN FEATURES

- Efficient and compact unit.
- Easy to install and totally self-contained.
- All high quality stainless steel (AISI 316) made with copper coils.
- Security devices stopping the unit at the end of the test or in case of overheatings.

B021

B079N

B079N
CABINET with aspirator to exhaust vapours and toxic solvents.
See p. 147

B016-10
HOT EXTRACTOR SET
PAPER FILTER METHOD

STANDARD: EN 12697-1 clause B.1.1

The unit is used to extract the binder from bituminous mixtures, and to determine the moisture content. Consisting of a metallic pot complete with gauze basket and filter, Dean Stark collector, Liebig condenser, filter paper Ø 400 mm (pack of 25 pcs.)

Dimensions: 480x480x900 mm
Weight: 22 kg approx.

B016-10

ACCESSORY

V200-02 HOT PLATE Ø 220 mm. 230V 1ph 50-60Hz 2000W

SPARE

B016-15 Filter paper 400 mm Ø (100 pcs.).

B017 KIT
HOT EXTRACTION APPARATUS
WIRE MESH FILTER METHOD

STANDARD: EN 12697-1 clause B.1.2

This apparatus consists of a cylindrical glass jar containing a stainless steel wire basket double cloth opening 0.063 mm and 0.4 mm.
The asphalt sample (500 to 2000 g) is placed inside the wire basket, the solvent is poured inside the jar. Now the wire basket is inserted into the jar which is covered by a **stainless steel** condenser connected to a water supply. The apparatus is placed on a hot plate and the boiling solvent drips into the basket dissolving out the bitumen. The filler passing through the mesh basket must be separated using the centrifuge extractor.

Dimensions: Ø 160x335 mm
Weight: 4 kg approx.

B017 KIT

V200

ACCESSORIES

V200 HOT PLATE Ø 185 mm 230V 1ph 50-60Hz 1500W.
B017-02 WIRE BASKET stainless steel cloth opening 0.4 mm.
V173-03 WIRE MESH with ceramic centre.

SPARES

B017-01 WIRE BASKET stainless steel, double cloth 0.063 and 0.4 mm openings.
B017-03 Pyrex glass jar.
B017-05 Metal condenser **stainless steel** with ring.

B016-20 KIT
SOXHELET MODIFIED METHOD

STANDARD: EN 12697-1 clause B.1.3

Consisting of flask 5000 ml capacity, 2000 ml extractor, cock, vapour tube and condenser; all glass made. Complete with 25 filtering cartridges Ø 80x240 mm, isomantle electric heater, stand and clamps.

Power supply:
230V 1ph 50-60Hz 900W
Dimensions:
400x400x1000 ml approx.
Weight: 20 kg approx.

B016-20 KIT

SPARE

B016-23
Filter cartridges for Soxhelet, inner diameter 80 mm height 240 mm (pack of 25 pcs.)

B061 KIT
KUMAGAWA (SOXHELET) EXTRACTOR
1 LITRE CAPACITY

STANDARDS: EN 12697-1 clause B.1.3 | LCPC

Used to extract the bitumen from hot-mixed paving mixtures. Consisting of an electric heating device, balloon 1 litre capacity, glass pipes, cooling unit and 25 filtering cartridges.

Power supply:
230V 1ph 50-60Hz 750W
Dimensions:
400x500x1000 mm approx.
Weight: 20 kg approx.

B061 KIT

B061-01 KIT
KUMAGAWA (SOXHELET) EXTRACTOR 2 LITRES CAPACITY

Basically similar to mod. B061 KIT but with 2 litres capacity.

SPARES

B061-02 Filter cartridges, Ø 58x170 mm for Kumagawa 1 litre. Pack of 25 pieces.
B061-03 Filter cartridges Ø 70x200 mm for Kumagawa 2 litres. Pack of 25 pieces.

B018
BINDER RECOVERY APPARATUS.
VACUUM PUMP HOT EXTRACTION METHOD

STANDARDS: EN 12697-1 Clause B.3.1 | BS 598:102

Used for the separation of solvent from the binder/solvent solution, and to determine the binder content in an aggregate/bitumen mixture. The apparatus consists of:

- Thermostatic water bath to keep boiling water during all the recovery cycle, complete with cover and digital thermostat, inside dimensions 280x280x230 mm.
  This unit may be used also for general purposes water bath.
- Two glass flasks having 250 ml capacity, complete with rubber bungs, tubing and cocks
- Vacuum gauge (to be connected to the vacuum pump,
- Pyrex flask, 1000 ml capacity, used as vacuum bottle

Power supply: 230V 1ph 50Hz 1000W
Weight: 25 kg approx.

NEEDED ACCESSORY

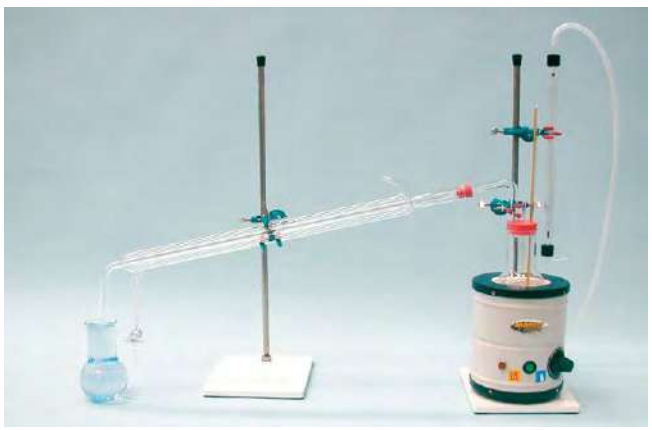
V203 + V205-10
VACUUM PUMP to produce a vacuum down 220 mbar, with vacuum regulator. Power supply: 230V 1ph 50Hz. Weight: 5 kg approx.

B018-10
RECOVERY OF BINDER BY ABSON METHOD

STANDARDS: ASTM D1856 | CNR N°133

This distillation assembly is used for recovery of binder from a solution of a previous extraction, with properties substantially as those of the bituminous mixture. The apparatus consists of glassware complete set, metallic stand supports and electric heating mantle with regulator.

Power supply: 230V 1ph 50-60Hz 750W **Weight:** 12 kg approx.



B019 KIT
REFLUX EXTRACTOR 1000 g CAPACITY

STANDARD: ASTM D2172

This simple apparatus, working on the same operation principle of the mod. B017, consists of a cylindrical glass jar containing a metal frame supporting two metal cones of stainless steel cloth and a metal condenser on top of the jar.
Supplied complete with 100 filter papers and wire gauze.

Dimensions: Ø 160x510 mm **Weight:** 5 kg approx.

ACCESSORY AND SPARES

V200 Hot plate Ø 185 mm 230V 1ph 50-60Hz 1500W

B019-01 Filter paper, pack of 100
B019-02 Pyrex glass jar
B019-03 Metal condenser
B019-04 N° 2 stainless steel cones with frame
V173-03 Wire mesh with ceramic centre

B020 KIT
REFLUX EXTRACTOR 4000 g CAPACITY

Similar to mod. B019 KIT but having 4000 g capacity.

Dimensions: Ø 280x510 mm **Weight:** 9 kg approx.

ACCESSORY AND SPARES

V200-02 Hot plate Ø 220 mm 230 V 1ph 50-60 Hz 2000 W

B020-01 Filter paper, pack of 100
B020-02 Pyrex glass jar
B020-03 Metal condenser
B020-04 N° 2 stainless steel cones with frame
V173-04 Wire mesh with ceramic centre
B020-05 Wire mesh 300x300 mm

B067N
VACUUM PYKNOMETER 10 LITRES CAPACITY

THEORETICAL MAXIMUM SPECIFIC GRAVITY OF LOOSE ASPHALT MIXTURES (RICE-TEST)

STANDARDS: EN 12697-5 | ASTM D2041

Transparent plexiglass made, complete with valve and gauge, it is used for a rapid determination of bulk specific gravity of aggregates, the max. theoretic specific gravity of bituminous uncompacted road mixtures and the percent air voids in compacted mixtures.
To perform the test a minimum ultimate vacuum of 30mm/Hg is requested.

Dimensions: Ø 300x450 mm high
Weight: 8 kg approx.

B067-01N
VACUUM PIKNOMETER

Same as model B067N but with a higher useful height (270 mm) conforming to TP Asphalt StB T5 standard.

ACCESSORIES

A059-02 KIT
VIBRO-DEAERATOR, ELECTROMAGNETIC with adjustable vibrating intensity.
To vibrate the pyknometer for the evacuation of the air.
Complete with fixing device to the pyknometer.
This unit can be used also as a Sieve Shaker.
Technical details: see Section A p. 40

V205-01 + V205-10 + V205-12 + V230-03
VACUUM PUMP, PORTABLE TWO STAGES, complete with vacuum regulator and condensed water trap, tubing 3 m long.
Technical detais: see Section V p. 597

B065 B065-12 V205-01+V230-03

B065
ROTOVAPOR
ROTARY EVAPORATION APPARATUS

STANDARDS: EN 12697-3 | ASTM D5404

This unit is used to recover bitumen from a solvent by minimizing the changes in the asphalt properties.
The test is performed by distilling the residue of the solution of solvent and asphalt.
The rotating distillation flask is partially immersed in a heated oil bath, and the solution is subjected to high vacuum, with fine regulation of pressure (up to ± 0.1 kPa) according to EN 12697-3.
The Rotary Evaporation Apparatus is essentially composed of:
- distillation flask 1000 ml capacity
- motor of variable speed, (suitable to rotate the flask at an adjustable rate of 10 to 280 rpm)
- solvent recovery flask, 1000 ml capacity; condenser, heated oil bath.

The angle of the rotary/distillation flask is 15°
The instrument is supplied complete with glass tubing with three way valve and transparent flexible hose for solution intake.
The Rotatory Apparatus requires a vacuum pump and a vacuum regulating system (see accessories).

Power supply: 230V 1ph 50-60Hz
Dimensions: 740x430xh845 mm
Weight: 15 kg approx.

V205-01 + V205-10 + V205-12 + V230-03 A059-02 KIT

ACCESSORIES

B065-12 VACUUM REGULATING SYSTEM, including regulation valve, pressure gauge and vacuum digital gauge 1 mbar resolution. Power supply: 230V 1ph 50Hz Dimension: 300x200x350 mm

V205-01 VACUUM PUMP, dual stage. Technical details: see p. 597 230V 1ph 50Hz

V230-03 RUBBER TUBE, lined for vacuum, 3 m long.

B065-14 DIATHERMIC OIL, can of 5 kg

B065-15 EVAPORATION BALLOON, glass, flat, 3 l capacity

B065-13 DISTILLATION FLASK, 2000 ml capacity (ASTM D5404)

B065-16 FLOW CONTROL DEVICE with flow-meter to ASTM D5404

B067A
AUTORICE NEW

THE ULTIMATE CONTROL FOR YOUR RICE TEST

STANDARDS: AASHTO T209 I ASTM D2041

The AutoRice is an automatic control unit for the Maximum Specific Gravity test. Rice test results are critical for pavement quality, mixture design and laboratory mixture performance determination.
By pressing a button, the AutoRice starts the vacuum pump, regulates the vacuum pressure, precisely controls the vacuum time and monitors the shaker frequency and acceleration which is a parameter that is not currently monitored during the test.
Monitoring the three factors during the test can help agencies and contractors achieve better accuracy and repeatability. Data from the Rice test can be downloaded via the USB port.
AutoRice has to be connected with a compatible vacuum pump, vacuum pycnometer and electromagnetic vibro-deareator in order to perform the rice test as per standards.

MAIN FEATURES

- Controls and monitors Rice test (AASHTO T209 & ASTM D2041) vacuum pressure and vacuum time.
- Reduces operator errors improving accuracy and repeatability.
- Provides capability to enter weights and calculate max specific gravity results.
- Replaces vacuum gauge.

TECHNICAL SPECIFICATIONS

- Foot print: 12”x9”x4” (30x22x10 cm)
- Hose connection: 3/8” hose barb
- Max pump power: 3/4 HP
- Vacuum control: ± 0.4 mmHg at 27.5 mmHg
- Power supply: 110/220V
- Weight: 5 lbs (2.5 kg)

B067A **V205-01+V205-12+V230-03** **A059-02A**

B007
ASPHALT SPLITTER

This instrument is used to break and crumble asphalt samples to facilitate bulk density tests and laboratory testing purposes by reducing the granulating time in few minutes with high quality results. A rough asphalt sample of approx. 1 kg is poured into the stainless steel bowl equipped, at its bottom, with three rotating paddles. The cover is closed, the machine started, and the three paddles break and crumble the sample in grains.
The bowl is now tilted to discharge the sample into the self supporting suitable pan supplied with.
A hinged cabinet reducing noise protects the bowl. When opening the cover while the splitter is working, a microswitch automatically stops the machine. Conforming to CE Safety Directive.

TECHNICAL SPECIFICATIONS

- Stainless steel bowl of 6 litres capacity
- Multirange timer: sec/min/hour
- Main switch, Start/Stop button
- Switch for reverse mode of the rotating paddles (very useful when the material restrains between paddle/bowl)
- Paddles speed: 1400 rpm
- Power supply: 230V 50Hz 1500W
- Dimensions: 490x730x855 mm
- Weight: 85 kg approx.

B007
Unloading phase

B007 Open

SPARE

B007-11 Kit of three rotating paddles with screws.

PARTICLE LOSS AND RESISTANCE TO FUEL

STANDARDS: EN 12697-17, 12697-43 | EN 1097-2 | ASTM C131
The test concerns the determination of the particle loss by abrasion of porous asphalt mixtures, and the determination of the resistance of a pavement or a bituminous mixture to aviation fuel.
These Standards require, within other specific tests, the abrasion tester:

A075N
LOS ANGELES ABRASION MACHINE

Technical details:
see Section "A"
Aggregates, p. 46

A075N

B022SP
BOTTLE ROLLING MACHINE

STANDARD: EN 12697-11

To determine the affinity between aggregate and bitumen, expressed by visual registration of the degree of bitumen coverage on uncompacted bitumen-coated mineral aggregate particles after influence of mechanical stirring action in the presence of water. Rotation speed adjustable from 0 up to 85 rpm.
The machine can roll up to 3 bottles at the same time.
Supplied complete with timer **range 0 - 99 hours**, to fully perform the test cycle.

Power supply: 230V 50-60Hz 1ph
Dimensions: 385x295x160 mm
Weight: 10 kg approx.

B022SP + S132-01

S132-01

B022-12

A122-10
TILT TEST

The instrument measures the roughness coefficient of a joint.
The unit is also designed to test the possible fluage tendency of bituminous mixtures covering a slope of a dam subject to high sun radiations. The fluage tendency is the permanent viscous deformation of a material. The apparatus consists of an inclined adjustable plane on which the sample is placed.
Inclination angle: 0 - 75°
Max. sample diameter: 100 mm
The plane is slowly tilted until sliding of the upper surface of specimen on the lower one occurs. The roughness index can be evaluated from the measured inclination angle.

Dimensions: 270x175x265 mm
Weight: 5 kg approx.

A122-10

NEEDED ACCESSORIES

S132-01 TEST BOTTLE, made of borosilicate glass, 500 ml capacity, diameter 86 mm, height 176 mm, 30 mm neck diameter, as expressly requested by EN Specification.

B022-12 GLASS ROD with a diameter of 6 mm equipped with 35 mm long fitting rubber tube.

INDENTATION TEST USING CUBES OR MARSHALL SPECIMENS

STANDARDS: EN 12697-20, EN 13108-6

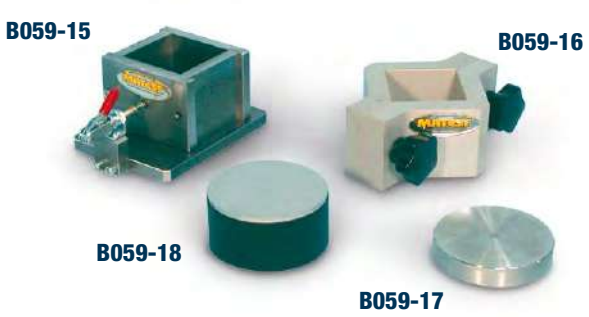
This EN describes a test method for determining the depth of indentation of mastic asphalt and rolled asphalt, when force is applied to them via a cylindrical indentor pin with a circular flat-ended base.
The test applies to aggregates of maximum nominal size less or equal to 16 mm.
This test method is performed on mastic and road constructions asphalts, on waterproofing and floor screeds in building constructions.
The indentation test can be applied also on Marshall specimens.
Condition the specimens together with their moulds for at least 60 min under water at the test temperature of 40 °C or 22 °C respectively with ± 1 °C accuracy.

B059-10
ASPHALT INDENTATION PENETROMETER

Comprising:
- Rugged basic frame where the screw penetration load device is fixed.
- Two interchangeable penetration pistons having 1 and 5 cm^2 surface.
- Two metallic discs having total weight of 500 N (51 kg) that are positioned on the load device.
- Dial gauge 30 mm, sens. 0.01 mm to measure the penetration.
- Stainless steel water bath complete with water discharge cock.

Heater, cube mould, test mould, **are not included** and have to be ordered separately (see accessories).

Dimensions: 530x600x820 mm
Weight: 160 kg approx.



B059-10

ACCESSORIES

B059-15
CUBE MOULD 70.7 mm
To prepare cube specimens.
Steel manufactured, it is easily detachable. Weight: 4350 g

B059-16
PENETRATION (ADJUSTABLE) TEST MOULD 69 mm.
Used during the penetration test of the cube specimen.
Made from aluminium alloy. Weight: 1850 g

B059-17
BASE, steel made, to fix the Marshall specimen into the Penetrometer.
Weight: 1100 g

B059-18
CALIBRATION DEVICE for the Indentation Penetrometer.
Weight: 700 g

B059-21
THERMOSTAT DIGITAL HEATING SYSTEM, complete with immersion heating element.
It heats water at the required temperature of 22 °C or of 40 °C with an accuracy within ± 1 °C as requested by Standards.
Power supply: 230V 1ph 50Hz 1500W
Weight: 3 kg approx.

C306-03
SEPARATE CONTROL PANEL, complete with switch and electric protections, to get the heating system to CE Safety Directive

C306-03

BULK DENSITY OF ASPHALT SPECIMENS
HYDROSTATIC GRAVITY METHOD

STANDARDS: EN 12697-6, EN 12390-7
ASTM D1186, D2726, C127 I AASHTO T166, T85

V085
SPECIFIC GRAVITY FRAME

Used for specific gravity determination of materials, and specifically the bulk density of laboratory compacted asphalt specimens and asphalt road cores.
Technical details: see section “V” p. 582

ACCESSORIES

V041
DENSITY BASKET, stainless steel, Ø 200 mm by 200 mm high, 3.35 mm mesh.

V075-11
DIGITAL BALANCE 6000 g capacity x 0.1 g sens.
Technical details and other models: see section “V” p. 581

A106
WAX MELTING POT
Technical details:
see section “A” p. 28

V300-19
PARAFFIN WAX, pack of 5000 g

V175-02
DIGITAL VERNIER CALIPER
0-200 mm x 0.001 mm

BITUMINOUS MIXTURES TEMPERATURE MEASUREMENT

STANDARD: EN 12697-13

V154
DIGITAL MICROPROCESSOR THERMOMETER

Range : -50 + 950 °C, resol. 0.1 – 1 °C
Supplied **without** probes to be ordered separately (see accessories).
Technical details and other models: see section “V” p. 590

ACCESSORIES

V154-01 PENETRATION PROBE, 120 mm long
V154-02 SURFACE PROBE, 260 mm long

BINDER DRAINAGE, BASKET METHOD

To determine the drainage of bituminous samples obtained from different mixtures of mineral fine aggregates or additives, for the evaluation of the drainage results.

STANDARD: EN 12697-18

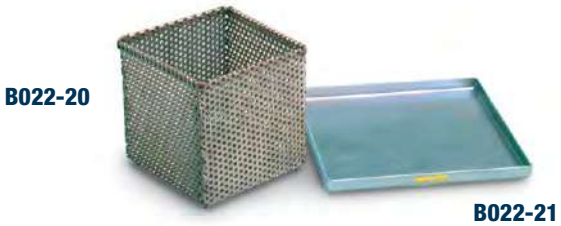
B022-20
DRAINAGE BASKET

Dimensions 100x100x100 mm, made from stainless steel sheet with Ø 3.15 mm holes.

Weight: 500 g approx.

B022-21
Tray, stainless steel made, dimensions 160x160x10 mm.

Weight: 500 g aprox.



B114
ASPHALT SAMPLES SEALING DEVICE

STANDARDS: ASTM D6752 I ASTM D6857 I ASTM D7063 I AASHTO T-331

The device is a system for sealing samples for determination of bulk specific gravity (density) of compacted and loose asphalt mixtures. The system can also be used for determining the bulk specific gravity and absorption of aggregate and stone. This product is now the standard for measurement of bulk specific gravity of open graded and absorptive compacted asphalt samples.
The samples are automatically sealed in specially designed puncture resistant polymer bags. Densities measured with this system are highly reproducible and accurate. The results are not dependent on material type or sample porosity.

Vacuum Pump: 1.25 HP
Power supply: 230V 1ph 50Hz 1430W
Dimensions: 490x640x510 mm
Weight: 91 kg approx.

NEEDED ACCESSORIES

B114-11 SMALL POLYMER BAGS 25x36 cm (pack of 100 pcs)
B114-12 LARGE POLYMER BAGS 38x46 cm (pack of 100 pcs)

B115
ASPHALT SAMPLES VACUUM DRYING DEVICE

STANDARDS: ASTM D7227 I AASHTO PP75

The vacuum drying device is specifically designed for rapid drying of compacted asphalt cores and samples. The quick and accurate dry weight, helps contractors determine pavement density close to real time and make adjustments to rolling pattern and material if necessary. It can also provide a matching baseline for density comparison between contractors and agencies.
The device dries specimens near room temperature, ensuring sample integrity and the most accurate & repeatable dry weight. Rapid moisture loss is attributed to electronic desiccation and high vacuum technologies. The system cycles a flow of ambient air and vacuum, ensuring a highly efficient moisture removal process. The state-of-the-art and patented thermoelectric cold trap is specifically designed to protect the vacuum pump from damage by capturing moisture extracted from the sample.

Vacuum Pump: 1 HP
Power supply: 230V 1ph 50Hz 1650W
Dimensions: 810x600x880 mm
Weight: 77 kg approx.

B115

B114

B068
MOISTURE INDUCED STRESS TESTER

STANDARD: ASTM D7870

Proper testing and screening of Hot Mix Asphalt (HMA) mixes for moisture susceptibility is a crucial requirement for designing today's high-performing, longer-lasting pavements. This product is designed to simulate HMA pavement asphalt stripping mechanisms, which are due to water and repeated traffic loading. Current moisture sensitivity tests suffer from poor repeatability and test times can take up to seven days. HMA conditioning in the instrument is automatic and can be completed in less than a day.
Plug the unit into a standard wall outlet, place the sample in the chamber, select your settings and the unit does the rest. The device creates pressure cycles within the chamber to simulate the effect of moisture on the asphalt mixture. The data from the unit can be stored and transferred to a PC for evaluation and storage.

Temperature Accuracy: ±1 °C
Pressure Accuracy: 0.25%
Power supply: 230V 1ph 50Hz 1650W
Dimensions: 1210x1210x1570 mm
Weight: 226 kg approx.

B068

LABORATORY BITUMINOUS MIXERS

AVAILABLE MODELS

E094
MIXER 5 LITRES CAPACITY

This bench mounting Mixer, is used for mixing samples of bituminous materials. Thanks to its double mixing action (shaft and planetary) it ensures uniform mixing. Two speed can be selected:
- 140 or 285 rpm for the revolving action
- 62 or 125 rpm for the planetary action

The mixer is supplied complete with stainless steel bowl, but **without** whisk to be ordered separately (see accessories).
It cannot be sold in CE markets without security guards (see mod. E095).

Power supply: 230V 1ph 50Hz 800W
Dimensions: 450x400x480 mm
Weight: 50 kg approx.

E094 + B028-03

E095
MIXER 5 LITRES CAPACITY

Same as mod. E094 but equipped with security guards, conforming to CE Safety Directive.

Note:
The proper utilization of the mixers mod. E094 and E095 requires to heat the bowl with the bituminous sample at the temperature specified by the Standards. To this purpose a common laboratory oven is used, and the sample mixing (time: approx 2 minutes) is performed immediately after having taken off the bowl from the oven. As an alternative to this procedure the heater mod. B028-01 can be used.

E095-01

B028-01


E095-03
B028-03

E095 + B028-03

ACCESSORIES FOR E094 and E095

B028-03 WHISK BEATER, thin wire, stainless steel, to EN Spec.

B028-01 ISOMANTLE ELECTRIC HEATER, complete with thermoregulator. Power supply: 230 V 1ph 50-60 Hz 800 W

E095-03 BEATER, stainless steel made.

SPARE

E095-01 Bowl, stainless steel, 5 litres capacity.

MIXERS 10 AND 20 LITRE CAPACITY

Mixers characterized by a robust construction with stainless-steel bowl and whisk, suitable to ensure homogeneous and uniform mixing through planetary action.
B025N is a table-mounted unit with a capacity of 10 litres, while the B025-01N model has a capacity of up to 20 litres. In accordance with CE directives. These planetary mixers are equipped with safety switches that automatically stop mixing if the grid is lifted by the user.
Each mixer is supplied complete with a stainless-steel bowl and a whisk. Beaters and electric heaters must be ordered separately (see accessories).
The machines are provided with a variable speed drive allowing to set a wide range of speeds:

- B025N:
  - 8 positions 50 to 150 rpm for the planetary action
  - 10 positions 115 to 400 rpm for the revolving action
- B025-01N:
  - 8 positions 50 to 150 rpm for the planetary action
  - 10 positions 180 to 540 rpm for the revolving action

NEW

B025N

B025-01N

HEATER

Note:
For a proper utilization of the mixers mod. B025N and B025-01N it is necessary to heat the bowl with the bituminous sample at the temperature specified by the Standards. To this purpose a common laboratory oven is used, and the sample mixing (time: approx 2 minutes) is performed immediately after taking the bowl out of the oven. To maintain the temperature during mixing, the mixers must be equipped with the specific Isomantle heaters (B025-05/B025-06)

AVAILABLE MODELS

MIXER 10L CAPACITY:

B025N
Power supply: 220V 1ph 50Hz 370 W
Dimensions: 570X340X585 mm. **Weight:** 42 kg approx.

B025NX
Same as B025N but 220V 1ph 60Hz

B025NY
Same as B025N but 110V 1ph 60Hz

MIXER 20L CAPACITY:

B025-01N
Power supply: 400V 3ph 50Hz 732 W
Dimensions: 730X610X1180 mm. **Weight:** 128 kg approx.

B025-01NX
Same as B025-01N but 220V 3ph 60Hz 732 W

ACCESSORIES

ACCESSORIES	B025N (10 litres)	B025-01N (20 litres)
HOOK BEATER	B025-15N	-
BEATER, ALUMINIUM	B025-12N	B025-13N
ISOMANTLE HEATER 230 V 1ph 50-60 Hz 1000 W	B025-05	B025-06
WHISK	B025-18N (ø 4mm wire - spare)	B025-10N (Ø 4mm wire) B025-19N (Ø 3mm wire - spare)
SPARE BOWL	B025-20N	B025-21N

B026N
PAVEMIX
AUTOMATIC ASPHALT LARGE LABORATORY MIXER, 32 LITRES CAPACITY

STANDARD: EN 12697-35 | ASTM D6307 | AASHTO TP53

The PaveMix has been expressly designed to prepare homogeneous bituminous mixtures at a strictly controlled temperature.
The preparation of the bituminous sample is obtained in a short time period (few minutes) to avoid any mechanical aggregate degradation and to fully coat all mineral components, as requested by EN 12697-35.

B026-05N
PAVEMIX NEW

LABORATORY MIXER similar to model B026N but upgraded with detachable helical mixing blades to facilitate the cleaning procedure.

MAIN FEATURES

- Mixing capacity: 32 litres max.
- Mixing bowl: stainless steel AISI 316.
- **Slot on the top of the lid to pour filler and additives during mixing.**
- Mixing temperature: selectable from ambient up to 260 °C through sensitive probe and digital display control.
- Mixing speed: adjustable from 4 to 40 rpm.
- **Easy tilting unloading operation by electromechanical motion with rotation up to 130°.**
- Strictly controlled temperature.
- Fast preparation of bituminous samples.

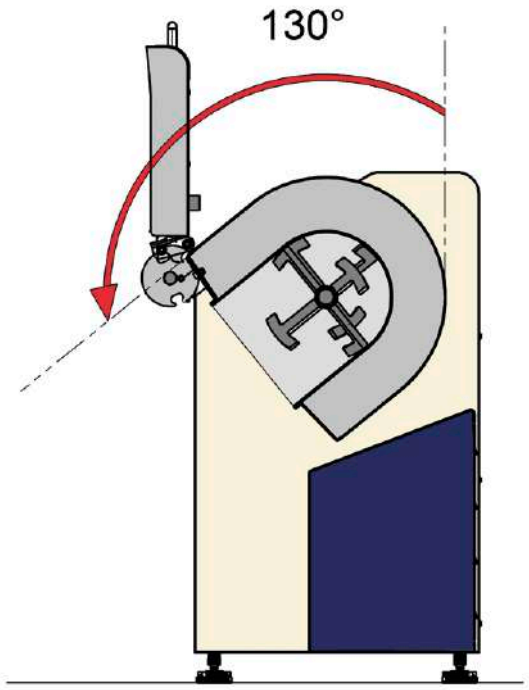
B026N

The Pavemix produces representative samples to perform:
- Gyratory compaction tests (EN 12697-10, EN 12697-31)
- Marshall stability tests (EN 12697-34, EN 13108)
- Wheel tracking wet and dry tests (EN 12697-22)
- Slabs compaction laboratory tests (EN 12697-33)
- Beam fatigue and Stiffness tests (EN 12697-26, EN 13108)
- Asphalt general purpose tests.

PaveMix consists of:
- Main frame holding a horizontal stainless steel bowl with a helical mixing shaft.
- The bowl, double wall insulation made of stainless steel AISI 316, contains an electric heater with probe sensor granting constant and uniform temperature control.
- **An electromechanical motion allows to tilt the bowl facilitate the unloading operation, with total rotation up to 130°**.

The control panel foresees:
- Digital thermo regulator to set temperature and to control the mixing temperature.
- Mixing speed regulator.
- Main and start/stop switches.
- Rotation inversion of the blades.
- Command to tilt the bowl.

Heating power: 3000W
Power supply: 230V 1ph 50-60Hz 4500W
Dimensions: 1280x700x1210 mm
Weight: 350 kg approx.



Unloading procedure.
Easy tilting of the bowl by electric motion with rotation angle up to 130°

B026-05N Detail of the detachable mixing shaft with blades NEW

Detail: mixing shaft with helical blades

Detail: slot on the top of the lid

B031N1
MARSHALL AUTOMATIC EN (IMPACT) COMPACTOR

STANDARDS: EN 12697-10, 12697-30 | comparable to: BS 598:107

This ruggedly constructed apparatus automatically compacts the bituminous sample and stops off the motor after the preset number of blows has been completed on the automatic digital display counter.
The trip mechanism is structured so that the sliding hammer falls at the same height at every blow.
The mould is held in position by a fast clamping device.
The compactor includes a vibrated concrete base where a laminate hardwood block is mounted.
Total weight of the compaction hammer (Rod + Foot + Sliding mass): 7850 ± 50 g
Sliding mass weight: 4535 ± 15 g
Free fall height: 457 ± 5 mm
Blow frequency: 50 blows in 55/60 seconds
The machine is equipped with safety door, conforming to CE Safety Directive.
When opened it stops automatically and cannot operate.
The control panel can be wall fixed or placed on a bench.
All moving parts are quickly/easily accessible for maintenance.
The compactor is supplied complete, **except for the mould** that must be ordered separately.

Power supply:
230V 1ph 50Hz 300W
Dimensions:
500x500x1890 mm
Weight: 220 kg approx.

B031N 1 + B031-01

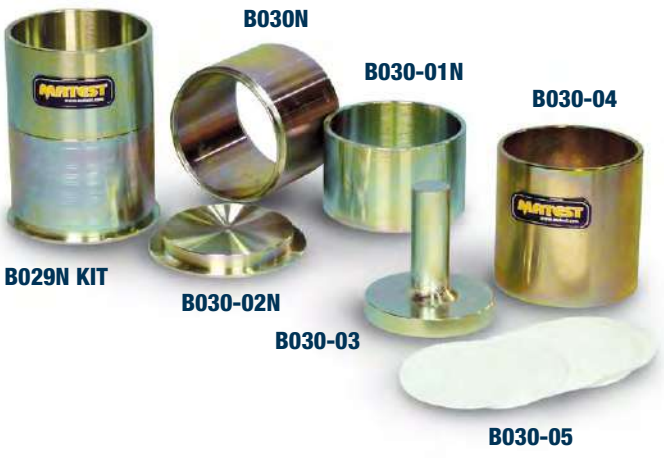
B031N 1

ACCESSORY

B031-01
CABINET, lined with sound-proofing material for noise reduction within CE limits.
Dimensions: 800x800x2000 mm approx.
Weight: 100 kg approx.

SPARE

B033-11N Compaction Hammer complete



B029N-KIT
MARSHALL COMPACTION MOULD, Ø 4"

STANDARDS: EN 12697-10 | EN 12697-30 | NF P98-251-2

Inside diameter. 101.6 mm (4")
Steel manufactured, plated against corrosion.

Weight: 3.150 g

Consisting of:

B030N	MOULD BODY only. Weight: 1300 g
B030-01N	FILLING COLLAR only. Weight: 850 g
B030-02N	BASE PLATE only. Weight: 1000 g

Note: French NF P98-251-2 Spec. requires the filling collar with a small different dimension, but fitting perfectly the mould body and the baseplate.

ACCESSORIES

B030-01NF	FILLING COLLAR only (NF P98-251-2). Weight: 850g
B030-03	EXTRACTION PLATE, to eject specimens from the mould. It is used in conjunction with B030-04 receiver. Weight: 1400 g
B030-04	SPECIMEN RECEIVER, used to receive the specimens ejected by the B030-03 extruder. Weight: 1300 g
B030-05	FILTER DISC Ø 100 mm. Pack of 100

B033N
AUTOMATIC MARSHALL ASTM COMPACTOR
FOR Ø 4" MOULDS

STANDARDS: ASTM D6926 I Comparable to AASHTO T 245

This ruggedly constructed machine has been designed to eliminate the laborious process of hand compaction. It automatically compacts the specimen and stops off the motor after the preset number of strokes has been completed on the automatic digital display counter. The trip mechanism is structured so that the hammer falls at the same height at every stroke. The unit incorporates a compaction wooden pedestal. The drive mechanism lifts the 4.53 kg. compaction hammer, plated against corrosion, to the height of 457 mm and allows free fall at nominal 55 blows per minute.
The control panel can be wall fixed or placed on a bench.
This compactor is suitable only for Marshall moulds Ø 4".
The compactor is supplied complete **except** for the mould which must be ordered separately.
It cannot be sold in CE markets without safety guards (see mod. B033-01N and B033-03)

Power supply: 230V 1ph 50Hz 300W
Dimensions: 540x400x1600 mm
Weight: 95 kg approx.

B033N

B033-01N

B033N + B033-03

B033-01N
AUTOMATIC MARSHALL ASTM COMPACTOR
FOR Ø 4" MOULDS

Same as mod. B033N, but equipped with safety guard, conforming to CE Safety Directive.
When opening the guard during Compactor working, a microswitch automatically stops the unit.

B036T
PORTABLE PEDESTAL
NEW

Without doubt the "handiest" system for the compaction of Marshall specimens in situ.
The equipment consists of:
- wooden pedestal
- steel base (compaction anvil)
- mould clamping system with quick couplings.

Dimensions: 420x310x520 (h) mm
Weight: 28 kg approx.

Note: the instrument has to be completed with the compaction hammer B032-05 (for 6" diameter mould) or B034N (for 4" diameter mould)

B036T + B034N

B032-KIT
MARSHALL COMPACTOR HAND OPERATED FOR Ø 4" MOULDS
STANDARD: ASTM D6926

Similar to mod. B033N, but the hammer is lifted and released manually.

Dimensions: 320x320x1600 mm
Weight: 60 kg approx.

The assembly consists of:

B034N
COMPACTION HAMMER, with 4.53 kg sliding weight, guided on a shaft.
Plated against corrosion.
Weight: 10 kg approx.

B036
COMPACTION PEDESTAL, consisting of a wooden block, capped with a steel plate.
Complete with mould clamp device.
Plated against corrosion.
Weight: 42 kg approx.

B037
SUPPORT and hammer guide.

B032 KIT

B035-01N
AUTOMATIC MARSHALL COMPACTOR
FOR 6" AND 4" Ø MOULDS

STANDARDS: ASTM D6926 I ASTM D5581
comparable to AASHTO T245

This ruggedly constructed apparatus automatically compacts the Marshall specimens 6" and 4" diameter, and stops after the preset number of blows has been completed on the separate automatic digital display counter.
The trip mechanism is structured so that the sliding hammer falls at the same height at every blow. The mould is stationary and the hammer has flat-foot.
The mould is held in position by a fast clamping device.
The unit incorporates a compaction wooden pedestal.
The drive mechanism lifts the 22.5 lbs. compaction hammer (Ø 6"), plated against corrosion, to the height of 18" and allows a free fall at 64 blows per minute.
Sliding mass for the Ø 6" specimen: 22.5 lbs. ± 0.01 lb (10.205 kg)
Sliding mass for the Ø 4" specimen: 4.53 kg
Free fall height: 18" ± 0.1" (457.2 mm)
Blow frequency: 64 per minute ± 4
The unit is equipped by an inverter, allowing to adjust the blow's frequency.
All moving parts are quickly/easily accessible for maintenance.
The control panel can be wall fixed or placed on a bench.
The compactor is supplied complete with collar to fix the mould 6" diameter, but **without the compaction hammer 6" diameter** (mod. B035-11N) **and 4" diameter** (mod. B035-12N), and the moulds, which must be ordered separately (see accessories).
The compactor cannot be sold in CE markets without security guards (see mod. B033-03)

Power supply:
230 V 1ph 50-60 Hz 500 W
Dimensions: 460x570x1700 mm
Weight: 180 kg approx.

B035-01N + B033-03
with mould and hammer

ACCESSORIES

B035-11N COMPACTION HAMMER 6" diameter, complete, for the B035-01N Compactor.

B035-12N COMPACTION HAMMER 4" diameter, complete, for the B035-01N Compactor.

B035-13 REDUCTION COLLAR to fix the mould B029NKIT+B030KIT (4" Ø) to the Marshall Compactor B035-01N

B033-03 SOUNDPROOF SECURITY CABINET, steel made, lined with sound-proofing material, complying to CE Safety Directive

B032-01
MARSHALL COMPACTOR, HAND OPERATED,
FOR 6" AND 4" Ø MOULDS

STANDARDS: ASTM D6926, D5581

Supplied complete with compaction hammer 6" diameter, wooden pedestal capped with steel plate and mould clamp device, support/hammer guide.

Dimensions: 320x320x1700 mm
Weight: 70 kg approx.

B032-01

ACCESSORIES

B034N
COMPACTION HAMMER 4" diameter, complete, for B032-01 Compactor.

B032-11
REDUCTION COLLAR to fix the mould B029N KIT+B030 KIT(Ø 4") to the Marshall Compactor mod B032-01

B032-11

SPARE

B032-05 Compaction Hammer 6" diameter, complete, for B032-01 Compactor

B035-01N
with mould and hammer

B035-11N

B035-12N

B030 KIT
MARSHALL COMPACTION MOULD, Ø 4”

STANDARDS: ASTM D6926 / Comparable to AASHTO T245

Inside diameter 101.6 mm (4”)
Steel manufactured, plated against corrosion.

Weight: 3100 g

Consisting of:

B030N Mould body only. Weight: 1300 g

B030-01N Filling collar only. Weight: 850 g

B030-08 Base plate only. Weight: 950 g

ACCESSORIES

B030-03 EXTRACTION PLATE, to eject specimens from the mould. It is used in conjunction with B030-04 receiver. Weight: 1400 g

B030-04 SPECIMEN RECEIVER, used to receive specimens ejected by the B030-03 extruder. Weight: 1300 g

B030-05 PAPER DISC Ø 100 mm. Pack of 100.

B030-06 BASE PLATE with handles (alternative to mod. B030-08)

B029-01KIT
MARSHALL COMPACTION MOULD, Ø 6”

STANDARD: ASTM D5581-96

Consisting of:

B029-02 Mould body

B029-03 Filling collar

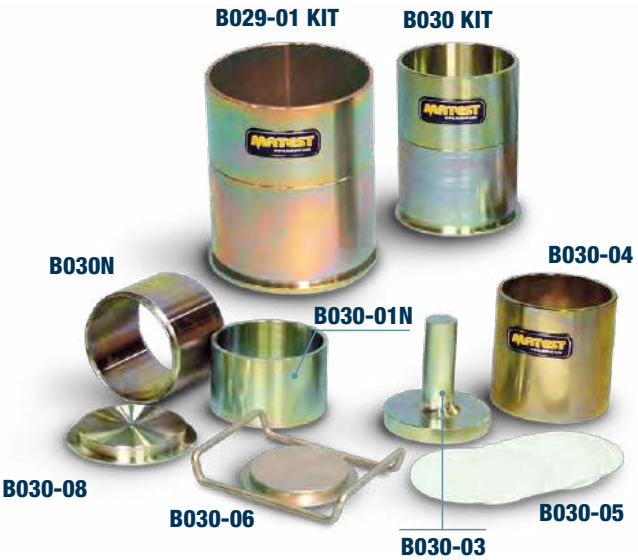
B029-04 Base plate

Steel manufactured, plated against corrosion.

Weight: 5 kg approx.

ACCESSORY

S200-14 Paper disc Ø 150 mm (pack of 100).



S114
UNIVERSAL EXTRUDER

Hand operated, actuated by a 5 tons hydraulic jack, it is designed to extrude samples having Ø 4” and 6”. It can therefore extrude Marshall, CBR, Standard and Modified Proctor specimens.

Dimensions:
Ø 300x500 mm
Weight: 32 kg approx.

S114

VIBRATORY COMPACTION METHOD

PREPARATION OF BITUMINOUS TEST SPECIMENS

Applicable to loose mixtures and cores to determine a density ratio for a bituminous mixture.

STANDARDS: EN 12697-9, 12697-10, 12697-32, 13266-4
BS 1377:4, 1924:2

The equipment consist of:

S197N1

B097
P. R. D. MOULD

Vertically split on one side, foreseen of clamp attachment to the base plate, plated against corrosion, is utilized for determining the degree of compaction of bituminous pavements, for quality control purpose.

Weight: 12 kg

B097

S197-01N

S197N1
VIBRATING HAMMER

Double insulated motor, trigger handle, for asphalt compaction in the percentage refusal density test. It can be used also for the compaction of Proctor and CBR specimens.
Technical details: see Section “S” p. 490

ACCESSORIES

B097-11N SMALL TAMPING FOOT, Ø 102 mm Complete with shank.

B097-12N LARGE TAMPING FOOT, Ø 146 mm Complete with shank.

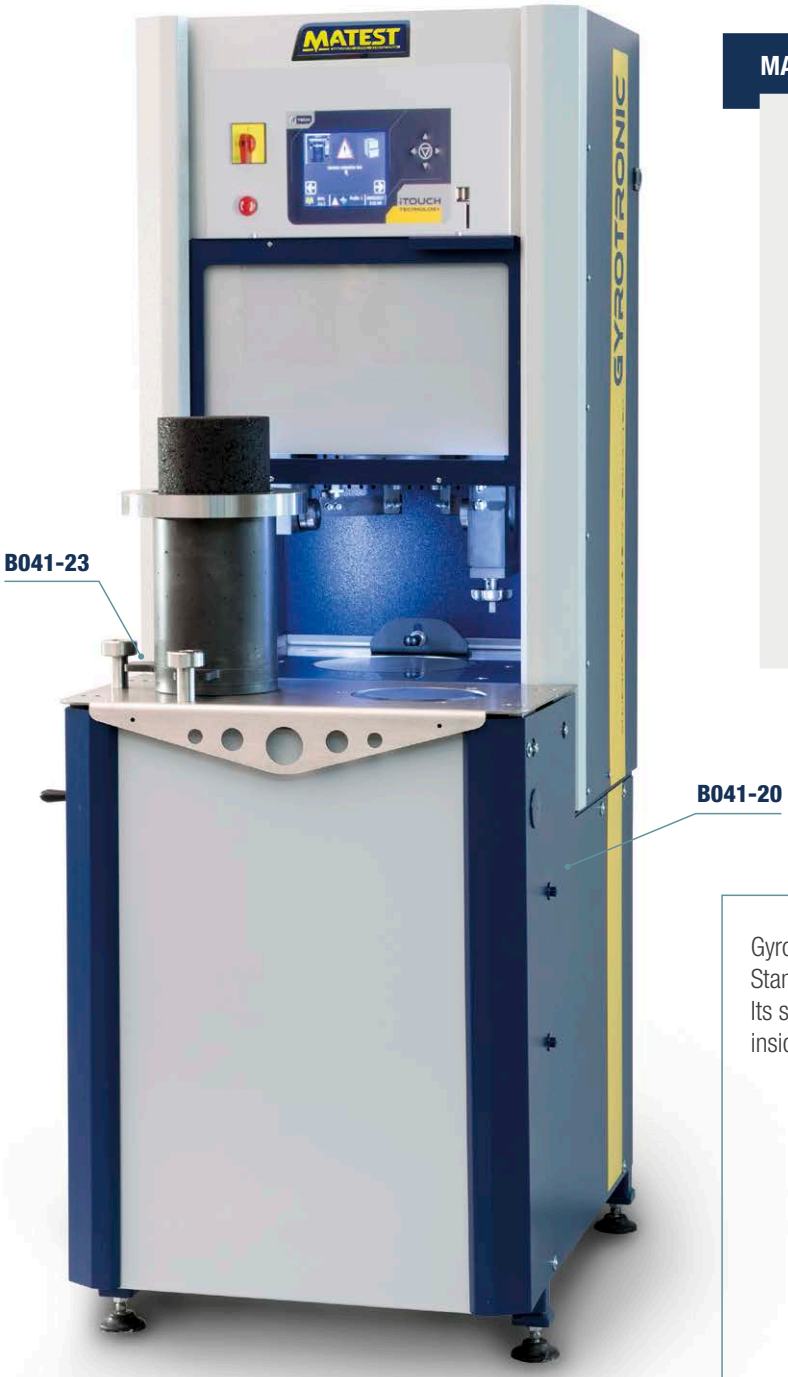
S197-01N SUPPORTING FRAME for vibrating hammer (see p. 490). Weight: 75 kg approx.

B097-12N **B097-11N**

GYROTRONIC
SUPERPAVE GYRATORY COMPACTOR

STANDARDS: EN 12697-10, EN 12697-31 | ASTM D6925 | AASHTO T312, TP4 | SHRP M-002

This Gyratory Compactor, entirely developed and manufactured by Matest, is used to simulate and reproduce the real compaction conditions under actual road paving operations, hence determining the compaction properties of the asphalt.

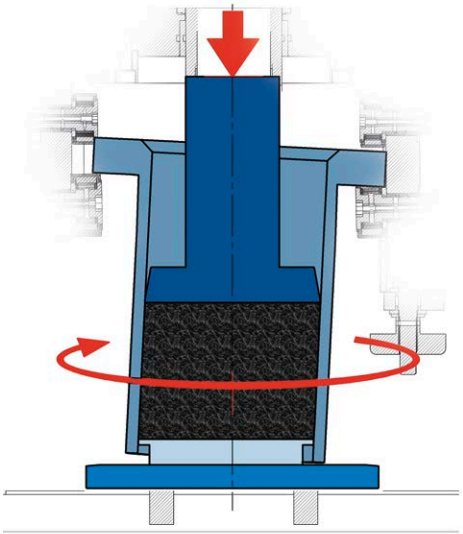


B041M with accessories

MAIN FEATURES

- Rigid steel frame ensuring excellent angle control.
- **Electro-pneumatic action with servo-controlled regulator.**
- Full color touch screen control unit, running like a standard PC based on Windows operating system.
- Software for PC control acquisition and data processing.
- Optional shear stress measurement.
- Concept based on American DOT principles.
- Cold mix emulsions which can be compacted.
- Optional integrated balance.
- Optional integrated extruder.
- Gyratory angle adjustable from 0 to 2.4° (up to 3°).
- **Electromechanical version available on request.**

Gyrotronic working principle precisely meets the international Standards specifications avoiding any interpretation deviation. Its stable mechanism with gears and bearers a is embedded inside a sturdy frame.



A SUCCESSFUL PRODUCT

- COST COMPETITIVE
- TRIED AND PROVEN
- OVER 50 UNITS DELIVERED EVERY YEAR

GYROTRONIC - SUPERPAVE GYRATORY COMPACTOR

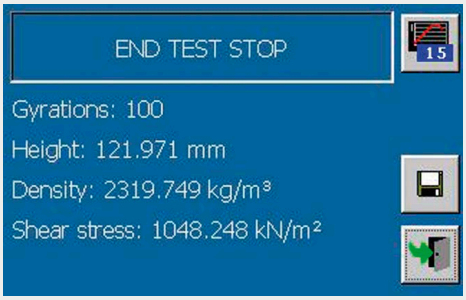
Gyrotronic compacts in a fully automatic way, by combining the rotary action and the vertical resultant force applied by a mechanical head. The Compactor comprises a highly rigid steel frame ensuring excellent angle control.
Load is applied by an electro-pneumatic cylinder, servo-controlled by a precision pressure regulator; the height is measured by a linear transducer.
Gyratory motion is generated by an eccentric high precision system allowing an easy set up with precision and constant angle of gyration.
The rotation speed is controlled by an inverter through on board computer control.
Using the proper perforated mould, the Compactor is able to run tests also on cold emulsified asphalt mix.
The acquired results are also employed in the investigation of volumetric and mechanical characteristics of the asphalt mix.
The machine is calibrated at Matest factory to the selected internal angle.

ADVANTAGES OF AN ELECTRO-PNEUMATIC COMPACTION SYSTEM

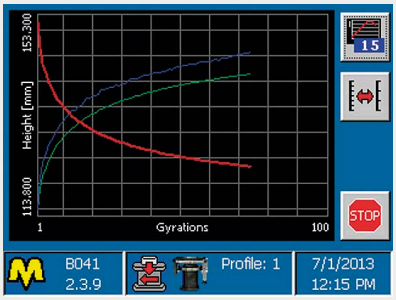
The Gyrotronic is equipped with a high performance, value engineered, **electro-pneumatic loading system**. The vertical actuator is low friction pneumatic cylinder and allows to apply constant stress regardless of the response of the specimen. In this way, the compaction is strictly performed in stress control and load/stress spikes are prevented. This concept provides a simple, cost effective solution with **reduced maintenance requirement**.

ON-BOARD TOUCH SCREEN or PC CONTROL

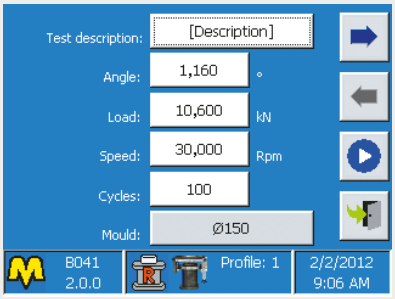
The touch-screen icon interface allows an easy set up of the parameters and an immediate automatic execution of the test, data acquisition and processing, graphics and file. A remote test control is available through a dedicated software, provided in bundle.
Direct connection to Intranet (through LAN network) and Internet to establish a remote communication and receive an immediate diagnostic of potential problems from Matest technicians, or for software updates.
Unlimited memory storage with: 2 USB ports, 1 SD card.
Hardware technical details: see catalogue at p. 19.



End test data (with shear stress value)



Test execution (data plot)



Setting of test parameters

TECHNICAL SPECIFICATIONS

- Compacted specimen size: Ø 100 and 150 mm; height from 0 to 200 mm for both sizes.
- Mould dimensions: Internal Ø 100 and 150 mm; height 250 mm for both moulds.
- Gyratory angle: adjustable from 0 to 2.4° (up to 3°)
- Number of cycles (gyratory): adjustable from 1 to 5000
- Gyration rate: adjustable from 5 to 60 work cycles/min (30 cycles/min requested by Standards)
- Vertical load on Ø 150 mm specimen: adjustable from 10 to 1000 kPa (1000 kPa with 10 bar compressor) (800 kPa with 8 bar compressor) (700 kPa with 7 bar compressor)
- Vertical load on Ø 100 mm specimen: adjustable from 23 to 1500 kPa (with 7 bar compressor)
- The vertical load on the specimen is automatically controlled and adjusted by the electronic system.

Modes of operation:

- Compaction of specimen in accordance to the selected number of rotations.
- Compaction of specimen upon reaching the selected height.
- Compaction of specimen upon reaching the selected density.
- **The machine can also perform a final flattering cycle at "zero" angle to obtain specimens with perpendicular faces.**

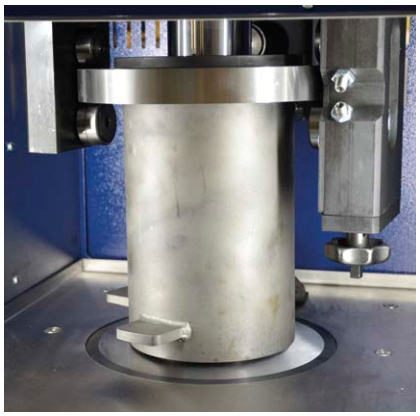
Data acquisition: number of rotations, specimen height, applied load (to ensure tolerances requested by the Standards)

Requires pressurized air, minimum 7 bar.

The Matest Gyratory Compactor is **supplied complete** with lubricant and power cord.
Optional extra are: moulds, filter paper, penetration pistons, extruder, bench, air compressor Accredia official vertical load calibration certificate, to be ordered separately (see accessories)

Power supply: 230V 1ph 50-60Hz 1000W 12A
Dimensions: 640x500x1050 mm
Weight: 240 kg approx.

Overview of mechanical "heart"



Compaction phase: simultaneous action of a static compression and of the shearing action

AVAILABLE MODELS

B041M
GYRATORY COMPACTOR - ASTM

STANDARDS: ASTM D6925 | AASHTO T312 | SHRP M-002
The machine is calibrated at Matest factory and supplied with the internal angle set to 1.16° as requested by ASTM, AASHTO Specifications.

B041M EN
GYRATORY COMPACTOR - EN

STANDARDS: EN 12697-10, EN 12697-31
The machine is calibrated at Matest factory and supplied with the internal angle set to 0.82° as requested by EN Specifications.

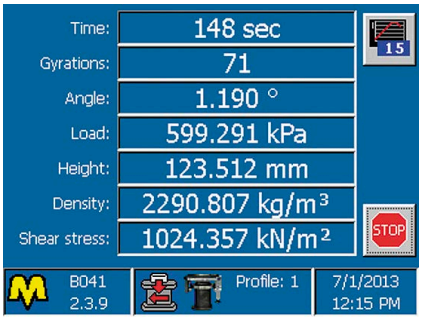
Note: Electromechanical Gyratory Compactor version available on request.

GYROTRONIC WITH SHEAR STRESS - RESEARCH GYRATORY COMPACTOR

This model is basically structured as mod. B041 and B041EN, but, in addition, **it includes the shear stress measurement device** and therefore it is recommended for both design and research purposes.
The device provides the most important parameters required to determine the main properties of asphalt mixes, and to predict their suitability for practical uses. This integrated measurement allows user to perform tests without any additional operation. The system comes already calibrated from the factory.

MAIN FEATURES

- Integrated shear stress measurement.
- A dedicated group of load cells measures all the involved forces acting on the specimen and through our software the effective shear stress value is calculated.
- Real time display of the instant shear stress value along with the entire compaction process.
- Calculation of the resultant load eccentricity and consequently the effective tilting moment.
- Results exportable into an Excel data report, which can be easily edited by the user.



Test execution with shear stress measurement

GYROTRONIC EXCEEDS THE STANDARDS

The R&D department is continuosly committed to improve the performance of SGC compactors. Matest aims to meet any type of need and purpose, from academics to researchers and routine testing laboratories, through a constant attention to quality.

The annual revisions have led to the development of a high performance electro-compaction system that exceeds the standard indications.

- Applies constant stress regardless the specimen response
- No rigid reaction to specimen behaviour
- Easy to control
- Inherently good stress/load control
- Cost competitive with low maintenance
- Reliable and precise

The following table clearly shows the reasons why Gyrotronic goes beyond the acknowledge figures.

	EN	AASHTO	ASTM INTERNATIONAL	SHRP		
CONSOLIDATION PRESSURE	600 kPa	600 kPa	600 kPa	600 kPa		10...1000 kPa (150 mm samples) 23...1500 kPa (100 mm samples)
ANGLE	0.82°	1.16°	1.16°	1.25°		Adjustable 0...2.4° (up to 3°)
GYRATIONS/MIN	30	30	30	30		Adjustable 5...60

GYROTRONIC AND ACCURACY

Gyrotronic strictly mantains the compaction angle, exceeding the EN and ASTMs standards. In fact, the angle **IEA_{240}** is precisely defined within an accuracy of ±0.003°.

Also, all specifications defined in the EN 12697-31 Annex C are complied and exceded. The maximum difference between the four individual measurements, that gives an idea about the **planarity of top and bottom faces**, is completely under the standards limit.

Another aspect is the parallelism between top and bottom faces: the difference between the Internal Top Angle, **ITA**, and the Internal Bottom Angle, **IBA**, also indicated as **δ_{TB}** meets and exceeds the standard.

The compacted specimens will be perfect for mechanical analysis: parallelism between top and bottom plane, associated with right planarity, and perpendicularity between vertical walls and each plane are the fully guaranteed.

	ASTM D6925 ASTM D7115 AASHTO T312	EN 12697-31	MATEST
PRESSURE	600±18 kPa	600±18 kPa	
ANGLE, IEA_{240}	1.16°±0.02°	0.82°±0.02°	1.16° ± 0.003° 0.82°± 0.003°
δ_{TB} = ITA - IBA		<0.10°	<0.02°
Max difference between individual measurements		<0.05°	<0.02°
δ_{LH} = IEA_{240}-IEA_{425}		<0.10°	<0.07

AVAILABLE MODELS

B045
GYROELECTRONIC

Electromechanical gyratory compactor. The load is applied by an electro-mechanical cylinder with a load cell positioned directly on the vertical actuator for precise load measurement.
The machine can also be configured as requested by EN Specifications **(model B045EN)**

B045-01
GYRORESEARCH

Used for research purposes, this electromechanical compactor allows for the **adjustment of the gyratory angle, selectable in a range between 0° and 3°**, during compaction, real time direct shear and torque measurement.

ACCESSORIES to perform the test: (for all Gyratory models)

B041-05 HARDENED SPECIMEN CYLINDER Ø 100 mm complete with bottom plate

B041-06 HARDENED SPECIMEN CYLINDER Ø 150 mm complete with bottom plate

B041-08 HARDENED SPECIMEN CYLINDER Ø 100 mm with holes for cold mix compaction, complete with bottom plate

B041-09 HARDENED SPECIMEN CYLINDER Ø 150 mm with holes for cold mix compaction, complete with bottom plate

B041-11 TOP PENETRATION PISTON Ø 100 mm

B041-12 TOP PENETRATION PISTON Ø 150 mm

Metallic discs, to make easier the handling of specimens after the test, strongly recommended accessory for low-cohesion mixtures, such as draining asphalts:

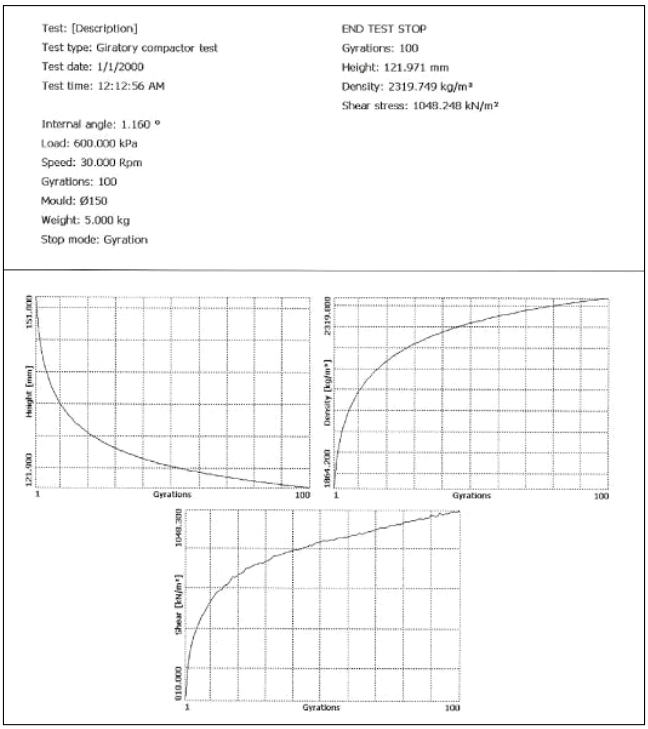
B041-13 METALLIC DISC for Ø 100 mm moulds. Pack of 2

B041-14 METALLIC DISC for Ø 150 mm moulds. Pack of 2

Paper discs, to prevent asphalt from sticking to the piston and the mould's base plate, and to absorb bitumen in excess:

B041-15 FILTER PAPER for Ø 100 mm moulds. Pack of 100

B041-16 FILTER PAPER for Ø 150 mm moulds. Pack of 100



Final report

Hollow Punches for Gyratory Compactor:

Used to maintain the core in the right shape and store cohesive asphalt or concrete samples after compaction.
Some asphalt and concrete mixes can be very unstable due to their high void ratio and large particle size. Wrapping the sample around the hollow punch will prevent it from crumbling down or receiving physical deformations once it is ejected from the mould.
The material will then settle down and assume its stiff properties once it cools down after compaction:

B041-17
HOLLOW PUNCH to stabilize and to mature the sample Ø 100 mm

B041-18
HOLLOW PUNCH to stabilize and to mature the sample Ø 150 mm

ACCESSORIES for the Gyratory Compactor:

B041-20 WORKTOP for B041 and B041EN, it can also accept the pneumatic specimen extruder (B041-23) and the integrated balance (B041-26)

or:

B041-19 WORKTOP for B041-01 and B041-01 EN, it can also accept the pneumatic specimen extruder (B041-23) and the integrated balance (B041-26)

B041-23 PNEUMATIC AUTOMATIC SPECIMEN EXTRUDER, it can be fixed to the worktop B041-19, B041-20, or to any bench.

V207 AIR COMPRESSOR, pressure 10 bar.
Technical details: see p. 598

B041-35 FILTER GROUP for condensed water removal from the compressed air. (needed accessory).

B041-21 WHEELS (kit of 4) with brake, for an easy displacement of the Compactor in the laboratory.

B041-30 VERTICAL FORCE TESTING DEVICE with load ring.

As alternative:

B041-31 VERTICAL FORCE TESTING DEVICE with digital dynamometer.

B041-33 KIT OF 2 DISTANCE PIECES of 105 and 115 mm high for the control of the height values measured by the linear transducer.

B041-34 ACCREDIA official vertical load calibration certificate.

WEIGHTING SOLUTIONS

B041-26
BALANCE, INTEGRATED into the worktop, to facilitate the sample and the mould weightings, by avoiding the stress of lifting them.
The weighting reading values are directly and automatically displayed on the control panel of the Compactor.
Capacity: 30 kg
Accuracy: ± 6 g

OR

B041-27
BENCH for lateral bearing of a weighting balance.
Suggested balance:
V075-13 Capacity 30 kg div. 0.5 g
or:
B041-24 Capacity 30 kg div. 0.1g as requested by EN (or a balance of the customer)

B041-28
GAM
GYRATORY INTERNAL ANGLE MEASURER

STANDARDS: EN 12697-31 | ASTM D7115 | AASHTO T344

This Gyratory Angle Measurer has been designed by MATEST to provide an angle validating device. In less than 30 minutes the operator may perform the calibration of the Gyratory Compactor.

The device perfectly simulates a HMA specimen as it generates an equivalent tilting moment and shear forces.

GAM can cover a wide range of angles, including the ones specified by EN and ASTM Standards.

The device allows to perform TOP and BOTTOM angle measurements as specified by the Standards; the average of the obtained values is then considered as the **internal angle of the machine**.

An excel spreadsheet, which is supplied along with the device, is used for data acquisition and processing, and provides the precise value of the internal angle according to the calculation procedure specified by EN 12697-31 (Annex-C) and AASHTO T344.

The spreadsheet allows to plot several graphs showing the measured data and it also provides some important indexes about the quality of the data.

MAIN FEATURES

- High accuracy of the measured data.
- Connection to PC through RS232 cable.
- Three modes of data acquisition: Single, Partial or Complete.
- Accuracy: more than 0.01°, as requested by the Standards.
- Data processing is carried out by a specific spreadsheet, which also allows to create the final calibration certificate.
- No need for power supply since the device is battery operated. Also it has an energy saving feature which automatically switch off the device if it is not being used for a while.
- Final calibration certificate.
- Stand-alone device (battery operated).
- Energy sawing with integrated automatic switch off function.

B041-28

TECHNICAL SPECIFICATIONS

- The device is supplied complete with:
  - Two different rings to perform tests either with M=240Nm or M=425Nm
  - Upper and lower base plate
  - RS232 cable
  - Strong practical suitcase
  - Calibration certificate
- Data are read by GAM and then downloaded (via RS232 cable) all together at the end of the measurements, with no need to connect the device to the PC after each measurement
- Possibility to repeat even just one of the measurement, and lately include it in the calculation spreadsheet

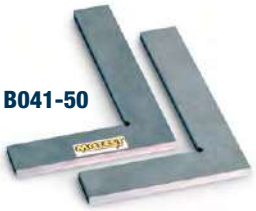
Power supply: n°2 batteries 1.5V type AA
Dimensions: Diameter 150 mm, Height 115 mm
Weight: 5.6 kg

ACCESSORIES

B041-50 GAM CALIBRATION-CHECKING set to ASTM (1.16° angle). The set is composed by two square rules. Supplied complete with factory certificate.

B041-51 GAM CALIBRATION-CHECKING set to EN (0.82° angle). The set is composed by two square rules. Supplied complete with factory certificate.

B041-55 ACCREDIA Official Calibration Certificate of the angle, for the square rules (ASTM and EN).


B041-50

Calibration certificate

ARC
ASPHALT ROLLER COMPACTOR
ADVANCED ELECTROMECHANICAL SYSTEM, HIGH LOAD, HOT ROLL, MULTI SIZE

STANDARDS: EN 12697-33 method 5.2 and EN 12697-33 annex A

GERMAN PROCEDURE TP-ASPHALT StB 33 APPROVED

B039N

MAIN FEATURES

- **40 kN vertical force**.
- Sturdy frame made of steel.
- Alternating displacement system, for table displacement and vertical load pressure.
- Integrated touch screen control unit based on Windows operating system.
- Easy management and analysis of data, test results, graphs.
- Touch-screen icon for an easy parameters set up and an immediate test execution.
- Unlimited memory storage with: 2 USB ports,1 SD card slot.
- Direct Internet and Intranet (LAN) connection for remote technical assistance and for software updates (see p. 19).
- **Heating of the segment roller (optional)**.
- Simple and quick roller and mould positioning.
- Perfect horizontal flatness of the slab surface.
- Uniform density and dimensions of the slabs.
- Easy to maintain.
- Energy controlled compaction procedure.
- Silent compaction.

HIGH LOAD | HOT ROLL | MULTI SIZE | HEATED CART | PERFECT SLAB FLATNESS | THERMAL SHOCK PREVENTION

B039N
ARC
ASPHALT ROLLER COMPACTOR
ADVANCED ELECTROMECHANICAL SYSTEM, HIGH LOAD, HOT ROLL, MULTI SIZE

STANDARD: EN 12697-33 method 5.2 and EN 12697-33 annex A | ASTM D8079

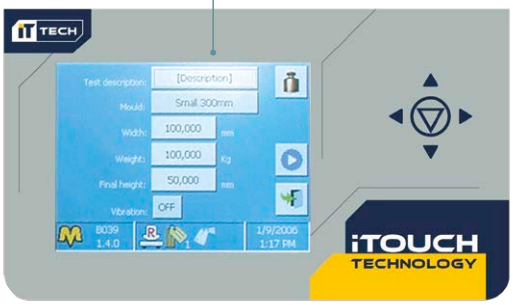
Asphalt Roller Compactor is entirely developed and manufactured by Matest. The machine works with an **electromechanical system, and therefore it does not require any air source (compressor) or hydraulic pressure.**
It is used to produce representative sample slabs of several dimensions of bituminous mixtures laid and compacted on site.
The compaction is performed through a segmented roller with alternated operated rotation which simulates the on-site action of a street roller.
The compaction cycle can be programmed in accordance to a certain load or deformation value.
The flexibility of the program grants the production of samples with uniform density and dimensions, fully meeting Standards specifications and research requirements; these samples are compatible for rut test with Matest Wheel Tracking apparatus B038 (see p. 112) and Matest Smartracker B038A (see p. 114). The sample slabs can be also cored or cut off to obtain cylinders and beams for bending fatigue, indirect tensile, static and dynamic creep, stiffness, and 4-point tests.

POLICARBONATE SAFETY SYSTEM CONFORMING TO CE STANDARDS

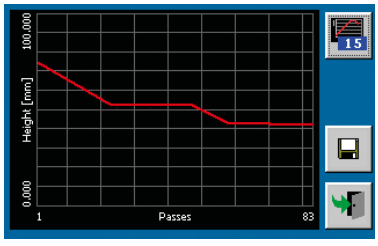
INTEGRATED TOUCH SCREEN CONTROL UNIT

EASY MOULD HANDLING

B039N
with open guard



Detail of the control panel

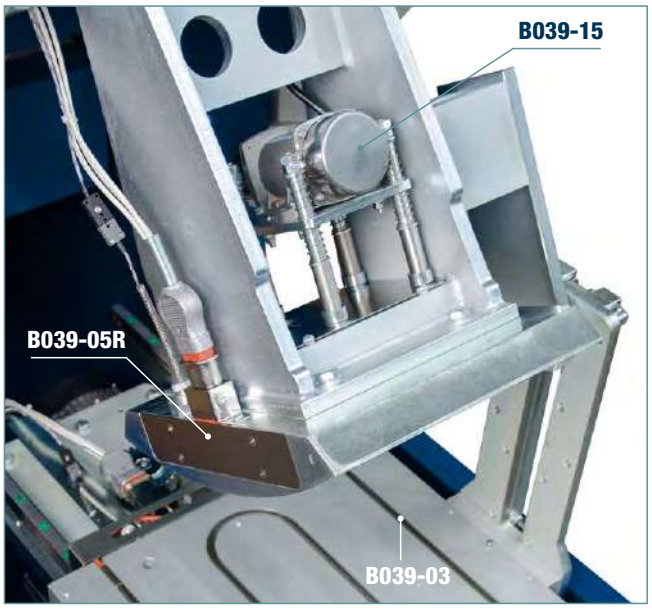


Energy controlled compactor procedure required by pr EN 12697-33 method 7.2 Annex A and TP Asphalt

TECHNICAL SPECIFICATIONS

- Possibility to use **standard or heated segment rollers of different sizes** (see accessories): width up to 400 mm, length up to 500 mm and radius 490 mm, to obtain slabs of
  - 500x400 mm, thick up to 180 mm
  - 400x305x25 to 100 mm thick
  - 320 x260 mm, thick up to 180 mm
  - 305x305x25 to 100 mm thick
- Vertical force selectable up to max. 40 kN (for all machine)
- **Programmable density target compaction**
- Policarbonate safety guard as requested by CE Directive
- Possibility to **perform the two-phase procedure (Pre-compaction and Compaction)** as specified by TP Asphalt-StB 33 and EN 12697-33 annex A
- The required n° of passes can be set before starting the test allowing an accurate test control by n° of passes
- **Sliding carriage speed adjustable** between 3 m/min and 12 m/min
- **Detailed output file** listing each pass and displaying duration, sample height, applied load and eventual roller and cart temperature
- Longitudinal compaction

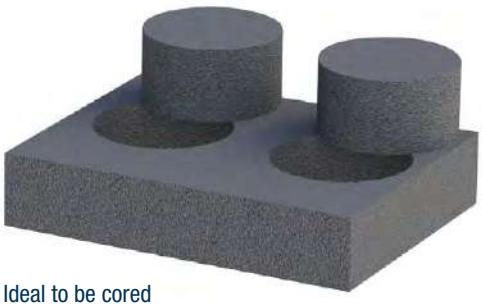
Power supply: 230 V 50-60 Hz 1ph 2100 W
(3100W with the heated segment roller)
Dimensions: 2200x1030x1880 mm
(2410 mm with opened guard)
Weight: 1300 kg approx.



Detail of the rolling vibrating device + heated roller + heated sliding cart


Detail of mould and roller


Optimally compacted sample with full planarity


Ideal to be cored

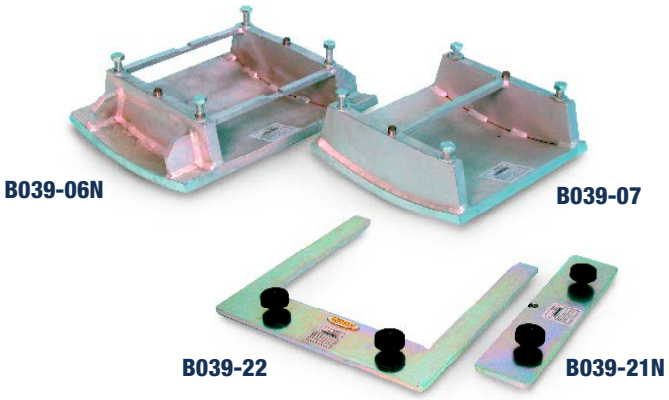
Three transducers are installed to manage the roller and table displacements and vertical load pressure.
The compaction cycle can be programmed up to a certain load or deformation value. When deformation value is programmed, the system automatically programs the suitable loads to obtain the selected final thickness.
The flexibility of the program grants the production of samples with uniform density and dimensions, fully meeting Standards Spec. and Research requirements.
A friendly and easy to use interface allows an immediate and fully automatic test execution, data acquisition and processing, test report and file.

The Roller Compactor is supplied **without** roller segment, slab mould, centering plate, that must be ordered separately (see accessories).

ACCESSORIES

"STANDARD" SEGMENT ROLLER, available dimensions:

B039-04 ROLLER for 320x260mm mould
B039-05 ROLLER for 500x400mm mould
B039-06N ROLLER for 400x305mm mould
B039-07 ROLLER for 305x305mm mould



MOULD to prepare asphalt slabs. Complete with handles.

Code	Dimensions
B038-09	320x260x180 mm
B038-10	305x305x50 mm
B038-11	305x305x100 mm
B038-12	400x305x50 mm (no handles)
B038-13	400x305x100 mm
B038-18	500x400x180 mm
B038-19	400x305x120 mm
B038-20	320x260x50 mm
B038-21	500x305x120 mm (with handles)
B038-22	300x300x120 mm (with handles)

B039-21N CENTERING PLATE for 400x305 mm mould
B039-22 CENTERING PLATE for 305x305 mm mould
B039-23 CENTERING PLATE for 320x260 mm mould
B039-24 CENTERING PLATE for 300x300 mm mould
B039-15 ROLLING VIBRATING DEVICE, reproducing street-roller vibrations during asphalt laying off.

HEATING OF SEGMENT ROLLER AND SLIDING CART

Possibility to heat and control temperature of the Segment Roller mounted on the Compactor and Sliding Carriage to keep the mould warm and avoid thermal shocks the might affect specimen's workability.

The equipment is composed of:

B039-02
CONTROL UNIT

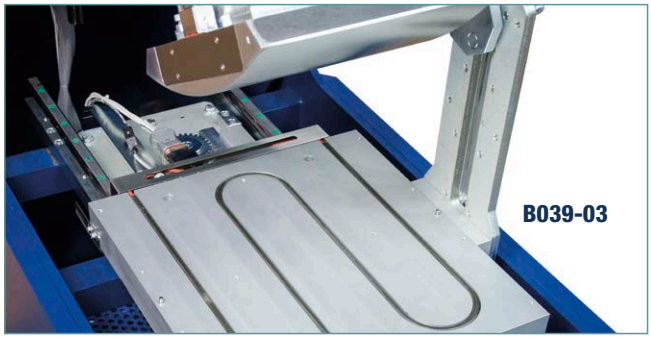
Mounted in the Roller Compactor, it foresees a thermoregulator circuit, complete with probe to measure and to adjust the temperature from room up to 180 °C.
It is connected to the segment roller equipped with heating resistances, to be connected to the control unit B039-02.

"HEATED" SEGMENT ROLLER, complete with heating resistances. Available dimensions:

B039-04R ROLLER for 320x260 mm mould
B039-05R ROLLER for 500x400 mm mould
B039-06NR ROLLER for 400x305 mm mould
B039-07R ROLLER for 305x305 mm mould
B039-08R ROLLER for 505x305 mm mould
B039-09R ROLLER for 300x300 mm mould

B039-03
SLIDING CART HEATING OPTION

Thermoregulated circuit with temperature probe to set and control cart temperature and keep mould hot. The temperature is adjustable from ambient up to 140 °C.



B039A

ASC

ASPHALT SHEAR BOX COMPACTOR

THE ONLY ELECTROMECHANICAL SHEAR BOX COMPACTOR

NEW **STANDARD: ASTM D7981-15** Standard practice for compaction of prismatic asphalt specimens by means of the Shear Box Compactor.

The ASC is being **used in FHWA Contract** "Deployment of Performance-Based Technologies for Mechanistic-Empirical Pavement Design and Resource Responsible Materials Design" to fabricate specimens for Level 1 analyses using the AASHTOWare Pavement ME Design software.
It is the only compactor capable of fabricating specimens for all of the following mechanistic-empirical performance tests:
Dynamic Modulus, AASHTO PP 61
Repeated Load Permanent Deformation, AASHTO TP 79
Flexural Fatigue, AASHTO T321
Low Temperature Creep and Strength, AASHTO T322

MAIN FEATURES

- Extremely sturdy fabricated frame combined with precision machined components.
- Servo hydraulic vertical ram with integral hydraulic power supply.
- Precision electro-mechanical shearing motion (user programmable).
- Integral specimen extruder.
- Electronic control unit with touch screen color display (no need for PC).
- Unlimited memory storage with: 2 USB ports, 1 SD card slot , RS232/485 serial port.
- The compaction cycle can be programmed by specifying vertical stress/load and test termination conditions; Number of cycles, Specimen height and/or density.
- Precision load cell(s) for vertical and shear stress measurement.
- Optional built-in mould heater.

THE MOST UNIFORM DENSITY OF ANY MACHINE

Specimen is extruded after the machine has completed the specified number of cycles, or when the required specimen height has been reached.
An automatic extruder allows an easy extraction of the compacted specimen.

B039A

TECHNICAL SPECIFICATION

Vertical force	Up to 100kN
Shearing force	Up to 50kN
Shear angle	4° ± 0.1°
Shearing cycle rate	3 ± 0.1 cycles per minute
Mould width	150mm ± 0.1 mm
Mould length	450mm ± 0.1 mm
Mould surface finish (inside)	Smoother than 0.4µm rms
Mould surface hardness	More than 48 Rockwell C
Mould capacity	Approx. 20 litres
Loading platen width	149 mm ± 0.2 mm
Loading platen length	449 mm ± 0.2 mm
Loading platen smoothness	Smoother than 0.4µm rms
Loading platen surface hardness	More than 48 Rockwell C
Number of cycles	Up to 100
Vertical stress	0.1 to 1.5MPa ± 0.01MPa
Compaction height	0 mm to 200 mm ± 0.1mm

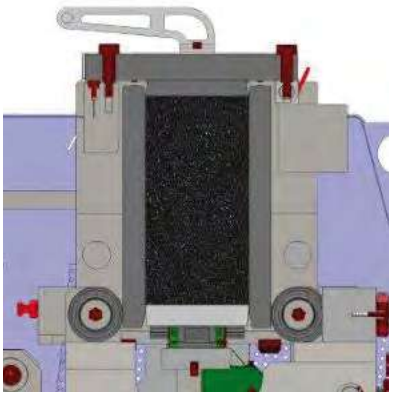
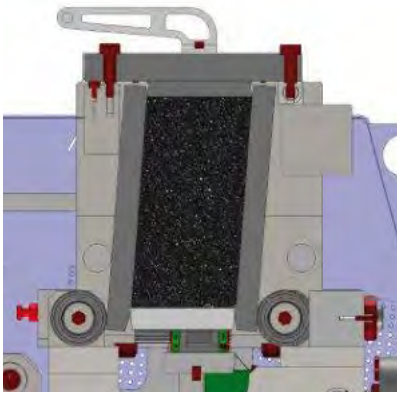
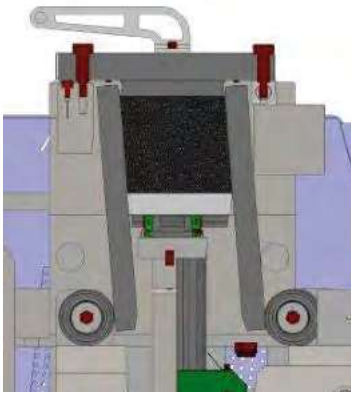
Power supply: 230V 1ph 50-60Hz
Dimensions: 788x1360x1314 mm
Weight: 1200 kg approx.

A RUGGED DESIGN FOR THE BEST SPECIMEN PREPARATION

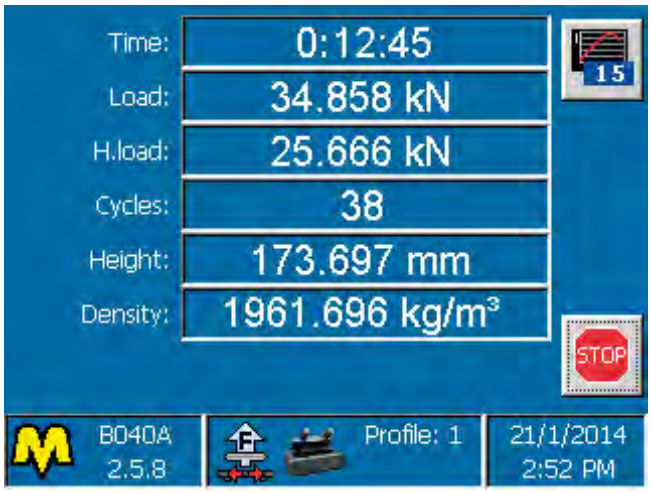
Asphalt technologists are acutely aware of the importance of a representative specimen during any laboratory performance testing.
The precise shearing motion of the ASC replicates the conditions of field compaction in order to reproduce the field properties of asphalt, quickly and easily under the controlled conditions of a laboratory.
The ASC compacts large asphalt prisms that can be sawn to produce four to six beams or slabs for laboratory wheel tracking; or the prism can be cored to produce three to four 100 mm diameter cylinders, all having essentially identical properties.
The electronic control unit, with touch screen color display, makes a PC an option, not a necessity.
The user friendly touch-screen icon interface allows for easy set up parameter entry, enables immediate (fully automatic test execution) data acquisition/processing, test report, and data file generation.
A LAN connection to Intranet/Internet enables remote communication to receive immediate diagnostic analysis and technical support from Matest technicians, and/or software updates

ACCESSORIES

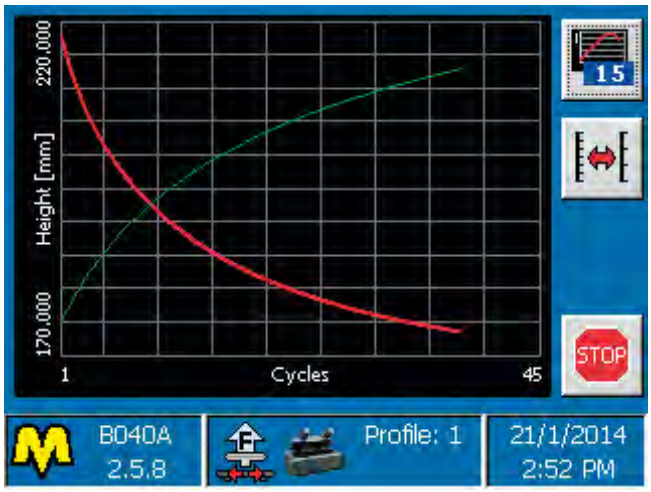
B039A-01	LOADING CHUTE
B039A-02	TRAY (2 off)
B039A-03	SPREADING COMB
B039A-04	LEVELING BLADE
B039A-05	BUILT-IN MOULD HEATER (optional)

During the compaction process a lateral displacement is applied to the specimen along with a vertical load, which results in a shearing action that makes the compaction similar to the the field.



Test parameters during compaction



Height-Cycles and Density-Cycles curves during compaction

B038
UNITRACKER
SINGLE WHEEL TRACKING APPARATUS

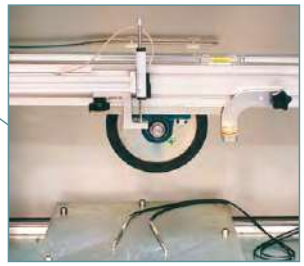
STANDARDS: EN 12697-22 | BS 598:110 | Comparable to NF P98-251-1, P98-251-4

This machine is used in laboratory, for evaluating the deformation (rut) depth of a bituminous mixture subjected to cycles of passes of a loaded rubber wheel under constant and controlled temperature conditions. To perform the test, a wheel tracking apparatus is used to simulate the effect of traffic and to measure the deformation susceptibility of the bituminous sample.
Matest wheel tracker fully satisfies both EN 12697-22 and BS 598:110 specifications and may perform the test following both procedures A and B, clearly specified by the EN Standard.

B038 with open doors

MAIN FEATURES

- **Accepts mould up to 500x400 mm, 180 mm high**.
- Perfectly fit for slabs made by Matest ARC Asphalt Roller Compactor.
- Continuous realtime rut depth measurement.
- Three temperature probes for temperature control and adjustement.
- Automatic control of machine and test.
- Realtime display of: number of cycles, rut depth, temperatures.
- Realtime cycle rate also displayed when using a serial connection to PC.



B038 detail

TECHNICAL SPECIFICATIONS

- Travel of the table: 230 ± 5 mm
- Table cycle frequency: adjustable 15 to 40 cycles per minute.
- Hard rubber tyred wheel having outside diameter 200 mm
- Wheel load on the sample:
  700N ±10N (EN 12697-22) or 520N (BS 598:110)
  The load is applied on the sample through a lever.
  The effective load applied on the sample can be adjusted by micrometrical weights positioning.
- Continuous real time rut depth measurement (penetration of the wheel into the sample) through a linear transducer 40 mm travel by 0.01 mm accuracy.
- The test frame is made of robust aluminium alloy and it is contained in a climatic cabinet **with adjustable temperature from 30 to 65 °C ± 1.0 °C**
  The cabinet is equipped with two doors with insulated glass for inspection
- The sample table has dimensions: 400x390 mm and can accept rectangular slabs of several sizes:
  305x305 mm, 50 or 100 mm high
  400x305 mm, 50 or 100 mm high
  200 mm dia. core samples, 50 mm high
  The sample confinement frames are not included and have to be ordered separately (see accessories)
- Matest wheel tracker accepts also samples with dimensions up to 500x400 mm, 180 mm high (this mould can be compacted with Matest ARC: Asphalt Roller Compactor)
- The machine is supplied complete with adaptors for a correct mould positioning and locking
- The wheel tracker is equipped with 3 temperature probes:
  1 probe, connected to the thermoregulator, for the control and adjustment of the cabinet temperature.
  2 probes for temperature measurement inside the specimen.

HARDWARE

- Data acquisition and processing system fully managed by micro-processor.
- Multifunctions keyboard with encoder for easy and rapid setup
- Large graphic display 320x240 pixel.
- RS 232 port for connection to PC.

FIRMWARE

The multilingual testing firmware allows:

- Management and automatic control of machine and test.
- Setup of all test parameters.
- Test data acquisition and processing
- Real time display of: number of cycles, rut depth, temperatures. Real time cycle rate will also be displayed when using a serial connection to PC
- Calibration menu for setting and checking all test data.
- From the control board, it is possible to select parameters, set data acquisition and processing according to EN and BS test procedures, with:

  Identification data of the sample (slab) under test.

  Cycle frequency.

  Number of passes to end the test.

  Max rut depth to end the test.

  Sampling frequency of the rut depth.

  Testing temperature.

  Sample (slab) thickness.

Power supply: 230V 50-60Hz 1ph 2200W
Power rating of the table: 500W
Dimensions: 1580x650x1790 mm
Weight: 400 kg approx.

ACCESSORIES

- * **B038-09** MOULD with HANDLES size 320x260x180 mm
- * **B038-10** MOULD with HANDLES size 305x305x50 mm
- * **B038-11** MOULD with HANDLES size 305x305x100 mm
- * **B038-12** MOULD no HANDLES size 400x305x50 mm
- * **B038-13** MOULD with HANDLES size 400x305x100 mm
- **B038-14** MOULD for core sample 200 mm diameter, 50 mm high
- * **B038-18** MOULD with HANDLES size 500x400x180 mm
- * **B038-19** MOULD with HANDLES size 400x305x120 mm
- * **B038-20** MOULD with HANDLES, size 320x260x50 mm
- **H009-01** PC complete with LCD monitor 22", keyboard, mousecables, installation.

Note:
* These moulds are suitable to be used also with Matest ARC: Asphalt Roller Compactor. Insert plates to reduce the thickness of the mould are available on request.

B038-13 **B038-18**

B038 with closed doors

B038AM
SMARTRACKER™
MULTI WHEELS HAMBURG WHEEL TRACKER; TEST ENVIRONMENT: DRY+WET

STANDARDS: EN 12697-22 | AASHTO T-324

PATENT No: US 9, 964, 471

PATENTED

B038AM

THE N° 1 UNIT IN U.S. MARKET

MAIN FEATURES

- Meets and exceeds AASHTO and EN Standards.
- Simultaneous testing of wet and dry samples.
- Indipendent motors for each wheel assure separate rutting analysis of each specimen.
- No lifting of heavy wheel assemblies. Wheels retract automatically.
- Sturdy machine, designed for the rugged construction laboratory environment.
- Sliding sample positioning mechanism for easy mould handling and placement in the machine.
- Does not require lifting of heavy wheel components.
- Cyber Plus Progress technology allow to apply a load with a perfect sinusoidal wave in accordance with AASHTO T-324:19.
- Fully Automatic machine. Detects and stops the test when the target rut depth is reached.
- Touch-screen control unit and new icons for a modern and user friendly approach.
- Each of the two wheel assemblies is equipped with displacement transducers for rut measurement.
- Mechanical recirculating water bath for temperature control within ± 1 °C.
- Easy to load, unload, drain water and clean the unit after each test.
- Compact design to accomodate small construction labs and make maintenance easier.
- Covered by US Patent.

B038AM
SMARTRACKER™
MULTI WHEELS HAMBURG WHEEL TRACKER - **PATENTED**

STANDARDS: EN 12697-22 I AASHTO T-324

The Hamburg wheel tracking device can be used to determine the resistance of Hot Mix Asphalt (HMA) to rutting and moisture sensitivity.
Matest model "**SmarTracker™**" meets and exceeds EN and AASHTO.
It is intelligently designed with innovative features and the needs of the end users in mind.
The most versatile wheel tracker on the market has independent motors for each wheel which assure separate rutting analysis of each specimen.
Now you can perform wet or dry test with both wheels or run one wheel under dry and one wheel under wet condition simultaneously during a single test.
Determine the creep slope, stripping inflection point and stripping slope with this state of the art and user friendly machine.
Equipped with the latest Cyber Plus Progress, Matest Smartracker controls the movement of the wheels in order to obtain a perfect sinusoidal wave. The measurement points for defining the ruth depth are completely customizable according to EN or AASHTO Standard and for research purposes. MATEST SmarTracker™ has been developed by our R&D engineers and scientific in association with some of the most experienced and reputable industry experts in the USA and the world.

TOUCH-SCREEN 7" FOR TEST EXECUTION AND REAL TIME RESULTS PLOT OF THE RUT DEPTH ALONG WITH THE NO. OF PASSES.

WATER AND AIR TEST IN COMPLIANCE WITH EN STANDARD

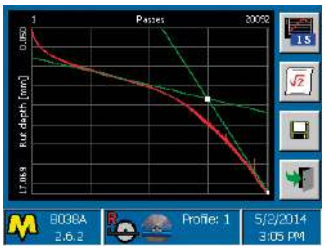
UNIQUE SYSTEM TO LOAD-UNLOAD THE MOULD

INNOVATIVE WHEELS ROLL OFF MECHANISM (PATENTED)

WATER TEST IN COMPLIANCE WITH AASHTO STANDARD

Unique system to Load-unload the mould

Innovative wheels roll off Mechanism (patented)



Real time results plot of the rut depth along with the no. of passes.

TECHNICAL SPECIFICATIONS

- Wheel load: 705 N
- Wheel speed: from 20 to 30 cycles/minute.
- Temperature control:
  EN 12697-22: 2500W heaters for air temperature control, ventilation for temperature uniformity, probe for air temperature, all controlled by the electronic system.
  AASHTO T324: 4000W heaters, recirculating pump, automatic feed and controls level.
- Temperature control range: from ambient up to 75°±1 °C
- Table travel: 230, 260, 280 mm
- Rut depth transducers range: 25 mm ± 0.1 mm accuracy.
- Slab thickness: adjustable from 38 to 120 mm

Power supply: 220V 50-60Hz
Dimensions: 1400x1300x1300 mm
Weight: 450 kg approx.

MAIN FEATURES

- No added stress to operators back from lifting heavy wheel assemblies.
- Sample holders slide into position and eliminate demanding lifting and placement of samples into the unit.
- Hood keeps technicians away from moving parts and provides better temperature control while the test is being conducted.

B038AM-15
SMARTRACKER HAMBURG VERSION AASHTO T324 (WATER TEST ONLY)

STANDARDS: AASHTO T324, AMAAC Mex Protocol

Same as model B038A but without cover, it allows water test only.

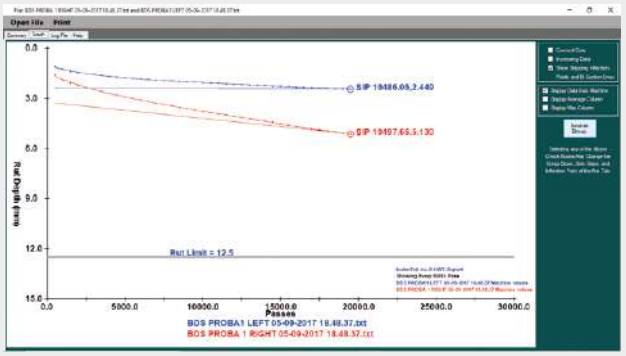
B038AM-15

TESTING SOFTWARE

The user-friendly software is integrated into the on-board digital control unit based on Windows operating system.
The software is fully customizable by the operator according to EN and AASHTO Standards, and the personal needs.
Automatic calculation of stripping inflection point (AASHTO).
Test execution and all parameters, such as water/air temperature, specimen temperature, ruth depth can be monitored in real time.
The software also allows exporting test data to an Excel compatible format.

B038A-16 SOFTWARE HWT-REPORT TO AASHTO T324

The Unique HWT-Report software allows the user to analyze the results from the SmarTracker to generate a report and a graph strictly conforming to AASHTO T324. The features of the software include the ability to analyze different locations along the wheel pass, graph maximum and average rut depths, stripping inflection point and detailed reports (selecting all the wheel passes or different sampling rates) that can be presented, printed or emailed.



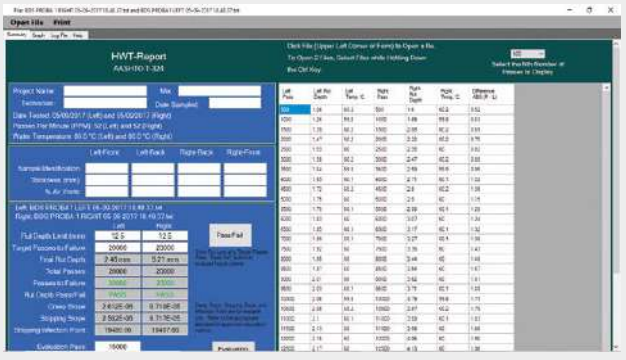


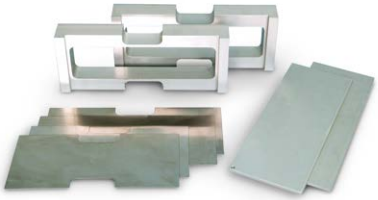
TABLE OF ACCESSORIES TO PERFORM DRY (AIR) AND WET (WATER) TEST FOLLOWING
EN 12697-22 AND AASHTO T324 SPECIFICATIONS

Standards	EN 12697-22		AASHTO T324	
Testing mode	Dry (air)	Wet (water)	Wet (water)	* Dry (air)
	2x **B038A-01** Rubber wheel 2x **B038A-11** EN Mould 2x **B038A-12** 2x **B038A-13** Adaptors **B038A-05** Air heating 2x **B038A-06** Probe (optional)	2x **B038A-01** Rubber wheel 2x **B038A-11** EN Mould 2x **B038A-12** 2x **B038A-13** Adaptors **B038A-06** Probe (optional)	2x **B038A-02** Steel wheel 2x **B038A-06** Probe (optional) FOR CYLINDRICAL SPECIMENS: 2x **B038A-10** AASHTO Mould 2x **B038A-03** Support for AASHTO Mould **B038A-10D** Adaptors FOR SLAB SPECIMENS: 2x **B038A-11** Mould **B038A-12+B038A-13** Adaptors	2x **B038A-02** Steel wheel 2x **B038A-10 or** 2x **B038A-11** Mould 2x **B038A-03** Support for AASHTO Mould 2x **B038A-12 +** 2x **B038A-13** Adaptors **B038A-05** Air heating 2x **B038A-06** Probe (optional)

Note: *AASHTO T324 does not require air test.

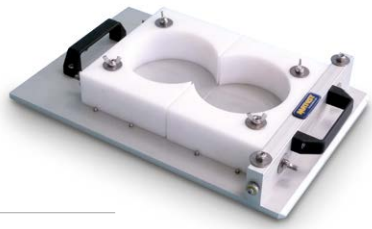
B038A-01
Rubber wheel for
EN 12697-22

B038A-11 EN mould

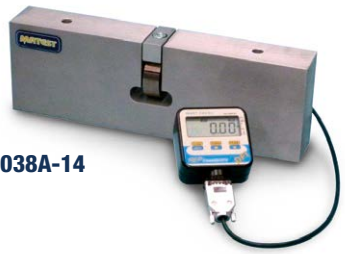


B038A-13 Horizontal adaptors for EN moulds

B038A-02
Steel wheel for AASHTO T324



B038A-10
AASHTO mould



B038A-14

NEEDED ACCESSORIES

EN 12697-22

B038A-01 RUBBER WHEEL 203x50 mm
B038A-11 EN MOULD 400x305x120 mm
B038A-12 SET OF VERTICAL ADAPTORS for EN mould to allow the positioning of specimens lower than 120 mm (up to a minimum specimen thickness of 20 mm)
B038A-13 SET OF HORIZONTAL ADAPTORS for EN mould to allow the positioning of specimens 260x320 mm and 305x305 mm

AASHTO T324

B038A-02 STEEL WHEEL 203x47 mm
B038A-10 AASHTO MOULD (2 cylinders Ø 150x60 mm)
B038A-03 TOOL for AASHTO positioning
or
B038A-07 STAINLESS STEEL SUPPORT for AASHTO positioning
B038A-10D VERTICAL ADAPTORS for AASHTO mould to allow the positioning of specimens with a thickness of 40 mm

OPTIONAL ACCESSORIES

B038A-04 ELECTROVALVE group for hot water
B038A-05 AIR HEATING SYSTEM for air conditioning test EN 12697 -22
B038A-06 PROBE for specimen's temperature determination
B038A-09 HPDE mould specimen holder.
B038A-14 VERIFICATION KIT for the calibration of the wheel load. The calibration kit is designed to facilitate the calibration or to check the machine's wheel load. The device is composed of a support block with a calibrated load cell and complete with a digital readout.
Max. load 1000 N, accuracy 0.05%.

B040
APS
AUTOMATIC PAVE SAW NEW

DUAL BLADE CONCEPT FOR PERFECT PARALLEL CUTTING

Matest has developed a dual bladed automated sawing system for fast, accurate cutting of cores, prisms and slabs prepared using Matest's range of asphalt compaction machines; GYROTRONIC-Gyratory Compactor, ASC-Asphalt Shear-box Compactor and ARC-Asphalt Roller Compactor for Four Point Bending (4PB), Two Point Bending (2PB), Overlay tester (OT), Semi Circular Bending (SCB) and wheel tracking tests using Matest/ Pavetest's range of leading edge testing systems.

It includes: **cooling water recirculation pump, tank and protection cabinet with interlocks to ensure operator safety.**

B040

MAIN FEATURES

- Two saw blade design ensures for perfect parallel cutting.
- Motorized feed with automatic retraction of saw carriage.
- Electronic control unit with touch screen colour display, that runs like a standard PC based on Windows operating system.
- Adjustable cutting speed.
- Slabs and prisms can be sawn safely and accurately.
- Jigs also available for trimming 100 and/or 150mm diameter cylinders/cores.
- Facilitates cutting rectangular beams, trapezoidal prisms, overlay test specimens, semi-circular & wheel tracking specimens, and cylindrical specimens.
- Simple spacer system allows precise preparation of beams and cylinders from 38mm to 160mm long, without the need for measurement.
- Other dimensions can be accommodated using integral ruler.
- Adjustable limit switches facilitates repetitive cutting with minimal saw carriage travel. Secure specimen clamping. Choice of mechanical or pneumatic.
- Protective enclosure, with safety interlocks, combines clean operation with unparalleled operator safety.
- Dynamic breaking system stops saw blade rotation when power is switched off.

THE NEXT GENERATION FULLY AUTOMATED ASPHALT SAWING SYSTEM

Matest's new APS-Automatic Pave Saw is the next generation fully automated asphalt sawing system with integrated specimen clamping. **The APS offers fast and accurate cutting of rectangular beams, trapezoidal prisms, overlay test specimens, semi-circular specimens, and trim- ming of cylindrical specimens.**

The APS uses two blades to ensure perfect parallel cutting of cylinders and beams at set intervals from 38 to 160 mm long.
If equipped with proper blades, the APS cuts not only asphalt but also several other materials.
The APS is controlled using Matest's tried and proven **iTouch electronic** control unit with touch screen colour display for perfect cutting of specimens for AASHTO, ASTM and EN standards without the need for manual measurements. **It is the safest and most advanced asphalt cutting saw** available on the market and is the perfect companion to our range of advanced asphalt preparation and testing equipment.
The APS is capable of cutting prismatic specimens up to 240mm high and a cutting length up to 700mm and cylindrical specimens up to 200mm diameter. **The APS can be configured using one or two blades, with a large range of jigs and fixtures** to cut rectangular beams, trapezoidal prisms, overlay test specimens, semi-circular & wheel tracking specimens, and trim cylindrical specimens accurately, with excellent parallelism and perpendicularity. Various alignment blocks, guides and reference spacers allow operators to easily achieve the most commonly used dimensions specified in a range of international standards with little or no measurement. Any other dimensions can be accommodated with the aid of an integrated ruler.

The **iTouch controller** allows the operator to easily control the cutting speed and sequence and a series of adjustable limit switches minimizes the saw carriage travel during repetitive cutting.
The high grade stainless steel work surface and associated corrosion resistant components ensures the unit will perform well and look good for many years.

The **protective enclosure** provides a high level of operator safety and protection from water spray. Safety interlocks prevent the operator from opening the enclosure and accessing hazardous areas while the blade is rotating. Once the cutting sequence has finished and the blade has stopped rotating, the enclosure is unlocked automatically.

ACCESSORIES

B040-01 APS DIAMOND BLADE, 650 mm diameter (q.ty 1 or 2)
or
B040-02 APS DIAMOND BLADE, 700 mm diameter (q.ty 1 or 2)

B040-03 SET OF SPACERS for mounting the APS Diamond blade, 650 mm diameter (needed for B040-01)

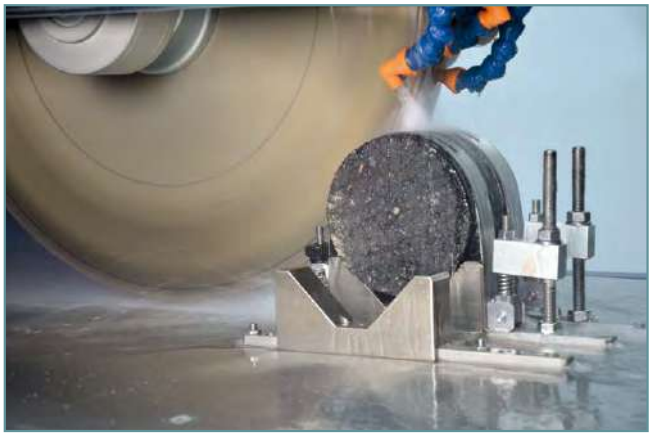
B040-04 SET OF SPACERS for two blades configuration (needed for two blades configuration)

B040-05 SPACER for one blade configuration (needed for one blade configuration)

B040-06 DISPLACEMENT TRANSDUCER for the control of the blade position

B040-07 PNEUMATIC CIRCUIT (needed with Pneumatic cutting jigs)

If equipped with pneumatic cutting jigs, the unit requires compressed air, minimum 8 bar



SPECIFICATIONS

- One or two blade concept
- Blade Diameter(s): 650 mm or 700 mm
- Blade Speed 1,400rpm (50Hz) or 1,680rpm (60Hz)
- Adjustable cutting speed, min 40 mm/min max 200 mm/min
- Max Cutting Depth 200 mm (with 650 mm blade diameter) or 240 mm (with 700 mm blade diameter)
- Cores 100 or 150 mm diameter (38 mm or 200 mm diameter on request)
- Max Prism Length 700 mm
- Cooling water recirculation pump and tank included
- Net Weight 500 kg approx.
- Parallel (Dual blade) cutting distance: 38 mm to 160 mm at set distances
- Dimensions 2370 mm (L) x 1340 mm (D) x 1670 mm (H)
- Air Supply 600 kPa (for pneumatic clamping option)
- Power Supply:
  400V 50Hz 3ph, 230V/220V 50Hz 3ph (B040)
  400V 60Hz 3ph, 230V/220V 60Hz 3ph (B040X)
  208V 60Hz 3ph (B040Z)

CUTTING JIGS

B040-10M APS manual Multi-Slab/Prism jig suitable for slabs and prisms with the following dimensions: 40 - 240 mm depth x 700 mm length.

B040-10P KIT APS automatic Multi-Slab/Prism jig suitable for slabs and prisms with the following dimensions: 40 - 240 mm depth x 700 mm length.

B040-12M APS manual trapezoidal specimen jig for two point bend (it requires B040-10M or B040-10P-KIT).

B040-13M APS manual core docking jig for Ø 150-100-60-50-40-38 mm cores.

B040-13P APS automatic core docking jig for Ø 150-100-60-50-40-38 mm cores.

B040-14 Instrumentation for Overlay test, wheel tracking core, semi-circular and disk shaped compact tension specimens (it requires B040-13M or B040-13P).

B040-20
ACD
AUTOMATED CORE DRILL

NEW

Matest has developed an Automated Core Drill (ACD) for fast, accurate cutting of cores from cylinders, prisms and slabs prepared using Matest's range of asphalt compaction machines; GYROTRONIC-Gyratory Compactor, ASC-Asphalt Shear-box Compactor and field specimens for subsequent testing using Matest/Pavetest's range of leading edge testing systems.

B040-20

MAIN FEATURES

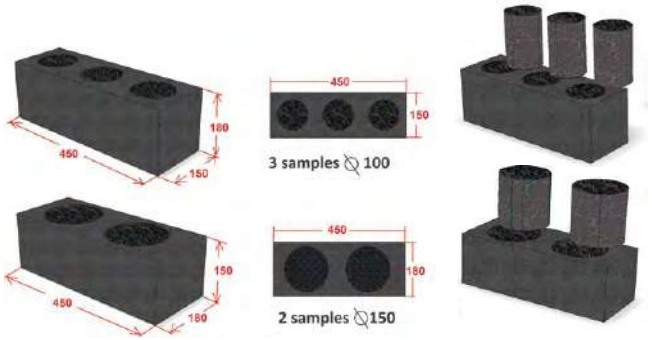
- Three selectable drill speeds.
- Clear protective/splash screen conforming to CE standards.
- Ideal for coring prismatic specimens compacted in Asphalt Shear-box Compactor (ASC).
- Suitable to core cylindrical specimens compacted in Gyratory compactor(s).
- Includes water container/tray.
- Adjustable specimen clamp eliminates specimen movement during coring.
- Three position fixture provides easy and accurate specimen positioning.
- Three core supports at fixed spacing yields two or three cores from one prism.
- Optional cylindrical specimen jig.

SPECIFICATIONS

Drill Bit Diamond/tungsten alloy, laser welded.
Core diameter 100 mm or 150 mm.
For other core diameters, see the accessories.
Core height up to 40 cm.
Specimen sizes:

- Cylindrical Sample: 160 mm x 70 mm - 400 mm (ØxH)
- Prismatic Sample:
  200-450 mm x 150-185 mm x 120-420 mm (LxDxH)
  315-340 mm x 220-260 mm x 120-420 mm (LxDxH)

Dimensions: 60 cm (L) x 80 cm (D) x 140 cm (H)
Net weight: 85 kg
Power supply: 230V 10A 50Hz 1ph (540/1, 300/1, 800 rpm)
230V 10A 60Hz 1ph (560/1, 330/1, 850 rpm)
115V 20A 60Hz 1ph (560/1, 330/1, 850 rpm)



MODELS

B040-20 Asphalt Core Drill (230V/50-60Hz) for prisms
B040-20Y Asphalt Core Drill (110V/60Hz) for prisms

ACCESSORIES

C339-03 Ø 100 x 420 mm long drill bit (needed)
C339-04 Ø 150 x 420 mm long drill bit (needed)
B040-21 Clamping cylindrical specimen jig to suit from 50 to 150 mm diameter specimens (needed)

B040-22 KIT DCT specimen. It includes:

- **B040-22** DCT specimens drilling jig
- **B040-33** Ø 25 x 420 mm long drill bit


B040-21

B040-23 KIT Transversal coring. It includes:

- **B040-23** Transversal coring jig
- **C339-02** Ø 75 x 420 mm long drill bit
- **B040-30** Ø 38 x 420 mm long drill bit
- **C339-01** Ø 50 x 420 mm long drill bit

B040-31 Ø 42 x 420 mm long drill bit
B040-32 Ø 55 x 420 mm long drill bit
C346 Core Extractor Ø 50 mm
C346-01 Core Extractor Ø 75 mm
C346-02 Core Extractor Ø 100 mm
C346-03 Core Extractor Ø 150 mm


B040-21

B042T
50 KN MARSHALL TESTING MACHINE

STANDARDS: ASTM D6927, D5581, D1559 | AASHTO T245
BS 598 :107 | NF P98-251-2

This sturdy frame, easy to use and maintain, is designed to perfectly bear strain and loads required during the test. The plate is raised at a constant rate of 50.8 rpm by means of an electrical motor.
Vertical span: maximum 480 mm, minimum 300 mm.
The applied load is measured by a proving ring 30 kN, supplied with calibration certificate. An electrical device is included to stop automatically the machine when reaching the maximum load capacity, in order to prevent damages caused by overload.
Two safety microswitches limit cylinder stroke while controlling stability measuring instrument.
The testing machine is fully equipped with 30 kN load ring, mould, flowmeter with dial gauge.

Power supply: 220V 1F 50Hz 750W
Dimensions: 500x450x1400 mm
Weight: 110 kg approx.

B047-02
TENSILE SPLITTING DEVICE

STANDARDS: EN 12697-23 | ASTM D6931 | AASHTO T283

Used to measure the splitting tensile strength and the radial strain of a Marshall specimen Ø 4" and 6", where a vertical load is applied. Supplied complete with loading strips to test specimens having Ø 4" and 6". Steel manufactured, plated against corrosion.

Dimensions: Ø 248x270 mm - **Weight:** 14 kg approx.

Alternative solution:

B047-02S NEW

TENSILE SPLITTING DEVICE for samples Ø 4" and 6" complete. Simple model not accepting the device B047-03 for strain measurements.

B042T

ACCESSORY

B047-03 SET OF TWO DIAL GAUGES 10 mm stroke and 0.01 mm sens. complete with adjustable supports for strain measurements, to CNR N.134

NEW

B046-03

B047-02S

B047-03

B047-03

B047-02

SPARES

B046N
STABILITY MOULD, Ø 4" (101.6 mm)
The mould, **aluminium made**, is completely open in the front and the introduction of the specimen becomes very easy thus avoiding disassembling operations. Weight: 6 kg approx.

B046-03
STABILITY MOULD, **steel made**, Ø 4" (101.6 mm) to ASTM D6927.
Altenative solution to B046N mould.
Weight: 9 kg approx.

B047
FLOW METER
Mounted on top of the stability mould, holding the dial gauge and incorporating a stem-brake keeping maximum deflection.
Weight: 500 g

B047-01
DIAL GAUGE
Stroke 10 mm,
div. 0.01 mm to be used in conjunction with the Flow Meter B047.

B047-01

B046N

B047

B043 KIT
DIGITAL MARSHALL TESTER 50 KN CAPACITY

STANDARDS: EN 12697-34, 12697-23, 12697-12
ASTM D6927, D5581, D1559 | AASHTO T245
BS 598:107 | NF P98-251-2

The testing frame is the same as for mod. B042 KIT, but the load is measured by an electric cell 50 kN capacity with high precision strain transducers; the flow is measured by an electronic displacement transducer 50 mm stroke and ± 0.1% linearity.
The Cyber-Plus Evolution 8 channels digital display unit with microprocessor (technical details: see B044N-SET p. 132, Hardware technical details: see p. 19) measures and displays at the same time the stability in kN and the flow in mm with peak hold features, with the possibility to transfer them to a PC and a printer through a RS232 port.
Supplied complete with Stability mould.

Power supply: 230V 1ph 50Hz 900W
Dimensions: 650x400x1100 mm
Weight: 120 kg approx.

B043 KIT

ACCESSORIES

B043-01N
SOFTWARE UTM2 (Universal Testing Machine 2)
Licence for MARSHALL test
Standards: EN 12697-34 | ASTM D6927, D5581, D1559
BS 598:107 | NF P98-251-2
Data processing program for "X-Y STABILITY/FLOW"
General description and technical details: see UTM2 p. 18

B046-03
STABILITY MOULD, **steel made**, for Ø 4" (101.6 mm)
Specimens to ASTM D6927.
Alternative solution to B046N mould.
Weight 9 kg approx.

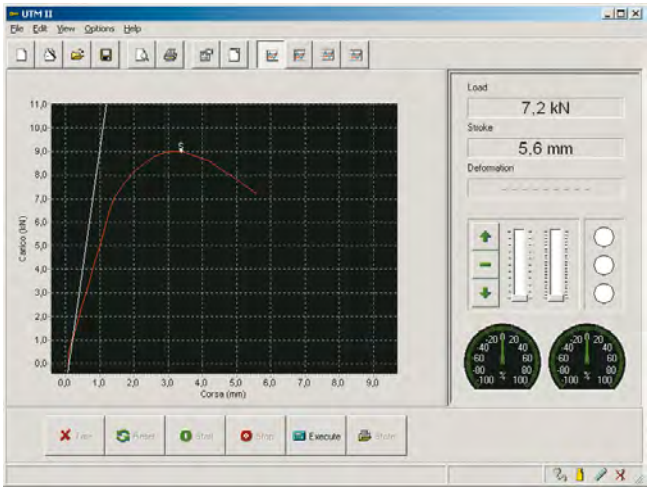
NEW

B046-03

B046N

SPARE

B046N
STABILITY MOULD Ø 4" (101.6 mm)
The **aluminium made** mould, is completely open in the front so the introduction of the specimen is made easy as there is no disassembly needed.
Weight: 6 kg approx.



B043-01N: Load/deformation "x-y" graphic exemple

Note: The Digital Marshall Tester B043KIT, completed by the specific accessories (listed below) is suitable to perform also the following tests:

DETERMINATION OF INDIRECT TENSILE STRENGTH

STANDARDS: EN 12697-23, EN 12697-12 | ASTM D6931
AASHTO T283

B047-02

TENSILE SPLITTING DEVICE FOR SAMPLE Ø 4" AND 6"
Used to measure the indirect tensile strength and the radial strain of a Marshall specimen Ø 4" and 6", where a vertical load is applied. Supplied complete with loading strips to test specimens having Ø 4" and 6". Steel manufactured, plated against corrosion.

Dimensions: Ø 248x270 mm
Weight: 14 kg approx.

Alternative solution:

B047-02S NEW TENSILE SPLITTING DEVICE for samples Ø 4" and 6" complete. Simple model not accepting the device B047-04 for strain measurements.

ACCESORIES

B047-04 SET OF TWO LINEAR RESISTIVITY TRANSDUCERS, stroke 10 mm, accuracy and linearity ± 0.3% to meet CNR N.134. Complete with supports and accessories for strain measurements.

B044-03 DISPLACEMENT TRANSDUCER, **additional**, 50 mm stroke, for a double measurement of the vertical displacement of the specimen during the tensile splitting test. Complete with cable and connector. When used with B043-02N software the average value of the two transducers is given.

B043-02N SOFTWARE UTM2 (Universal Testing Machine 2)
Licence for INDIRECT TENSILE STRENGTH
Standards: EN 12697-23, EN 12697-12 | ASTM D6931
AASHTO T283
General description and technical details:
see UTM2 p. 18

DIRECT SHEAR (LEUTNER) BETWEEN BITUMINOUS STRATA

STANDARD: ALP A StB T.80

Direct shear test (LEUTNER) on the connection between bituminous strata, carried out on asphalt cylinder specimens diameter 150 mm or 100 mm obtained from road cores or on laboratory made specimens.

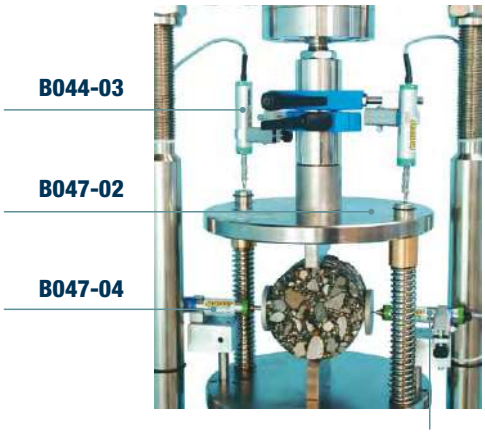
NEEDED ACCESSORIES

B047-10
LEUTNER testing head for specimens Ø 150 mm

B047-11
SPACERS for Ø 100 mm specimens with Leutner head.

B043-03N
SOFTWARE for Marshall and Leutner tests.

B047-10 + B047-11



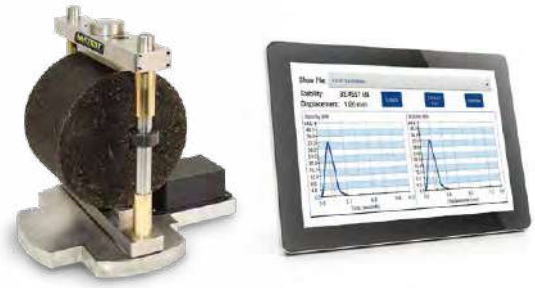
B047-04

B047-06

DIGITAL UPGRADE FOR ANALOG LOAD FRAME

STANDARDS: AASHTO T283, ASTM D6931 and D4867

- For tensile strength tests performed in the lab
- 100 Hz data collection rate
- Displays exact peak load, reducing potential of operator error
- Eliminates the need for plotters and plotter pens
- Provides digital record for printing, storage or email



WATER SENSITIVITY OF BITUMINOUS SAMPLES

STANDARD: EN 12697-12

This test determines the effect of saturation and accelerated water conditioning on the indirect tensile strength of bituminous mixtures, by evaluating the effect of moisture with different sample conditions.
Equipment: Digital Marshall tester B043KIT, indirect tensile strength accessories, and also:

B052-02

WATER BATH, DIGITAL, WITH COOLING DEVICE

Temperature range: +3 to +95 °C, accuracy ± 1 °C.
(EN 12697-12 Standard requires a temperature to be selected in the range of +5 to +25 °C).
Capacity: 45 litres
Inside dimensions: 635x360x205 mm
The bath can also be used for Marshall tests and general laboratory purposes.
Technical details: see p. 135

B052-02

MULTI-FUNCTION TESTING FRAMES, ALSO SUITABLE FOR MARSHALL TESTS

S213-05N
CBR/MARSHALL 3 SPEEDS FRAME 50 KN NEW

The frame is provided of three fixed speed ranges, easily selectable with a frequency changer (inverter) activated by an electric switch:
1.00 mm/min for CBR tests (as Australian and old BS Standards)
1.27 mm/min. for CBR tests
50.8 mm/min for Marshall tests.
Supplied **without** load ring and accessories which have to be ordered separately.
Technical detail: see p. 494

S212M
UNIVERSAL MULTISPEED LOAD FRAME 50KN

This motorized machine with electronic **digital touch-screen** controlled by microprocessor, is suitable to perform all the tests when the requested speed rate is within:
0.05 to 63 mm/min with max. load of 50 kN
It can therefore perform:
- Marshall test with rate of 50.8 mm/min.
- Splitting tensile test on Marshall specimens.
- Unconfined, CBR tests.

Supplied **without** load ring and accessories which have to be ordered separately.
Power supply: 230V 1ph 50-60Hz 750W
Technical Specifications: see p. 494

S212M

NEW

B046-03

S213-05N + MARSHALL accessories

ACCESSORIES for S212M and S213-05N frames

MARSHALL test, Ø 4":

S212-05 Load piston
B046N Stability mould Ø 4" (101.6 mm) **aluminium made**
As alternative:
B046-03 Stability mould Ø 4" (101.6 mm), **steel made** NEW to ASTM D6927
B047 Flow meter
B047-01 Dial gauge for flow meter
S370-08S Load ring 30kN with electric stop safety device
S374 Brake device to hold max. load

MARSHALL test Ø 6"

STANDARD: ASTM D5581

S212-05 Load piston
B046-02 Stability mould Ø 6"
B047 Flow meter
B047-01 Dial gauge for flow meter
S370-10S Load ring 50 kN with electric stop safety device
S374 Brake device to hold max. load

B046-02

Note: The frames S212N and S213-05N are suitable also for tensile splitting tests (EN 12697-23, ASTM D6931, AASHTO T283) by using the specific devices described on p. 123

MULTIFUNCTION TESTING FRAMES:
COMBINED WITH "CYBER-PLUS 8 EVOLUTION", COMPUTERIZED DIGITAL DISPLAY SYSTEM

Technical Specifications:
The frame is the same as for the previous load frames (mod. S212N - S213-05N), but the load is measured by an electric 50kN cell with high precision strain transducers. The deformation (flow) is measured by a displacement transducer 50 mm stroke and ± 0.1% indipendent linearity. The **CYBER-PLUS 8 EVOLUTION** computerized multichannel digital display system (technical details: see mod. B044N-SET on p. 132), measures and displays at the same time load (stability) in kN and deformation (flow) in mm with peak hold features and possibility to print certificates and graphics directly on a laser printer via USB or to transfer them to PC via Ethernet.

S214-05N KIT
CBR/MARSHALL 3 SPEED LOAD FRAME NEW
DIGITAL TOUCH-SCREEN, COMPUTERIZED

Technical details of the frame: see mod. S213-05N, p. 494
Supplied complete with "Cyber-Plus 8 Evolution" system (B044N-SET, details on p. 000, Hardware details at p.19), load cell and displacement transducer, but **without** accessories to be ordered separately.

S215A
UNIVERSAL MULTISPEED LOAD FRAME
DIGITAL, TOUCH-SCREEN, COMPUTERIZED

Technical Spec. of the frame: see mod. S212N at p. 494
Technical Spec. of S215A: see p. 19
Supplied **without** accessories for Marshall, CBR, Unconfined tests and Software, to be ordered separately.

B046-02

iTECH

S215A
+ MARSHALL accessories

NEW

B046-03

iTECH

S214-05N KIT + MARSHALL accessories

SOFTWARES FOR THE FRAMES COMBINED WITH "CYBER-PLUS 8" SYSTEM:

B043-01N SOFTWARE UTM2 (Universal Testing Machine 2) Licence for **MARSHALL** test.
Standards: EN 12697-34 | ASTM D6927, D5581, D1559

B043-02N SOFTWARE UTM2 (Universal Testing Machine 2) Licence for **TENSILE SPLITTING** test.
Standards: EN 12697-23 | ASTM D6931

Description and technical details of Software UTM2: see p. 18

H009-01 PERSONAL COMPUTER, complete with LCD monitor 22", keyboard, mouse, connection cables, installation and setting up of the purchased software.

C128 Laser printer, for the graphic and test certificate printing, to be connected directly to Cyber-Plus 8 through USB.

C127N On board graphic printer on thermo-paper

Note: The frames S214-05N KIT and S215A are suitable also for tensile splitting and direct shear (Leutner) test, by using the specific devices described at p. 123

ACCESSORIES for the frames, mod. S214-05N KIT and S215A

S212-05 LOAD PISTON
B046N STABILITY MOULD Ø 4" **aluminium made**, or
B046-03 STABILITY MOULD Ø 4" **steel made** NEW
B046-02 STABILITY MOULD Ø 6" Standard: ASTM D5581

S205N

UNITRONIC 50 KN
UNIVERSAL MULTIPURPOSE TOUCH-SCREEN FRAME
FOR COMPRESSION / FLEXURAL TESTS

iT TECH

WITH AUTOMATIC LOAD OR DISPLACEMENT/DEFORMATION CONTROL, for testing:

- MARSHALL
- SPLITTING TENSILE
- DIRECT SHEAR (Leutner) on the connection between bituminous strata.
- SCB: Automatic Asphalt fracture test (see next page)

Soil:
- CBR (California Bearing Ratio),
- UNCONFINED COMPRESSION,
- QUICK TRIAXIAL

Concrete:
- FLEXURE ON BEAMS
- FLEXURE ON TILES

Cement:
- FLEXURE on 40x40x160mm specimens,
- COMPRESSION on cubes 40, 50, 70mm
- TENSILE on mortar briquettes (mod. S205-05N)

Metal, plastic, wires, ropes, textiles, papers etc.
- TENSILE TESTS, 25kN max capacity load (mod. S205-05N)

Clay blocks:
- PUNCHING

Rock and stones:
- UNIAXIAL SPLITTING TENSILE

Technical features:
By using suitable devices, Unitronic tester, within the limits of its max. 50 kN capacity for compression/flexural and 25 kN for tensile (see accessory S205-05N), performs compression, flexural, splitting tensile and direct tensile tests, with automatic load or displacement/deformation control.

The load is applied by a mechanical jack that is driven by a motor **brushless with closed loop through optic encoder** and controlled by a microprocessor. Stroke electric end switches are applied to the load piston to save the machine from accidental handlings.
The two crossheads foresee couplings to fix the different test devices (see accessories). The stress is measured by an electric load cell; the measurement and the displacement control of the crosshead is achieved by the electronic device incorporated into the machine.

Firmware:
- Electronic control unit “Cyber-plus Evolution” with Touch-Screen colour display, that runs like a standard PC based on Windows operating system.
- The machine can be connected to a PC for remote test execution through suitable Software.
- Direct connection to Intranet and Internet to establish a remote communication and receive an immediate diagnostic analysis from Matest technicians, or for updates of the software.
- Unlimited memory storage with: 2 USB ports, 1 SD card slot.
- RJ45 network connection
- Possibility to select different languages.

NEW

S205N with load cell

TECHNICAL SPECIFICATIONS

- Maximum compression capacity: 50kN
- Maximum tensile capacity: 25kN (accessory S205-05N)
- Adjustable testing speed from 0.01 to 51 mm/minute
- Adjustable pace rate from 1 to 15000N/sec.
- Max. ram travel: 100 mm
- Daylight between columns: 380 mm
- Max. vertical daylight: 850 mm
- Unitronic 50 kN is supplied without accessories and software to perform the specific tests that must be ordered separetely (see accessories at next pages)

Power supply: 230V 1F 50-60Hz 1500W
Dimensions: 500x450x1450 mm
Weight: 130 kg approx

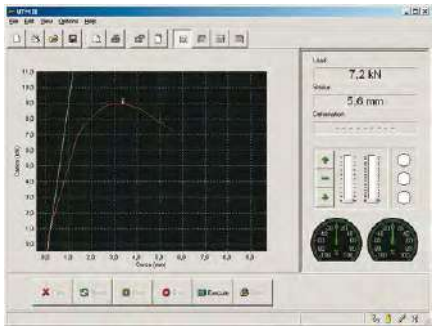
SPECIFIC APPLICATIONS ON BITUMINOUS MATERIALS

MARSHALL STABILITY TEST

STANDARDS: EN 12697-34 | ASTM D 6926, D5581, D1559
AASHTO T245 | BS 598 :107 | NF P98-251-2
Test development with displacement control.

NEEDED ACCESSORIES

S337-34 Strain gauge load cell, 50 kN capacity.
S212-05 Loading piston.
B046N Stability mould Ø 4" **aluminium made**.
As alternative:
B046-03 Stability mould Ø 4" **steel made** ASTM D6927 NEW
B046-02 Stability mould Ø 6" steel made ASTM D5581
B043-01N Software for Marshall test.



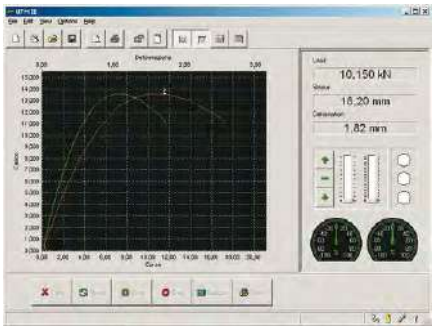
B043-01 Software Marshall test

SPLITTING TENSILE TEST

STANDARDS: EN 12697-23 | ASTM D6931 | AASHTO T283 | CNR 134
Test development with displacement control.

NEEDED ACCESSORIES

S337-34 Strain gauge load cell, 50 kN capacity.
S212-05 Loading piston.
B047-02 Splitting tensile device for samples Ø 4" and 6"
B047-04 Set of TWO displacement transducers with accessories.
B043-02N Software for Splitting Tensile test.



B043-02 Software splitting tensile test

DIRECT SHEAR (LEUTNER) BETWEEN BITUMINOUS STRATA

STANDARD: ALP A StB T.80
Direct shear test (LEUTNER) on the connection between bituminous strata, carried out on asphalt cylinder specimens Ø 150 mm or 100 mm obtained from road cores or on laboratory made specimens.
Test development with displacement control.

NEEDED ACCESSORIES

S337-34 Strain gauge load cell, 50 kN capacity.
S212-05 Loading piston.
B047-10 LEUTNER testing head for specimens Ø 150 mm.
B047-11 Spacers for Ø 100 mm specimens with Leutner head.
B043-03N Software for Marshall and Leutner tests.

Note: Needed accessories listed above, are common for different tests. We recommend to check them when ordering, to avoid duplications.
Additional specific applications described at p. 500

S205N
AUTOMATIC SCB SYSTEM NEW

iTECH

THE FAST AND SIMPLE WAY TO PERFORM ASPHALT FRACTURE TESTING

STANDARDS: EN 12697-44 | AASHTO TP124 | ASTM D8044

The Automatic SCB system, used in conjunction with the S205N Unitronic 50 kN load frame, is an accurate device for conducting mechanical testing of asphalt mixtures. It can perform various versions of the Semi-Circular Bend (SCB) test for evaluating the fracture characteristics of asphalt mixtures at intermediate service temperature conditions. Pavement engineers can use these tests to determine the material characteristics needed for pavement design, quality control and/or quality assurance purposes.

Our Automatic SCB system is able to operate in load-control and displacement-control modes and can accommodate a wide range of test accessories in order to run several asphalt performance tests, including IDT/TSR, MARSHALL and DIRECT SHEAR.

In particular, Matest offers accessories for conducting SCB tests according to **EN 12697-44, AASHTO TP124** (recommended by University of Illinois) and **ASTM D8044** (recommended by Louisiana State University). The load and displacement parameters measured by the Automatic SCB system can be used to predict cracking performance of asphalt mixtures based on the Illinois Flexibility Index (I-FIT) and Critical Strain Energy Release Rate (Jc).

S205N + SCB accessories

MAIN FEATURES

- Precision load cell and LVDT for load and specimen vertical displacement measurement.
- Loading sequence fully automated with microprocessor control of the loading ram.
- Load and displacement measured with 8 analog A/D inputs.
- Touch screen display and intuitive controls allow for rapidly setting new test parameters and monitoring test data in real time.
- The data acquisition system can connect to multiple transducers simultaneously.
- The frame maintains the specimen alignment during the test.
- The durable electromechanical loading system needs minimal maintenance.
- Optional high quality Environmental Chamber performing tests between -25 °C and + 60 °C.

TECHNICAL SPECIFICATIONS

See the S205N unit technical specifications, at page 126, 500.

S205N UNITRONIC 50KN CONFIGURATIONS:

EN 12697-44
Tensile strength and fracture toughness-crack propagation.

NEEDED ACCESSORIES

B250-01 Basic indirect tensile (idt) jig, for 100-150 mm diameter
B254-01 Scb jig (requires basic idt jig)
B254-51 Pair of scb wear plates
S337-34 Load cell 50 kn capacity
B045-13 Loading piston
S336-15 Transducer type "B" travel: 10 mm
B045-14 Coupling hardware
S335-15 Universal coupling pliers for transd./dial
B043-05N Software for auto-scb test

Detail of the configuration

Asphalt specimen positioning

AASHTO TP124
Determining the fracture potential of asphalt mixtures using semicircular bend geometry (scb) at intermediate temperature.

ASTM D8044
Evaluation of asphalt mixture cracking resistance using the semi-circular bend test (SCB) at intermediate temperature.

NEEDED ACCESSORIES

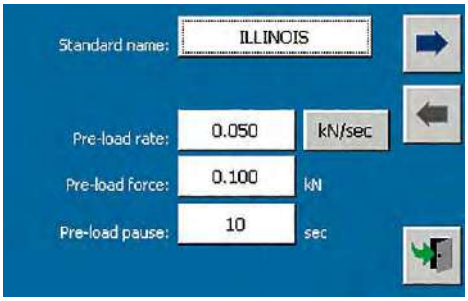
B208 SCB frame
B254-02 Springs
B254-10 Roller support
S337-31(*) Load cell 2,5 kn capacity
B045-13 Loading piston
S336-15 Transducer type "B" travel: 10 mm
B045-14 Coupling hardware
S335-15 Universal coupling pliers for transd./dial
B043-05N Software for auto-scb test

OPTIONAL ACCESSORIES

B254-12 Positioning device

(*) As alternative to item S337-31
S337-32 Load cell 10 kN capacity
S337-33 Load cell 25 kN capacity
S337-34 Load cell 50 kN capacity
S337-35 Load cell 5 kN capacity

Detail of the configuration



Software interface

S206N
UNITRONIC 200 KN

IT TECH

MULTIPURPOSE TOUCH-SCREEN FRAME
FOR COMPRESSION, FLEXURE AND TENSILE TESTS,
WITH AUTOMATIC SERVO-CONTROLLED LOAD OR DISPLACEMENT DEFORMATION CONTROL.

Unitronic 200kN is the universal and versatile machine designed and manufactured by Matest to satisfy the need of control, research and test on:
Roads (Marshall, Duriez, CBR etc.), Steel, Concrete, Cement, Wood, Plastic, etc.
The machine is composed of a sturdy base containing the transmission components and the hardware control instruments.
The base holds two columns, made of high resistance steel with ground hard chrome surfacing.
The upper crosshead can be adjusted in height, to hold the accessories to perform the specific tests.
The lower mobile crosshead is operated by a recirculating ball screw and rotating lead, that through a servo-controlled motor assures the correct application of load and constant speed.
The load is applied with a mechanical jack activated by a **brushless closed-loop motor with optical encoder** controlled by a microprocessor.
The two crossheads have couplings to fix the different test devices (see accessories).
The stress is measured by an electric load cell; the measurement and the displacement control of the crosshead is achieved by the electronic device incorporated into the machine.
Stroke electric end excursion switches of the upper mobile crosshead are foreseen to save the machine from accidental handlings.

S206N

FIRMWARE:
- Electronic control unit **Cyber-plus Evolution** with Touch-Screen colour display, that runs like a standard PC based on Windows operating system for the management and analysis of the data, test results, graphs.
- The Touch-Screen icon interface allows an easy set up of the parameters and immediate execution of the test.
- The machine can be connected to a PC for remote test execution through suitable Software; the machine can in any case perform the tests without any external PC, because of the **Cyber-Plus** grants performances like a PC.
- Direct connection to Intranet (connection to a LAN network) and Internet to establish a remote communication and receive an immediate diagnostic analysis from Matest technicians, or for uptdates of the software.
- Unlimited memory storage with: 2 USB ports, 1 SD card slot, RS232/485 serial port.
- Possibility to select different languages.
- Hardware technical details: see p. 19

SPECIFICATIONS OF THE FRAME:
- Max. load: 200 kN (both Compression and Tensile)
- Max. vertical daylight: 900 mm (without accessories)
- Max. vertical daylight with compression platens: 800 mm
- Compression platens diameter: 216 mm (upper platen on seat ball)
- Distance between columns: 650 mm
- Crosshead travel: ± 200 mm (400 mm total)
- Testing speed range: from 0.01 to 100 mm/min
- Load rate: from 1 N/s to 5 kN/s
- Displacement resolution: 0.01 mm with accuracy better than 0.2%
- Machine Class: 1

The Unitronic 200 kN is **supplied complete with:**
Electric load cell 200 kN capacity, crosshead displacement device, upper with seat ball and lower compression platens.
Are not included: accessories and software for specific tests that must be ordered separately (see accessories).

Power supply: 230V 1ph 50-60Hz 850W
Dimensions: 950x560x2400 mm
Weight: 820 kg approx.

Note:
The machine can be equipped with intermediate load cells to the max. capacity of the machine, to satisfy specific test requirements.

SPECIFIC APPLICATIONS:

DURIEZ TEST SET

STANDARD: NF P98 - 251-1, NF P98 - 251-4

Used to determine the mechanical and phisical properties of bituminous mixtures. To perform the test, the specimens have to be temperature conditioned using a suitable climatic chamber (see mod. C313, p. 348)

S206N Unitronic 200 KN
S206-21N Software for Duriez test

Duriez test set for 120 mm diameter specimens:

B095-01 Testing mould
B095-02 Penetration piston
B095-03* Penetration piston grooved
B095-04 Upper/Lower piston
B095-05* Upper/Lower piston grooved
B095-06 Two temporary supports
B095-07 Demoulding cylindrical container

Duriez test set for 80 mm diameter specimens:

B096-01 Testing mould
B096-02 Penetration piston
B096-03* Penetration piston grooved
B096-04 Upper/Lower piston
B096-05* Upper/Lower piston grooved
B096-06 Two temporary supports
B096-07 Demoulding cylindrical container

* Used for cold mixtures with bituminous emulsions

B095-01...B095-07

DIRECT SHEAR (LEUTNER) BETWEEN BITUMINOUS STRATA

STANDARD: ALP A StB T.80

Direct shear test (LEUTNER) on the connection between bituminous strata, carried out on asphalt cylinder specimens Ø 150 mm or 100 mm obtained from road cores or on laboratory made specimens.

S206N Unitronic 200 kN
S337-34 Strain gauge load cell 50 kN capacity
S206-31 Flange/connector of the load cell S337-34
S212-05 Loading piston
B047-10 LEUTNER testing head for specimens Ø 150 mm
B047-11 Spacers for Ø 100 mm specimens with Leutner head
B043-03N Software for Leutner and Marshall tests.

MARSHALL STABILITY TEST

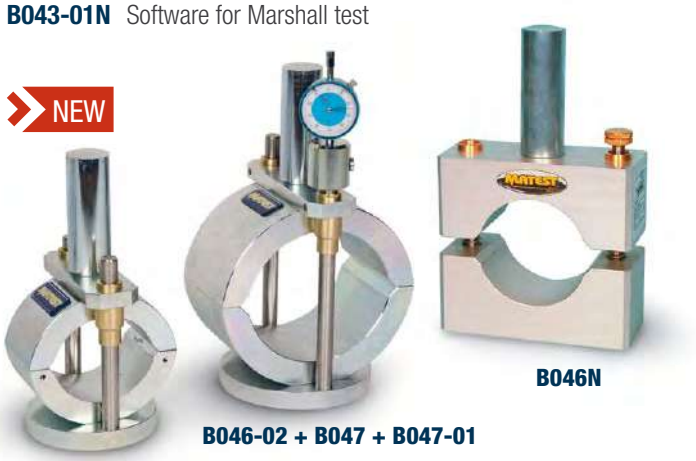
STANDARDS: EN 12697-34 | ASTM D6927, D5581, D1559
AASHTO T245 | BS 598:107 | NF P98-251-2

S206N Unitronic 200 kN
S337-34 Strain gauge load cell 50 kN capacity
S206-31 Flange/connector of the load cell S337-34
S212-05 Loading piston
B046N Stability mould Ø 4" **aluminium made**

As alternative:

B046-03 Stability mould Ø 4" **steel made**. ASTM D6927 NEW
B046-02 Stability mould Ø 6" **steel made**. ASTM D5581
B043-01N Software for Marshall test

NEW



B046N

B046-02 + B047 + B047-01

B046-03

SPLITTING TENSILE TEST

STANDARDS: EN 12697-23 | ASTM D6931 | AASHTO T283 | CNR 134

S206N Unitronic 200 kN
S337-34 Strain gauge load cell 50 kN capacity
S206-31 Flange/connector of the load cell S337-34
S212-05 Loading piston
B047-02 Splitting tensile device for samples Ø 4" and 6" (p. 121)
B047-04 Set of TWO displacement transducers with accessories (p. 123)
B043-02N Software for Splitting Tensile test (p. 18)

S337-34

S212-05

B047-02 + B047-04

B047-10 + B047-11

Additional specific accessories for tests on:
Concrete and Mortar (compression, flexure, punching etc.) - Soils (CBR) - Steels (Tensile), are listed in soil section, p. 508.

B044N-SET
CYBER-PLUS 8 EVOLUTION TOUCH-SCREEN

Developed for the implementation and upgrading of any type of existing machines (even not manufactured by Matest) applicable to:

- Marshall mechanical load frame mod. B042 KIT.
- CBR/Marshall 3 speeds load frame mod. S213-05N.
- CBR loading machine motorized mod. S211 KIT.

Suitable to perform the following tests:

- MARSHALL: EN 12697-34 | ASTM D6927, D5581, D1559
  CNR N. 30 | NF P98-251-2 | BS 598 :107
  AASHTO T245
- INDIRECT TENSILE TEST: EN 12697-23, EN 12697-12
  ASTM D6931, D4123 | AASHTO T283
- DETERMINATION OF THE WATER SENSIBILITY OF BITUMINOUS SPECIMENS: EN 12697-12
- CBR TEST: EN 13286-47 | CNR | UNI 10009 | AASHTO T193
  ASTM D1883 | BS 1377:4 | NF P94-078.
- UNCONFINED TEST: ASTM D2166

MAIN FEATURES

- Acquisition and data processing system up to 8 analogical/digital channels.
- Remote control through PC and UTM2 software.
- Graphic display 1/4 VGA color Touch-Screen.
- Instant display of load and deformation.
- Automatic correction of the axis origin and automatic calculation of all the results.
- Safety switch-off at max reached load and/or deformation.
- IT TECH

B044N SET

HARDWARE SPECIFICATIONS

- 8 indipendent channels available for the load cells or potentiometrics transducers for load, or displacement measurements;
- Stabilized power supply of the analogical channels: 5 Vcc and 3 Vcc;
- Analogue input: ± 20 mV and ± 5 V;
- Nominal resolution: 24 bit;
- Acquisition up to 200 readings for each channel;
- Safety discrete On/off output;
- Graphic display ¼ VGA colour Touch-Screen;
- Time and calendar system.

FIRMWARE SPECIFICATIONS

- Instant visualization of the load measured by an extensometric cell.
- Instant visualization of the deformation measured by 4 linear displacement transducers.
- Visualization of the graphic of the test.
- Visualization of date and time.
- Semi-automatic configuration and calibration of all transducers connected.
- 20 steps lining that can be set by the enduser.
- Automatic correction of the axis origin for CBR/Marshall tests.
- Setting of all the parameters for test: alarms, zero threshold, end-test percentage, calculation parameters.
- Time/date and language selection (Italian, English, French, German, Spanish, Polish).
- Unlimited file for each type of test
- Symbols of pushbuttons functions
- Informative messages (planning alarms, load cell and strain transducer setting, etc.)
- Printing of the results on the incorporated thermal graphic printer (accessory C127N). Transfer and management via Ethernet of the filed data or real-time.

Hardware technical details: see p. 19

B044N-SET is composed of:

B044N
CYBER-PLUS 8 EVOLUTION
Unit for data acquisition.
Power supply: 230V 1F 50-60Hz.

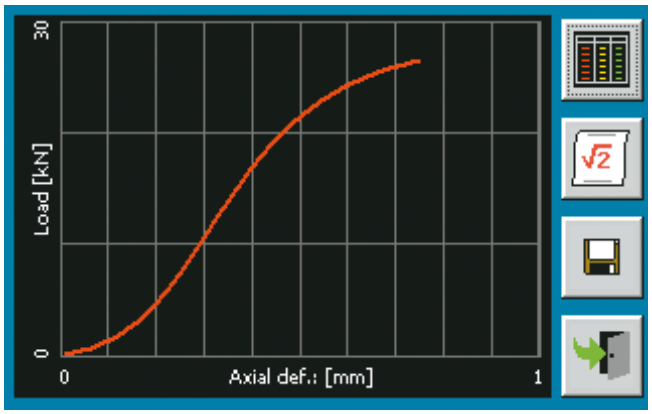
S337-34
LOAD CELL
50kN capacity, with high precision strain transducers, complete with cable and connector.

S336-14
LINEAR DISPLACEMENT TRANSDUCER
50 mm stroke, independent linearity ± 0.1% complete with cable and connector.

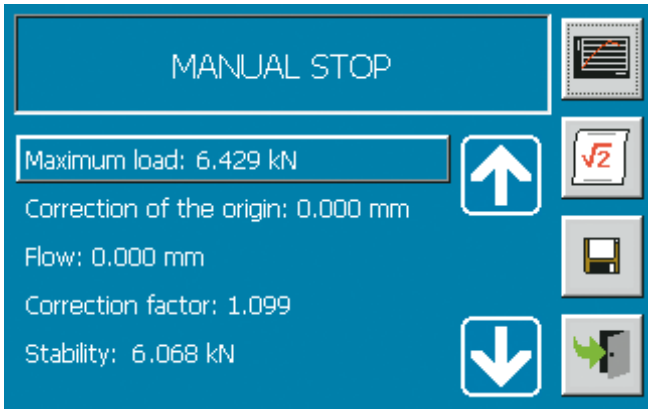
All necessary accessories for fixing the load cell and transducer to the test machine, are provided.
The system is calibrated ready to use and COMPLETE with a calibration certificate.
Every item can be ordered separately.

ACCESSORIES

B043-01N
SOFTWARE UTM2 (Universal Testing Machine 2)
Licence for **MARSHALL** test
Data processing program for **X-Y STABILITY/FLOW**
STANDARDS: EN 12697-34 | ASTM D6927, D5581, D1559
BS 598:107 | NF P98-251-2



Example of Marshall stability/flow graph



Real time display of final results

B043-02N
SOFTWARE UTM2 (Universal Testing Machine 2)
Licence for **INDIRECT TENSILE STRENGTH**
STANDARDS: EN 12697-23 | ASTM D6931 | AASHTO T283

Selection of test method on touch-screen panel

Real time results during test

S218N
SOFTWARE UTM2 (Universal Testing Machine 2)
Licence for **CBR** Test
STANDARDS: EN 13286-47 | UNI CNR 10009 | ASTM D1883
BS 1377:4 | NF P94-078 | AASHTO T193

S218-01N
SOFTWARE UTM2 (Universal Testing Machine 2)
Licence for **UNCONFINED** Test
STANDARDS: ASTM D2166

Description and technical details of Software UTM2: see p. 18

H009-01
PERSONAL COMPUTER, complete with LCD monitor 22", keyboard, mouse, connection cables, installation and setting up of the purchased software.

C128
LASER PRINTER for test certificate and graphics printing with direct connection to CYBER-PLUS 8.

C127N On board graphic printer on thermo-paper

WATER BATHS FOR MARSHALL SPECIMENS

STANDARDS: EN 12697-34 I ASTM D6927, D1559, D5581 I AASHTO T245
Used to maintain in water Marshall specimens at costant temperature of 60 °C ± 1 °C and asphalt specimens at 37.8 °C ± 1 °C.
These baths are also ideal for general laboratory use.

B051

MODELS

B051
MARSHALL WATER BATH

The internal tank and cover are stainless steel made, outside box is of painted steel sheet with wool insulation. The specimens are held by a stainless steel perforated shelf spaced from the bottom.
The bath has a capacity of 46 litres and is designed to hold up to 20 Marshall specimens.
Temperature range: from ambient to 95 °C.
Inside dimensions: 615x505x150 mm
Overall dimensions: 660x540x230 mm
The bath is supplied **without** thermostat and heating element to be ordered separately (see accessories).

Weight: 18 kg approx.

B051 + B051-01

NEEDED ACCESSORY for the B051 Bath

B051-01
THERMOSTAT ANALOGIC Heating System, complete with immersion heating element.

Power supply: 230V 1ph 50-60Hz 1500W

In alternative:

B051-02
THERMOSTAT DIGITAL Heating System, complete with immersion heating element. The digital system ensures a better temperature control of the water at 60 ± 1 °C or 37.8 ± 1 °C as requested by Standards.

Power supply: 230V 1ph 50-60Hz 1500W

B051-01

B051-02

C306-03

C306-03
SEPARATE CONTROL PANEL, complete with switch and electrical protections to get B051-01 and B051-02 thermostats to CE safety Directive.

B052
DIGITAL WATER BATH

This bath is fully double walled stainless steel made with wool insulation. The specimens are held by a shelf spaced out from the bottom. Complete with a digital thermostat and an electric stirrer **for continuous water recirculation**, ensuring a constant and uniform temperature of 60 ± 1 °C or 37.8 ± 1 °C as prescribed by the Standards.
The bath can hold up to 20 Marshall specimens
Capacity: 60 litres
Temperature range: from ambient to 95 °C
The bath is equipped with a dual safety thermostat to prevent accidental over-heatings.

Inside dimensions: 700x550x150 mm
Outside dimensions: 950x660x360 mm
Power supply: 230V 1ph 50-60Hz 1500W
Weight: 20 kg approx.

B052 + B052-10

B052-01
DIGITAL WATER BATH

Identical to mod. B052 but:
Inside dimensions: 430x420x160 mm
Outside dimensions: 620x500x330 mm
The bath can hold up to 9 Marshall specimens

Capacity: 30 litres
Power Supply: 230V 1ph 50-60 Hz 1200W
Weight: 15 kg approx.

B052-01

E136-01
DIGITAL WATER BATH

Identical to mod. B052 but:
Inside dimensions: 900x600x360 mm
Outside dimensions: 1050x680x630 mm
The bath can hold up to 80 Marshall specimens

Capacity: 200 litres
Power Supply: 230V 1ph 50-60 Hz 4000W
Weight: 55 kg approx.

B052-02

B052-02
DIGITAL WATER BATH WITH COOLING DEVICE

Similar to mod. B052 but equipped with cooling unit placed under the bath for controlling water temperatures where the ambient temperature is quite higher.
Temperature range from: + 3 to + 95 °C, accuracy: ± 1 °C.
The bath can hold up to 12 Marshall specimens
Capacity: 45 litres

Inside dimensions: 635x360x205 mm
Outside dimensions: 800x430x1000 mm
Power supply: 230V 1ph 50Hz 1650W
Weight: 60 kg approx

ACCESSORY FOR MOD. B051...B052-02

B052-10 ALCOOL CONTROL THERMOMETER 0-100 °C subd. 1 °C

B053-10
COHESION TESTER

STANDARDS: ISSA TB139, comparable to EN 12274-4 | ASTM D3910

This instrument is used for cohesion tests on the mix, and to determine the proper consistency or mix design for a slurry seal mixture. The pneumatic cylinder incorporated into the unit applies a pressure to the sample. A hand torque tester supplied with the cohesion unit, measures the torquing strength by determining the complete solidification of the mix.
Supplied complete with torque wrench, 5 moulds Ø 60x6 mm, 5 moulds Ø 60x10 mm, 5 moulds Ø 70x6 mm, 5 moulds Ø 70x10 mm accessories, spare parts.
To perform the test an air pressure source is needed.

Dimensions: 400x250x300 mm approx.
Weight: 20 kg approx

ACCESSORIES

V206 AIR COMPRESSOR. 230V 50Hz 1ph.

SQUARE MOULD to EN 12274-4 with 4 holes to prepare the sample:

B053-12 MOULD 140x140x6.3 mm
B053-13 MOULD 140x140x10 mm
B053-14 MOULD 200x200x13 mm
B053-15 MOULD 200x200x19 mm

SPARES

B053-16 MOULD Ø 60x6 mm (2 pieces)
B053-17 MOULD Ø 60x10 mm (2 pieces)
B053-18 MOULD Ø 70x6 mm (2 pieces)
B053-19 MOULD Ø 70x10 mm (2 pieces)

B053
"VIALIT" BINDER ADHESION TEST

STANDARDS: EN 12272-3 | NF P98-274-1

Used to evaluate the global adhesion and the active adhesion between bitumen and aggregates for road surfaces realization.
The equipment is formed by:
Six metal test plates
Steel ball weighing 512 g
Metallic base with three vertical support points and metallic rod 500 mm high
Metallic hand operated roller, rubber lined with lead shots ballast.


B053

Weight: 40 kg approx.

SPARE: **B053-01** Metal test plate.

S148
SAND ABSORPTION CONE AND TAMPER
CONSISTENCY DETERMINATION

STANDARDS: EN 12274-3, EN 1097-6
Used for the determination of the absorption and specific gravity of fine aggregates.

Weight: 600 g approx.


B053-10

B053-20
PLANETARY ABRASION TESTER
DETERMINATION OF WEARING

STANDARDS: EN 12274-5 | ASTM D3910 | NLT 320
The unit consists of a planetary mixer in which container the slurry mixture is placed and a weighted special headed rubber hose applies an abrasion action.

Power supply: 230V 1ph 50Hz
Dimensions: 340x460xx500 mm approx.
Weight: 40 kg approx.

NEEDED ACCESSORIES

B053-22 SET OF 4 ROUND METALLIC MOULDS
Ø 279-295 ± 0.5 mm
Heights: 6.3 - 10 - 13 - 19 mm to EN 12274-5 Spec.

B053-23 SET OF 3 ROUND METALLIC MOULDS
Ø 279-295 ± 0.5 mm
Heights: 6.3 - 8.2 - 10.5 mm to ASTM D3910 Spec.


B053-20

B053-05
RATE OF SPREAD DEVICE

STANDARDS: EN 12272-1 | BS 598:108
This apparatus is used for determining the rate of spread of coated chippings on the road surface.
The device consists of a 300 mm square tray, lifted by 4 chains which are fixed on a spring balance.
The rate of spread is directly measured in kg/m^2.

Weight: 1500 g approx.


B053-05

SECTION B

ASPHALT | BITUMEN | PAVETEST

Bituminous mixture, also known as asphalt mixture, is mainly composed by aggregates and bitumen, an infinite variety of mixtures being possible. This section is divided into three parts and shows the whole range of equipment for analyzing each component of the bituminous mixture.

ASPHALT. The first part is dedicated to the asphalt testing machines used to provide a solution for the whole “asphaltic path”: mixing, compacting, modelling and testing. The equipment meets the needs of those who want to perform quality control or experimentation of new asphalt mixtures.

BITUMEN. This section shows equipment required for bitumen testing: these include machines to study the rheological properties of bitumen as well as the features of bituminous emulsion. The last part of this section provides better solutions to perform field tests on road surface.

PAVETEST. Pavetest’s range of pavement dynamic testing systems both complements and completes Matest’s Asphalt and Bitumen business unit. All our products comply with the principal international standards.

B059M
SMARTIP
FULLY AUTOMATIC PENETROMETER

NEW

STANDARDS: EN 1426 | ASTM D5 | AASHTO T49 | ASTM D217 | BS 1377-2 | NF T66-004 | DIN 52210 | IP 49 | JIS K 2207

SMARTIP is an automatic apparatus for the determination of the needle penetration value, avoiding any possible operator lack of concentration and ensuring a reliable repeatability of the results. It is a smart instrument thanks to the latest technologies adopted, the integrated microprocessor control and the user-friendly interface.

The instrument automatically reaches the contact point before starting the test and the penetration result is measured thanks to a high performance contactless displacement transducer. SMARTIP can be implemented with the device for an automatic measurement of electrically conductive samples (model B059M-01), in order to improve the material tested range. An ultra-bright LED lamp helps the operator in checking the touching point of the needle while a stepper motor controls the vertical movement to reach exactly the desired point without any manual movement of the plunger. The needle probe is automatically released for each penetration thanks to an electromagnetic system and automatically blocked at the end of the test.

The plunger comes back at the initial position at the end of each test by a simple recall command in order to re-positioning the needle before the new measurement.

A 7" touch screen display is included in the SMARTIP frame, easy to use. It shows in real time the penetration/time graph, the test temperature and the average result according to the number of tests done. Unlimited results can be saved on USB device for preparing a laboratory report and for further analysis.

SMARTIP is supplied complete with the accessories for determination of the needle penetration according to EN 1426, ASTM D5 and AASHTO T49 standards, and USB flash drive for saving data. Thermostatically controlled water bath, chiller, temperature probe PT100, device for an automatic measurement of electrically conductive samples and mirror can be ordered separately as accessories.

MAIN FEATURES

- Fully automatic test, simply pressing the START button: approach, touch point, penetration.
- Automatic identification of the needle contact point and needle positioning, avoiding any possible operator lack of concentration and ensuring a reliable repeatability of the results.
- Electro-magnetic needle probe release to perform the test.
- Automatic zero at the contact before starting penetration.
- Penetration measurement thanks to a high-tech contactless displacement transducer with 0.01 mm resolution, in a range of 0 - 50 mm.
- 7" touch screen display equipped with an user-friendly software and clear interface.
- Real time display of penetration/time curve, average result and test temperature.

B059M

B059M-01
SMARTIP

Same as B059M but implemented with device for testing electrically conductive samples.

TECHNICAL SPECIFICATION

- Measuring range: 0 – 50 mm;
- Resolution: 0,01 mm;
- 7” touch screen display;
- Test time 5 s (adjustable from 0 to 9999 s);
- Programmable delay time: from 0 to 999 s;
- Programmable reference positions for holder assembly: 8;
- Test simultaneously displayed: up to 10;
- Connection: USB port and LAN port for PC connection;

Power supply: 110-230V 50-60Hz 1ph
Overall dimensions: 325x400x730 mm
Weight approx.: 25 Kg approx.

B058

B058-01

B058M

B058-01

ACCESSORY

B058 THERMOSTATICALLY controlled water bath.
Technical details: see p. 142

B058-01 WATER BATH DISH with incorporated thermostatic coil, to be connected to the bath mod. B058.It keeps the temperature of the bitumen sample directly on the penetrometer, by avoiding to transfer it.
Dimensions Ø 151x90 mm

B058M WATER CHILLER: 7.5 l capacity, with electronic temperature controller with ± 0.1 °C accuracy and fluid temperature range between 5 and 30°C. Suitable for chilling penetrometer water baths or temperature controlled setting time tests
- 230 V 50-60Hz 1ph
- Power consumption: 350 W
- Overall dimensions: 415x300x420 mm
- Weight: 15 kg approx.

B059M-11 TEMPERATURE PROBE, PT100: Measurement of the sample temperature in real time. It’s connected with the monitor in order to show the temperature during each test

B057-08 THERMOMETER, IP 38C

B057-06 PENETRATION NEEDLE conforming to EN 1426 and ASTM D5, supplied with official UKAS certificate

B057-07L LONG NEEDLE hardened

B057-03 GLASS TRANSFER DISH

B056-09 PENETRATION BALL

B057-09 STANDARD PENETRATION CONE conforming to ASTM D217 and EN 13880-2

SPARES for B059M

V122-05 Sample cup 55x35 mm

V122-06 Sample cup 70x45 mm

B057-07 PENETRATION NEEDLE, individually verified

B057-04N 50 g weight

B057-05N 100 g weight

B056 KIT
STANDARD DIAL PENETROMETER

STANDARDS: EN 1426 | ASTM D5 | BS 1377-2 | NF T66-004
AASHTO T49

Used to determine the consistency of a bituminous sample under fixed conditions of load, time and temperature. The penetration is expressed in distance of tenths of millimeters vertically penetrated by a standard needle. The standard penetrometer has a sturdy aluminium base table with levelling screws, plated vertical rod, **micrometric vertical adjustment device**.
The slider is brass made with free fall. The dial, graduated in 360° (division 0.1 mm), has a diameter of 150 mm.
The penetrometer is supplied with stop and release push button, automatic zero set, micrometer adjustment, set of weights 50 and 100 g penetration needle, brass sample cups Ø 55x35 mm and 70x45 mm.

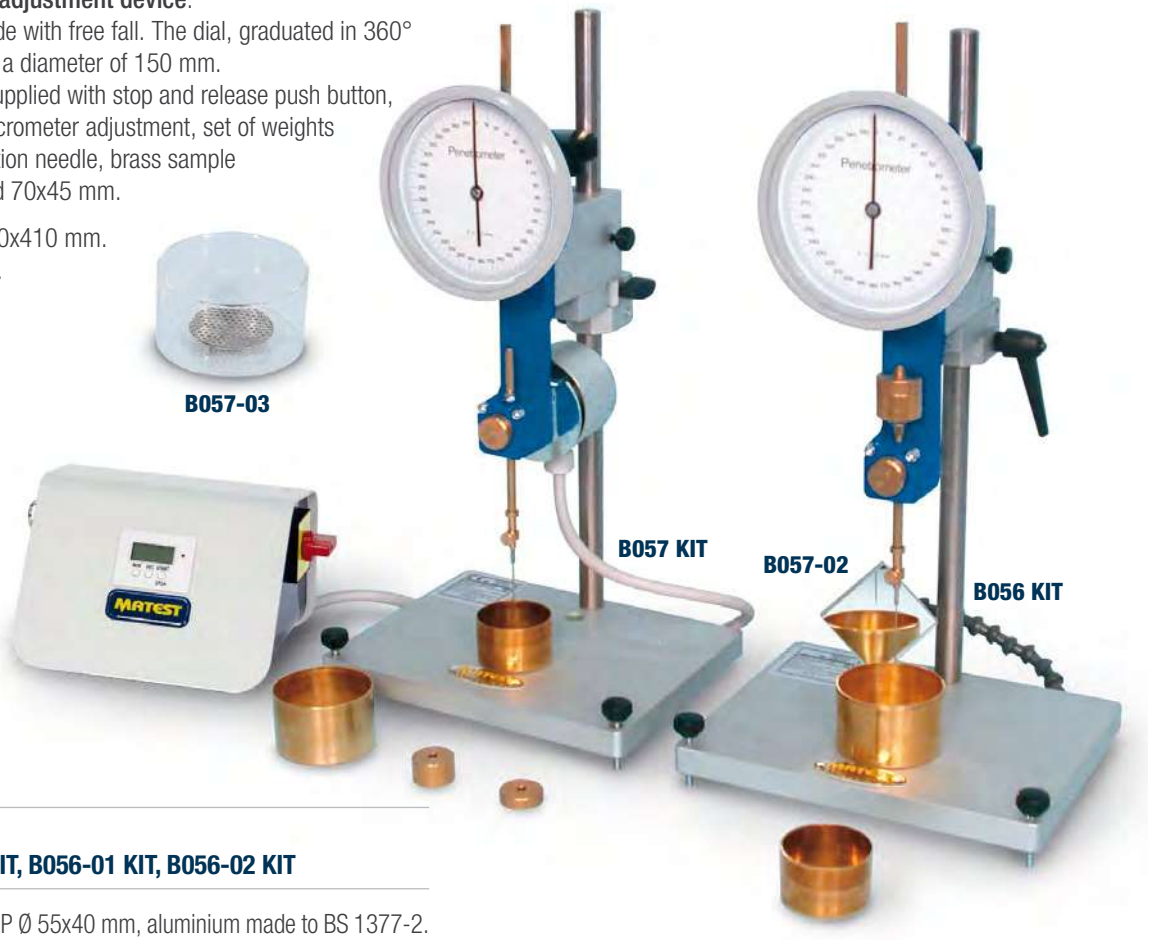
Dimensions: 220x170x410 mm.
Weight: 11 kg approx.

B057-03

B057 KIT
AUTOMATIC DIAL PENETROMETER

Basically structured as mod. B056 KIT but having a magnetic controller device with electronic digital programmable timer that automatically releases the plunger head and ensures free falling of the needle during the 5-seconds test.

Power supply: 230V 1ph 50-60Hz 200W
Dimensions: 220x280x410 mm
Weight: 15 kg approx.



ACCESSORIES
for B056 KIT, B057 KIT, B056-01 KIT, B056-02 KIT

V122-08 SAMPLE CUP Ø 55x40 mm, aluminium made to BS 1377-2.

B057-02 MIRROR, for an easier setting of the needle.

B057-03 TRANSFER DISH, made of glass, with support.

B057-06 PENETRATION NEEDLE HARDENED STEEL, 42.5 ± 2.5 mm long supplied with UKAS Verification Certificate. Weight: 2.5 ± 0.05 g

B057-07 PENETRATION NEEDLE HARDENED STEEL, 42.5 ± 2.5 mm long. Each needle is individually verified with engraved serial number, and perfectly meets EN 1426 Specification. Weight: 2.5 ± 0.05 g

B057-01L NEW LONG PENETRATION NEEDLE, not hardened, 52.5 ± 2.5 mm. Comparable to EN, to test specimens where the penetration is expected to exceed 35 mm

B057-07L NEW LONG PENETRATION NEEDLE HARDENED, 52.5 ± 2.5 mm to EN 1426, to test specimens where the penetration is expected to exceed 35 mm

B057-08 TERMOMETER, IP 38C Range: +23 °C to +26 °C. Grad. 0.1 °C

B089 TERMOMETER, EN, Range: +19 °C to +27 °C. Grad. 0.1 °C - ASTM 17C

SPARES for B056 KIT, B057 KIT, B056-01 KIT, B056-02 KIT

B057-01 Penetration needle, not hardened, 42.5 ± 2.5 mm long. Comparable to EN Spec. Weight: 2.5 ± 0.05 g

B057-04 50 g weight.

B057-05 100 g weight.

V122-05 Sample cup, brass made, Ø 55x35 mm

V122-06 Sample cup, brass made, Ø 70x45 mm

B056-01 KIT
STANDARD DIGITAL PENETROMETER

STANDARDS: EN 1426 | ASTM D5 | BS 1377-2 | NF T66-004
AASHTO T49

Used to determine the consistency of a bituminous sample under fixed conditions of load, time and temperature. The penetration is expressed in distance of tenths of millimeters vertically penetrated by a standard needle. The standard penetrometer is ruggedly constructed, with an aluminium base table with levelling screws, plated vertical rod, **micrometric vertical adjustment device**.
The slider is brass made with free fall.
The digital readout of the penetration values has readings in mm and inch, with 0.01 mm resolution, LCD 5 digits display, with zero set in any position.
Power: 1.5V battery.
The penetrometer is supplied with stop and release push button, automatic zero set, micrometer adjustment, set of weights 50 and 100 g penetration needle, brass sample cups Ø 55x35 mm and 70x45 mm.

Dimensions: 220x170x410 mm
Weight: 11 kg approx.

B056-02 KIT
AUTOMATIC DIGITAL PENETROMETER

Basically structured as mod. B056-01 KIT but having a magnetic controller device with electronic digital programmable timer that automatically releases the plunger head and ensures free falling of the needle during the 5-seconds test.

Power supply: 230V 1ph 50-60Hz 200W
Dimensions: 220x280x410 mm
Weight: 15 kg approx.

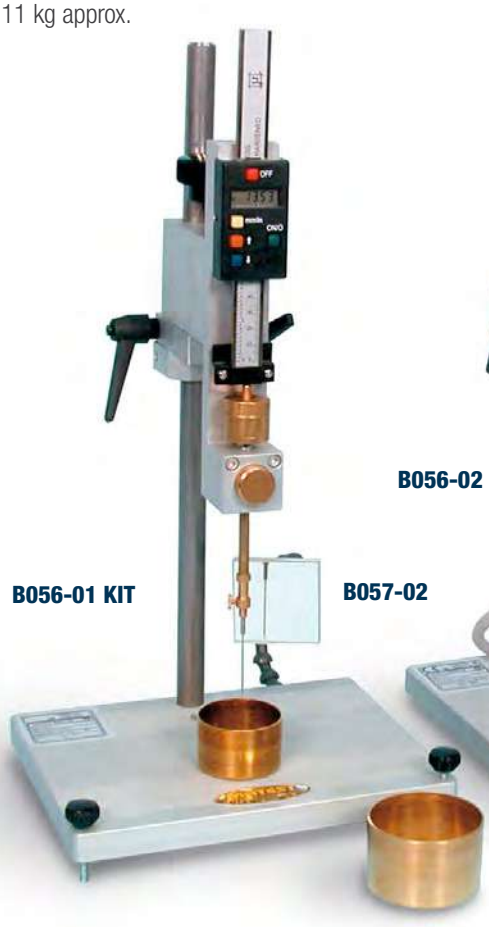
ACCESSORIES
for B056 KIT, B057 KIT, B056-01 KIT, B056-02 KIT

B056-09 NEW
PENETRATION BALL. Hot applied jont sealants. Test method for the determination of penetration and recovery (resilience).
STANDARD: EN 13880-3

B057-09 NEW
STANDARD PENETRATION CONE Ø 65 mm for measuring the consistency of lubricating grease.
Brass body and steel point made. Weight: 102.5 g
STANDARDS: EN 13880-2 | ASTM D217 | IP 179
ISO 2137 | DIN 51804

B057-09

B056-09



B056-01 KIT

B056-02 KIT

B057-02

B016
AIR BATH

Used for softening bitumen before performing a range of tests including ductility, flash point, penetration, loss on heating.
Inner vessel, stainless steel made, has 600 g capacity.
Complete with thermoregulator, pilot lamp.

Power supply: 230V 1ph 50-60Hz 500W
Dimensions: 140x140x350 mm
Weight: 5 kg approx.

B016

B058
THERMOSTATICALLY CONTROLLED WATER BATH FOR PENETROMETER

Provides water at the required temperature of 25 ± 0.1 °C.
The unit consists of a stainless steel water bath 10 litres capacity with wool insulation, immersion heater with digital thermostat, motor pump with connections, cooling coil device, current water operated, to maintain a constant temperature of the bath when room temperature is slightly higher.
The bituminous sample is immersed into the water bath, and placed on the penetrometer only at the time of the test, by eventually using the transfer dish (accessory mod. B057-03).

Power supply: 230V 1ph 50-60Hz 350W
Dimensons: 375x335x420 mm
Weight: 12 kg approx.

B058 detail

ACCESSORY

B058-01
WATER BATH DISH with incorporated thermostatic coil, to be connected to the bath mod. B058.It keeps the temperature of the bitumen sample directly on the penetrometer, by avoiding to transfer it.
Dimensions Ø 151x90 mm

B060
BACON SAMPLER

STANDARDS: EN 58 | CNR N° 81, N° 98
ASTM D140 | AASHTO T40

Used to obtain asphalt or oil samples from various levels within a storage tank by the "thief" method.
Made from brass. Capacity 237 ml

Dimensions: Ø 50x250 mm
Weight: 2 kg approx.

B060

B090
BREAKING VALUE OF CATIONIC BITUMEN EMULSIONS: MINERAL FILLER METHOD

STANDARDS: EN 13075-1 | IP 494

Equipment for the determination of the breaking value of cationic emulsions, (manual version) comprising:
Filler feeding pan, complete with support base and clamp, nickel spatula, two round porcelain dishes.

Weight: 2 kg approx.

ACCESSORIES for Automatic Version

B090-10 ELECTRIC STIRRER having 260 rpm, 230V 50-60Hz 1ph
S157-06 SUPPORT BASE for stirrer.
B090-11 PROPELLER for electric stirrer.
B090-12 METALLIC CONTAINER, 500 ml capacity.
B090-19 REFERENCE FILLER, original Forshammar, recommended by EN Spec. Bucket of 10 kg
B090-20N REFERENCE FILLER, 25 kg where SIO^2 content and Volumetric Mass conform to EN 13075-1; while grading composition does not conform.

B063-10
PARTICLE CHARGE TESTER

PARTICLE POLARITY OF BITUMEN EMULSIONS

STANDARDS: EN 1430 I ASTM D244 I CNR N. 99

This apparatus is used to identify the particle charge of bitumen emulsions.
The equipment comprises:
- Milliammeter scale up to 10 mA on support base
- Variable resistor
- Two stainless steel electrodes
- Insulating device
- Beaker 250 ml capacity to EN spec.
- Glass rod

Power supply: 250V 1ph 50-60Hz
Dimensions: 200x200x600 mm
Weight: 3 kg approx.

ACCESSORY

B063-11
BEAKER 500 ml capacity to ASTM spec.

B063-10

B072-20
WILHELMI SOFTENING POINT APPARATUS

STANDARDS: EN 1871 I DIN 1996-15

Used for determining the softening point of bituminous materials for road construction, according to Wilhelmi method.
The softening point is the temperature where a layer of thermoplastic material has a deformation given by a steel sphere weighting 13.9 g.
The apparatus comprises a ring divided in two halves on a metal support frame, glass beaker, steel ball 15 mm diameter.

Weight: 2 kg approx.

B072-20 + B072-02

ACCESSORIES for B072-20

B072-02
THERMOMETER, ASTM 16C, scale +30 °C +200 °C , subd. 0.5 °C.

B073-02
ELECTRIC HEATER WITH MAGNETIC STIRRER, suitable for still water and glycerine tests, with softening point up to 150 °C.
Power supply: 230V 1ph 50-60Hz 700W
Weight: 4 kg approx.
See p. 150

B063 KIT
EMULSIFIED ASPHALT DISTILLATION APPARATUS

STANDARDS: EN 1431 I ASTM D 244 I AASHTO T 59 I CNR N° 100

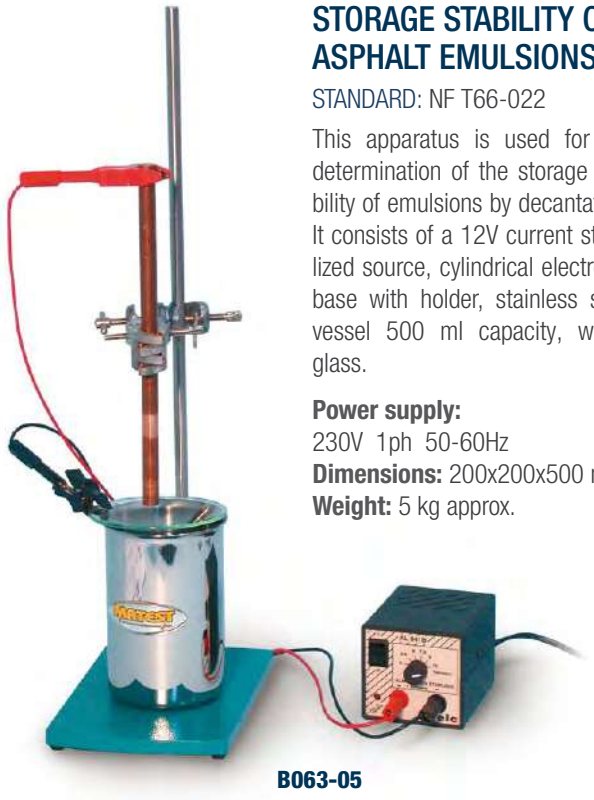
Used for the determination of cut-back asphaltic materials by the distillation test. The set is formed by: aluminium still container, glass connectors including condenser, stands, graduated cylinder, two thermometers ASTM 7C range -2 to +300 °C, gas ring burner with gas stop valve controlled by a flame sensor.
It can be sold on CE markets, but not usable in closed spaces.

Weight: 12 kg approx.

SPARE

B063-01 Thermometer -2 to +300 °C ASTM 7C

B063 KIT



B063-05
STORAGE STABILITY OF ASPHALT EMULSIONS

STANDARD: NF T66-022

This apparatus is used for the determination of the storage stability of emulsions by decantation. It consists of a 12V current stabilized source, cylindrical electrode, base with holder, stainless steel vessel 500 ml capacity, watch glass.

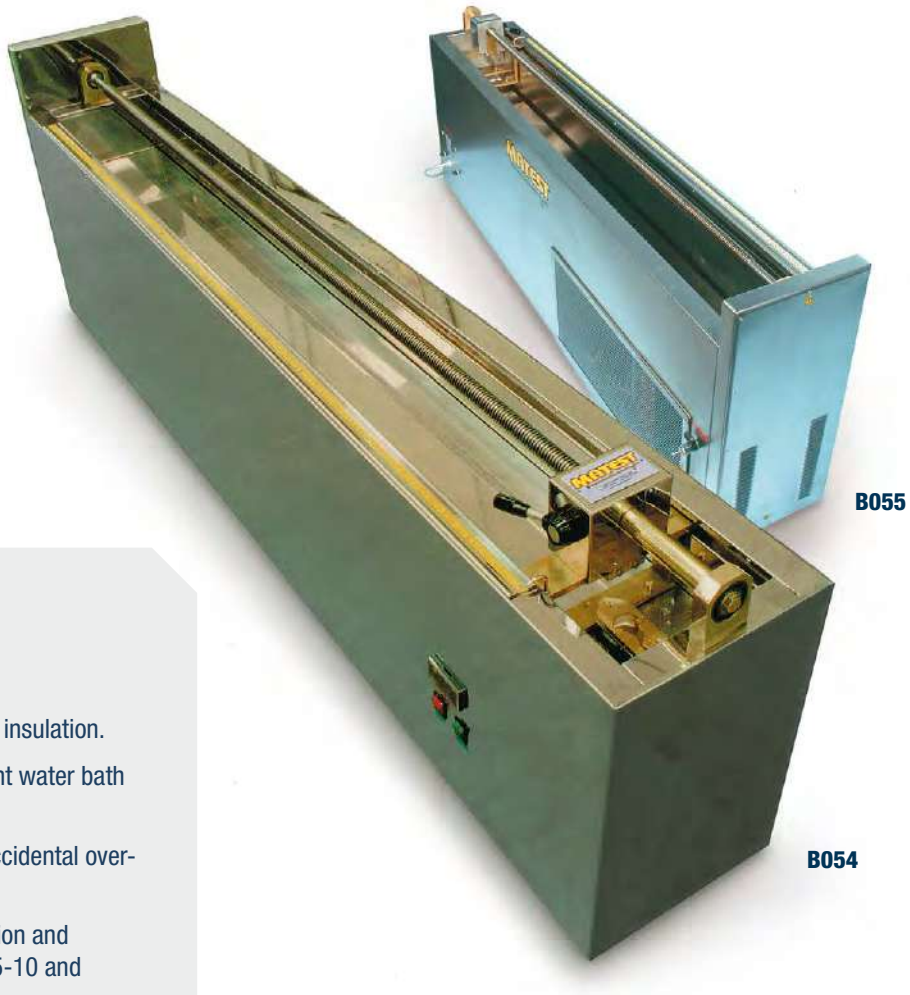
Power supply:
230V 1ph 50-60Hz
Dimensions: 200x200x500 mm
Weight: 5 kg approx.

B063-05

B054
DUCTILOMETER

STANDARDS: EN 13398, EN 13589 | ASTM D113, D6084 | AASHTO T51
Used to determine the bituminous ductility, that is the distance to which a briquette of molten bitumen can be extended under controlled conditions, before breaking. The Ductilometer basically consists of a moving carriage travelling along guide ways. The carriage is driven by an electrical motor, inside a large tank fitted with digital thermostat, immersion electric heater, cooling coil for cold water circulation and pump unit.
Max. traction force: 300 N, accuracy: ± 0.1 N
The ductilometer can accept up to 3 specimens simultaneously. Supplied complete **except** for the briquette mould and base plate that must be ordered separately (see accessories).

Power supply: 230V 1ph 50Hz 750W
Dimensions: 1880x360x680 mm
Weight: 95 kg approx.



B055

B054

MAIN FEATURES

- Works automatically.
- Speed 50 mm/min.
- Max stroke 1500 mm.
- Stainless steel made with fibreglass insulation.
- Digital thermoregulator for a constant water bath temperature (25 °C ± 0.5 °C).
- Dual safety thermostat to prevent accidental over-temperature.
- Cyber-plus 8 evolution data acquisition and processing system available in B055-10 and B055-20N models.

B055
DUCTILOMETER WITH COOLING SYSTEM

Same as for mod. B054 but equipped with incorporated refrigerating unit for tests with water temperature from + 5° to + 25 °C.

Dimensions: 1880x360x680 mm
Weight: 130 kg approx.

ACCESSORIES

B054-01
DUCTILITY BRIQUETTE MOULD - STANDARDS: ASTM, AASHTO, GOST
Used to prepare the specimen, it is brass made, accurately machined. Supplied without base plate. Weight: 300 g

B054-03
DUCTILITY BRIQUETTE MOULD - STANDARD: EN 13398
Used to prepare the specimen, it is brass made, accurately machined. Supplied without base plate. Weight: 300 g

B054-04
DUCTILITY BRIQUETTE MOULD - STANDARD: EN 13589
Used to prepare the specimen, it is brass made, accurately machined. Supplied without base plate. Weight: 300 g

B054-02 BASE PLATE for ductility briquette mould.

B054-03 B054-01 B054-04 B054-02

B055-10
DUCTILOMETER WITH DATA ACQUISITION HIGH PERFORMANCE

STANDARDS: EN 13398 | EN 13589 | EN 13703 | ASTM D113, D6084 | AASHTO T51 | GOST 11505-75, 33138-2014

Same as mod. B054, but upgraded with:

- Cyber-plus Progress data acquisition and processing system, **colour touch screen display** ¼ VGA, 24 bit resolution. It automatically performs data acquisition and processing. Directly connected to printer (accessory) via USB it prints the test certificate. Equipped with slots for external pendrive or SD card infinite memory support with direct connection to PC. Hardware details: see p. 19, 225
- Software UTM NET to unload and visualize test data to PC.
- One electric load cell 50 N capacity complete with installation and calibration. (Possibility to install later on up to 3 cells directly by the end user).

Supplied **without** briquette mould and base (see accessories).

ACCESSORIES

B055-15
LOAD CELL electric, 50 N capacity, complete with installation and calibration (possibility to install up to 3 cells).

B055-16
REFRIGERATING UNIT, incorporated into the machine, for tests with water temperature from +5 °C to +25 °C (not possible to fix on later).

Ductility moulds and base plate: see p. 144

B055-10

B055-20N

B055-20N
DUCTILOMETER WITH DATA ACQUISITION FOR RESEARCH HIGH PERFORMANCE

STANDARDS: EN 13589, 13703, 13398 | ASTM D113, D6084
AASHTO T51, T300, T301
GOST 11505-75, 33138-2014

Developed and manufactured for ductility tests and for research purposes. Stepper motor providing a variable speed range from 1 to 400 mm/min with digital displacement measuring system.
Up to 3 samples can be tested simultaneously.
One electric high capacity load cell 500 N (possibility to install later on up to 3 cells directly by the end user).
Automatic positioning of start test.
Visualization of the elongation in mm and load/elongation chart.
Max elongation recording before breaking failure.
Absorbed energy elaboration.
Temperature setting and visualization of the test execution with continuous recording during the test.
Test certificate print-out (USB connector or local printer).
Cyber-plus Progress data acquisition and processing system **colour touch screen display** (technical details: p. 19, 225).
Software UTM2 to unload and display test data to PC.
Glass upper cover.
Supplied **without** briquette mould and base (see accessories).

Power supply: 230V 1ph 50-60Hz 1000W
Dimensions: 2140x400x650 mm
Weight: 110 kg approx.

ACCESSORIES

B055-15
LOAD CELL electric, 50 N capacity, complete with installation and calibration, suitable for soft bitumen.

B055-25
LOAD CELL electric, 500 N capacity, complete with installation and calibration (possibility to install up to 3 cells).

B055-26
REFRIGERATING UNIT, incorporated into the machine, for tests with water temperature from +0 °C to +25 °C. 230V 1ph 50 Hz (Not possible to fix later on).

C128
LASER PRINTER, bench model, for graphics and certificates with direct connection via USB.

Ductility moulds and base plate: see p. 144

Detail: 3 load cells 500 N

CALIBRATION EQUIPMENT FOR DUCTILOMETERS WITH DATA ACQUISITION

AVAILABLE MODELS

B055-27 KIT
CALIBRATION EQUIPMENT FOR MOD. B055-10

Consisting of:

C138M
UNIVERSAL DIGITAL TESTER WITH MICROPROCESSOR

This user friendly menu driven digital display, connected to the calibration load cell, allows to perform an accuracy's verification of the loads measured from the Ductilometer under control, and it allows to produce the relative certificate.
Technical details: see p. 326

B055-30
CALIBRATION LOAD CELL

Electric, 50 N capacity, complete with installation devices.

TECHNICAL SPECIFICATIONS

- Full Scale nominal output: 2 mV/V
- Linearity + Hysteresis:
- ± 0.1% of full scale
- Repeatability: ± 0.03% of full scale
- CLASS: AA

B055-34
ADAPTER

Coupling device between the load cell and the ductilometer

B055-28 KIT

NEEDED ACCESSORY

C138-05 CALIBRATION PROCESS of the load cell combined with the Universal digital tester, complete with Matest Calibration Certificate.

Alternative:

C138-10 CALIBRATION CERTIFICATE issued by an accredited Calibration Institute (ACCREDIA Centre)

B055-28 KIT
CALIBRATION EQUIPMENT FOR MOD. B055-20N

Consisting of:

C138M
UNIVERSAL DIGITAL TESTER WITH MICROPROCESSOR

This user friendly menu driven digital display, connected to the calibration load cell, allows to perform an accuracy's verification of the loads measured from the Ductilometer under control, and it allows to produce the relative certificate.
Technical details: see p. 326

B055-32
CALIBRATION LOAD CELL

Electric, 500 N capacity, complete with installation devices.

TECHNICAL SPECIFICATIONS

- Full Scale nominal output: 2 mV/V
- Linearity + Hysteresis:
- ± 0.1% of full scale
- Repeatability: ± 0.03% of full scale
- CLASS: AA

B055-35
ADAPTER

Coupling device between the load cell and the ductilometer

B077 KIT
FRAASS APPARATUS BREAKING POINT

STANDARD: EN 12593

This apparatus is used to determine the breaking point of semisolid and solid bitumes. It consists in a flexure device with two concentric sliding resin tubes, jaws for the test specimen, flexure system with handle, cooling device with three containers, plate in special harmonic steel, thermometer IP 42C.

Weight: 4 kg approx.

B077 KIT

SPARES

B077-01 Plate (spring) in special armonic steel
B077-02 Thermometer IP 42C

HUBBARD-CARMICK SPECIFIC GRAVITY

STANDARDS: EN ISO 3838 I ASTM D70
NF T66-007

V111 Cylindrical type, 24 ml
V111-01 Conical type, 25 ml


V111-01 V111

B075
WATER IN BITUMEN EMULSIONS

STANDARDS: EN 1428, 12847 I ASTM D244 I NF T66-023

Used to determine the water in petroleum products or bituminous materials, by distilling them with a water immiscible, volatile solvent.

The equipment comprises:
- Glass balloon 500 ml
- Glass receiver 25 ml capacity with 0.1 ml grad.
- Glass reflux condenser

Electric heater with thermoregulator, clamps.

Power supply: 230V 1ph 50Hz 500W
Weight: 8 kg approx.

B075

B076
WATER IN BITUMINOUS MATERIALS (DEAN-STARK)

STANDARDS: ASTM D95, D244
AASHTO T55 I IP 74-77
CNR No. 101 I NLT 123

Identical to mod. B075 except for the receiver having 10 ml capacity.

BITUMINOUS EMULSIONS
RESIDUE ON SIEVING

STANDARD: EN 1429

B076-21 Sieve, stainless steel, Ø 75 mm, 0.5 mm opening
B076-22 Sieve, stainless steel, Ø 75 mm, 0.16 mm opening
B076-24 Pan and Cover, stainless steel, Ø 75 mm.

STANDARD: ASTM D6935-17

B076-25 Sieve, stainless steel, Ø 75 mm, 0.18 mm opening
B076-26 Sieve, stainless steel, Ø 75 mm, 1.4 mm opening

B076-21...B076-26

BITUMINOUS EMULSIONS
MIXING STABILITY WITH CEMENT

STANDARD: EN 12848

B076-23 Sieve, stainless steel, Ø 75 mm, 2 mm opening
B076-22 Sieve, stainless steel, Ø 75 mm, 0.16 mm opening
B076-24 Pan and Cover, stainless steel, Ø 75 mm.

B079N
CABINET WITH ASPIRATOR

Double aspiration system, certified to EN 14175-2-3 Bureau Veritas. Used to exhaust vapors and toxic solvents caused by Centrifuge Extractors, Hot Extractors etc., by avoiding they are diffused in the laboratory. Metal frame, monolithic stoneware, 4 sockets + switch, water spout and cock, electric aspirator, electric lighting.
The front transparent door can be lifted by vertical counterweights for an easy access to the operation desk.

Power supply: 230V 1ph 50-60Hz
Dimensions: 1800x830x2500 mm
Weight: 380 kg approx.

B079-01


B079N

ACCESSORY

B079-01
LOWER CUPBOARDS, bilaminated plastic made, complete with doors and shelves.

B069 KIT
DISTILLATION OF CUT-BACK ASPHALTS, ELECTRIC

STANDARDS: ASTM D402 I AASHTO T78 I NF T66-003
UNE 7112, 7072

Used to measure the amount of the most volatile constituents in cut-back asphaltic products.
The apparatus consists of: electric heater with thermoregolator, distillation flask, condenser tube, adapter, shield, receiver, supports, graduated cylinder, thermometer ASTM 8C -2 to +400 °C, subd.1 °C

Power supply: 230V 1ph 50-60Hz 600W
Weight: 12 kg approx.

B069 KIT

SPARE

B069-11 Thermometer -2 +400 °C sudd. 1 °C, ASTM 8C

EFFECT OF HEAT AND AIR ON A MOVING FILM OF ASPHALT

B066M KIT
ROLLING THIN-FILM OVEN HIGH PERFORMANCE

STANDARDS: EN 12607-1 | ASTM D2872 | AASHTO T240

New model with enhanced performance and reliable technology needed to study the aging phenomena on traditional and innovative bituminous binders.
The frame and the internal chamber are made of high quality stainless steel with a large door to detect the test room.
This new version is totally controlled by 7'' digital touch-screen panel in terms of test temperatures, start and stop carriage rotation and ventilation system.
Also, when the test starts, the internal room temperature, the air flow and the carriage speed (15 rpm ± 0.2) are shown in real time on the digital display.
Supplied complete with digital flow meter, precision digital thermostat to maintain 163 °C temperature, control thermometer ASTM 13C, ventilation device, eight glass containers Ø 64x140 mm. The unit includes a dual safety thermostat to prevent overheating.

Power supply: 230V 1ph 50-60Hz 1700W
Dimensions: 620x620x910 mm
Weight: 55 kg approx.

MAIN FEATURES

- 7" Touch-screen color display.
- Temperature ramp designed to achieve the target temperature within 10 minutes when the door is closed.
- Flow meter range: from 200 to 14.000 ml/min.
- Temperature accuracy ± 0.1 °C when the target temperature test is achieved.

NEW **B066M KIT** open door with touch screen display

B066N KIT closed door

NEW

B066-02N

B066N KIT
ROLLING THIN-FILM OVEN RTFOT | ASTM | EN

STANDARDS: EN 12607-1 | ASTM D2872 | AASHTO T240

Used to measure the air and heat effect on a moving film of asphaltic semisolid materials. External frame and internal chamber are stainless steel made with insulated fiberglass intermediate chamber.
Rotation speed of the plate: 15 rpm ± 0.2.
Provided with a large glass door for inspections. The oven must be connected to an air compressor 2 bar max. pressure, or to a diaphragm pump (see accessory). Supplied complete with flow meter, precision digital thermostat to maintain 163 °C temperature, control thermometer ASTM 13C,
ventilation device, eight glass containers Ø 64x140 mm.
The oven is equipped with a dual safety thermostat to prevent accidental over-heatings.

Power supply: 230V 1ph 50Hz 1700W
Dimensions: 620x620x910 mm
Weight: 55 kg approx.

ACCESSORY

B066-11N
Portable compressor, including pressure reducer for precise delivery pressure setting. Very low-noise, ideally for indoor use 59db. Max pressure 8 bar, 6 litres air reserve.
Power supply: 230V 50Hz

B066-11N

SPARES

B066-02N Glass container Ø 64x140 mm, top quality product with improved finishing.

B064-03 Thermometer, ASTM 13C.
Range: +155 °C to +170 °C div. 0.5 °C.

B064 KIT
ROTATING SHELF THIN FILM OVEN
DETERMINATION OF LOSS IN MASS AND RESISTANCE TO HARDENING (TFOT)

STANDARDS: EN 12607-2, EN 13303 | CNR N° 50 | ASTM D6, D1754 | AASHTO T47, T179 | BS 2000 | UNE 7110 | NF T66-011

Internal chamber and external frame all made of stainless steel, double wall insulation with fiberglass, double door. Temperature control by digital thermoregulator. The oven is equipped of a dual safety thermostat to prevent accidental over-heatings. The plate rotates at 5-6 rpm. Supplied complete with glass control thermometer ASTM 13C, +155 to +170 °C subd 0.5 °C.
The oven is supplied **without rotating shelf and accessories**, that must be ordered separately.

Power supply: 230V 1ph 50Hz 1500W
Internal dimensions: 330x330x330 mm
Outside dimensions: 460x450x700 mm
Weight: 40 kg approx.

B064 KIT + B064-01 KIT
open door

The oven mod. B064 kit can be equipped in two versions, with the following accessories:

B064-01 KIT
Rotating shelf complete with 9 containers Ø 55x35 mm for the **Determination of Loss on Heating** to: EN 13303 | ASTM D 6 BS 2000 | NF T066-011 | AASHTO T47 | CNR N° 50
NF T066-011 | AASHTO T47 Standards.

B064-02
Rotating shelf, complete with 2 containers Ø 140x9.5 mm for the **Determination of Thin Film** to: EN 12607-2 | ASTM D1754 AASHTO T149 | UNE 7110 Standards.

As alternative

B064-02 SP
Rotating shelf, same as B064-02, but complete with 4 containers.

B064-02

B064-01 KIT

B064-02SP

B064 KIT + B064-02
closed door

SPARES

V122-05	Brass container Ø 55x35 mm
B064-04	Stainless steel container Ø 140x9.5 mm

B072
RING AND BALL SOFTENING POINT APPARATUS

STANDARDS: EN 1427 I ASTM D36 I AASHTO T53 I NF T66-008
Comparable to: BS 2000 I UNI 4161 I DIN 52011 I UNE 7111

The softness of bitumen depends, amongst other factors, on the substance temperature, the more the temperature increases, the more increases the softness of the bitumen.
The unit consists of a pyrex beaker, brass frame, two tapered rings, two ball centering guides and two balls.

Weight: 900 gr

ACCESSORIES

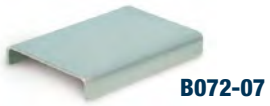
B072-01 THERMOMETER ASTM 15 C -2 to+80 °C subd. 0.2 °C

B072-02 THERMOMETER ASTM 16 C +30 to+200 °C subd. 0.5 °C

B072-07
POURING PLATE

Used to pour the bituminous mixture into the brass tapered ring, as required by EN 1427 Specification.

Dimensions: 75x50x10 mm



B074
HOT PLATE

Complete with thermoregulator for temperature adjustment.

Power supply: 230V 1ph 50-60Hz 1000W
Weight: 6 kg approx.

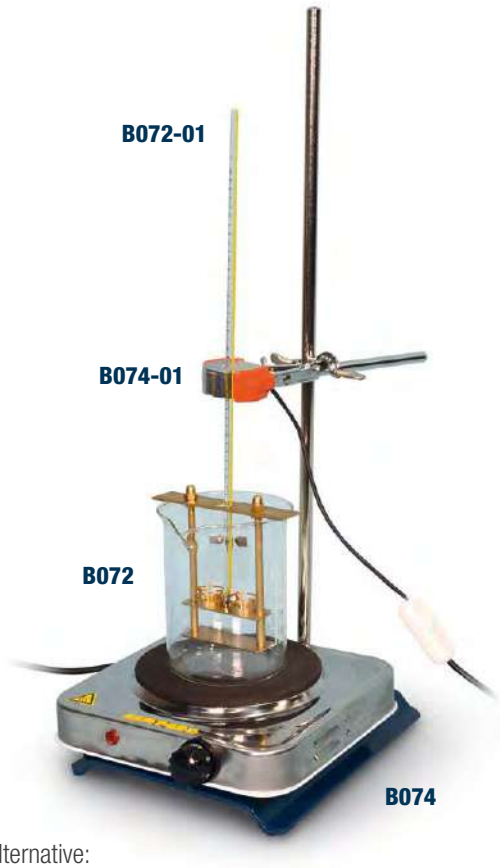
ACCESSORY for B074

B074-01
ELECTRIC STIRRER, ensures a more uniform temperature to the bath. Supplied complete with vertical support and base.
Power supply: 230V 1ph 50Hz 100W
Weight: 3 kg approx.

As alternative:

B073-01
HOT PLATE WITH MAGNETIC STIRRER
Complete with thermoregulator for temperature adjustment and magnetic stirrer with electronic adjustment from 100 to 1200 rpm. Suitable for tests in distilled water with softening point between +30 °C to +80 °C.

Power supply: 230V 1ph 50-60Hz 700W
Weight: 4 kg approx.



As alternative:

B073-02
HOT PLATE WITH MAGNETIC STIRRER

Same as mod. B073-01, but with more powerful electric heating resistance, suitable **also** for tests in glycerine with softening point over +80 °C up to +150 °C.

Power supply: 230V 1ph 50-60Hz 700W
Weight: 4 kg approx.

SPARES for B072

B072-03 Steel ball Ø 9.5 mm
B072-04 Brass tapered ring
B072-05 Ball centering guide
B072-06 Pyrex beaker

B070M
SOFTMATIC
AUTOMATIC DIGITAL RING AND BALL APPARATUS

STANDARDS: EN 1427 | ASTM D36 | AASHTO T53 | NF T66-008;
comparable to: BS 2000 | DIN 52011 | UNE 7111
UNI 4161 | CNR N.35

This high technology digital microprocessor tester, designed and manufactured by Matest, automatically determines the softening point of asphalts and pitches.

Two laser sensors detect the balls fall determining the softening point.
The bath temperature is measured by an electronic system maintaining the gradient (5 °C/min) as specified by the Standards.

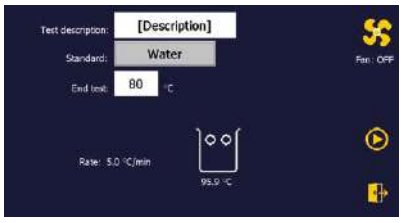
A magnetic stirrer with electronic speed adjustment from 0 to 160 rpm also ensures a uniform temperature in the vessel during the test execution.
The cooling system enables to quickly cool down the samples, allowing to perform many more tests per day.

The **touch-screen** graphical interface allows an easy set up of the parameters and the immediate execution of the test.
High resolution color display, 800x480 pixel, offers all the functions of a PC for the management and analysis of data, test results, and graphs.

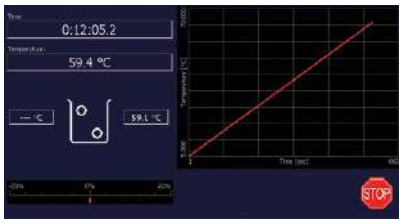
Two test parameters can be selected in the microprocessor menu:
- test on boiled distilled water for softening point from 30 to 80 °C.
- test on glycerol for softening point from 80 up to 150 °C.

The tester is basically composed of:
- Ceramic-glass heating plate with automatic cut off at the end of the test cycle.
- Motherboard with microprocessor, which controls: heater/stirrer, temperature probe, laser sensors, pre-heating phase of the plate, and memorizes all the test parameters.
- Steel balls centering device.

Power supply: 230V 1ph 50-60Hz 700W
Dimensions: 435x330xh510 mm
Weight: 20 kg approx.



Test execution



Temperature-Time graph

ACCESSORY

B070-11
RODS WITH SPHERICAL ENDS (set of 2 pieces)
for checking and calibration of the instrument.

B070M

MAIN FEATURES

- Real time display of the Temperature (°C)-Time(sec) graph along the entire test.
- Touch-screen TFT LCD graphic display, 800x480 pixels, 7 inches.
- Unlimited memory (USB pendrive, internal Micro SD) editable data via PC.
- Multilanguage selection.
- Microprocessor friendly-driven menu to control all the test phases.
- Top quality components: laser sensors, electronic magnetic stirrer, ceramic-glass heating plate.
- Fully automatic.

SPARES

B072-03 Steel ball 9.5 mm diameter
B070-15 Brass tapered ring, chromed
B070-16 Brass centering guide, chromed
B070-17 Pyrex beaker

B065
ROTOVAPOR
ROTARY EVAPORATION APPARATUS
BITUMINOUS BINDERS. RESISTANCE OF HARDENING. ROTATING FLASK TEST: RFT METHOD
STANDARD: EN 12607-3

This unit is used to evaluate the hardening effect of a treated bituminous binder sample. The test is performed by putting 100 g of bituminous binder into the rotating flask. The sample is heated at 165°C and ambient temperature air is blowed into the flask containing the binder hardening the same. The hardening effect is evaluated according to penetration, viscosity and softening point tests.
The Rotary Evaporation Apparatus is essentially composed of:
distillation flask 1000 ml capacity rotated by a speed motor at an adjustable rate between 10 and 280 rpm, condenser, solvent recovery flask, heated oil bath.
The angle of the rotary/distillation flask is 15°
The instrument is supplied complete with glass tubing with three way valves and transparent flexible hose for solution intake.
The Rotatory Apparatus requires a vacuum pump and a vacuum regulating system (see accessories at p. 84).

Power supply: 230V 1ph 50-60Hz
Dimensions: 740x430xh845 mm
Weight: 15 kg approx.

B065

B075-05
SOLUBILITY OF BITUMINOUS BINDERS
STANDARDS: EN 12592 | ASTM D2042

The set comprises :
Gooch crucible complete with funnel and rubber ring.
Filter flask 500 ml capacity with rubber stopper.
Whatman filter discs, Ø 25 mm (pack of 100)

Weight: 1000 g approx.

BITUMEN EMULSIONS:

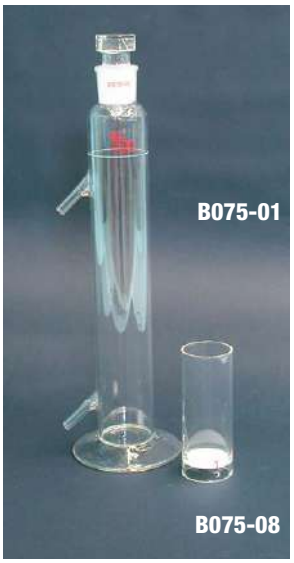
B075-01
GRADUATED CYLINDER WITH SIDE TUBES AND STOPPER
DETERMINATION OF SETTLING TENDENCY
STANDARDS: EN 12847 | IP 485

The cylinder has 600 ml capacity, it is marked at 500 ml and two side tubes are foreseen.

Weight: 800 g approx.

Note: To perform this test the water in petroleum emulsion, equipment mod. B075 is also required. See p. 147

B075-05


B075-01
B075-08

B075-08
GLASS TUBE WITH GLASS FILTER
DETERMINATION OF PENETRATION POWER
STANDARDS: EN 12849 | IP 487

The glass tube has 41.5 mm inside diameter by 115 mm height, and a fused-on glass filter with holes size between 0.160 and 0.250 mm is fitted.

Weight: 300 g approx.

B080
ENGLER DIGITAL VISCOMETER

STANDARDS: ASTM D 490, D 1665 I AASHTO T54 I BS 2000
NF T66-020 I CNR N° 102

Used to compare the specific viscosity of road-oils and tars to the viscosity of water. It consists of a water bath complete with digital precision thermoregulator, electric stirrer, cooling device, Engler flask. The viscometer is equipped of a dual safety thermostat to prevent accidental over-temperatures.

Power supply:
230V 1ph 50Hz 300W
Dimensions:
265x270x550 mm
Weight: 12 kg approx.

B080 + B082-01

B081
ENGLER DIGITAL VISCOMETER TWO ELEMENTS

Basically structured as mod. B080 but having **Two elements**, electrically operated, supplied complete.

Weight: 20 kg approx.

ACCESSORIES for Engler

B082-01 THERMOMETER ASTM 23 C range +18 +28 °C subd. 0.2 °C

B082-02 THERMOMETER ASTM 24 C range +39 +54 °C subd. 0.2 °C

B082-03 THERMOMETER ASTM 25 C range+95 +105 °C subd. 0.2 °C

B082-04 THERMOMETER NF T66 -020 range 0-55 °C. subd. 0.2 °C

B082-06 KOHLRAUSH CALIBRATION FLASK 200 ml capacity

B082-07 FILTER SCREEN, ASTM N°50

B082-05 SPARE Engler testing flask

B083-01...B083-10

B084-01 KIT
STANDARD TAR (BRTA, REDWOOD) DIGITAL VISCOMETER

STANDARDS: EN 12846-01, EN 12846-02, EN 13357 I IP 184
NF T66-005

Used to determine the viscosity of cut-back bitumen and road oil. The instrument consists of a stainless steel bath (tank), agitator, rheostat, immersion electric heater with digital thermostat to take the water to the desired temperature, cooling coil for water supply connection. The viscometer is equipped of a dual safety thermostat to prevent accidental over-temperatures.
Supplied with control glass thermometer IP 8C, range 0 - 45 °C, subd. 0.2 °C, graduated glass cylinder 100 ml capacity.
Supplied **without** Cup, Go/not go gauge, ball valve to be ordered separately (see accessories).

Power supply: 230V 50-60Hz 1ph 300W
Dimensions: 265 x 270 x 550 mm
Weight: 12 kg approx.

B084-02 KIT
TWO PLACES TAR VISCOMETER, DIGITAL

Basically structured as mod. B084-01 KIT,
but having **TWO ELEMENTS**

ACCESSORIES for Standard TAR

Standards: EN, NF, IP
B083-01 Go/not go gauge for Ø 4 mm orifice
B083-02 Cup with orifice Ø 4 mm
B083-03 Ball valve Ø 4 mm

Standards: EN, NF, IP
B083-04 Go/not go gauge for Ø 10 mm orifice
B083-05 Cup with orifice Ø 10 mm
B083-06 Ball valve Ø 10 mm

Standard: EN 12846-02
B083-08 Go/not go gauge for Ø 2 mm orifice
B083-09 Cup with orifice Ø 2 mm
B083-10 Ball valve Ø 2 mm

SPARES

B083-07
Thermometer IP 8C,
range 0 - 45 °C,
subd. 0.2 °C.

V101-03
Graduated cylinder, glass,
100 ml capacity.

B084-01 KIT
+ accessories

B086 KIT
CLEVELAND OPEN CAP FLASH AND FIRE POINT TESTER

STANDARDS: EN 22592 | ASTM D92 | AASHTO T48
IP 36 | NF T60-118 | ISO 2592

Used to measure the flash and fire points of lubrificated oils and petroleum products.
Complete with brass cup, thermometer IP 28C (ASTM 11C) range -6 +400 °C, electric heater with thermoregulator, double line fuse.
Supplied **without** flame gas device to be ordered separately.

Power supply: 230V 1ph 50-60Hz 600W
Dimensions: 220x285x265 mm approx.
Weight: 10 kg approx.

NEEDED ACCESSORY

B086-02
FLAME GAS device, complete with gas-stop valve controlled by a flame sensor and maximum thermostat with reset button.
It can be sold in CE markets, but not usable in closed spaces.

SPARE

B086-10 Thermometer IP 28C (ASTM 11C), range -6 +400 °C.

B087
SAYBOLT DIGITAL VISCOMETER

STANDARDS: ASTM D88 | AASHTO T72

Used to determine the viscosity of petroleum products at specified temperatures between 70 to 210 °F. Stainless steel made, the Saybolt viscometer is supplied complete with two interchangeable orifices **Furol** and **Universal**, oil bath, electric heater with digital thermoregulator, stirrer, cooling coil, viscosity flask. Thermometers, filter funnel, withdrawal tube **are not included** and must be ordered separately. The viscometer is equipped of a dual safety thermostat to prevent accidental over-heatings.

Power supply: 230V 1ph 50-60Hz 500W
Dimensions: 280x260x510 mm
Weight: 12 kg approx.

ACCESSORIES

Saybolt Thermometers		Range	Subd.
B089	ASTM 17C	+19 a +27 °C	0.1 °C
B089-01	ASTM 18C	+34 a +42 °C	0.1 °C
B089-02	ASTM 19C	+49 a +57 °C	0.1 °C
B089-03	ASTM 20C	+57 a +65 °C	0.1 °C
B089-04	ASTM 21C	+79 a +87 °C	0.1 °C
B089-05	ASTM 22C	+95 a +103 °C	0.1 °C

B087-11
FILTER FUNNEL complete with wire filter ring mesh.

B087-12
WITHDRAWAL TUBE complete.

B087-11

B087-12

SPARES for SAYBOLT

B089-06 Furol orifice
B089-07 Universal orifice
B089-08 Saybolt flask 60 ml capacity

B086-02

B086 KIT

B087-01
TWO TUBE SAYBOLT VISCOMETER

Basically structured as mod. B087 but with two tubes. Supplied complete except thermometers, filter funnel and withdrawal tube.

Dimensions: 270x270x550 mm approx.
Weight: 14 kg approx.

B087-01

B092 KIT
TAG CLOSED-CUP VISCOMETER. FLASH POINT

STANDARDS: ASTM D56 I API 509

Suitable for testing volatile flammable flashing between 0 and 175 °F (except fuel oils).
Supplied complete with cup, water bath, lid, slide, thermoregulated electronic heating device, thermometer ASTM 9C range -5 to +110 °C and thermometer ASTM 57 C range -20 to +50 °C.
The tester is equipped of a gas flame feeder.

Power supply: 230V 1ph 50Hz 700W
Dimensions: 200x300x400 mm approx.
Weight: 10 kg approx.

B092 KIT

B093 KIT
TAG OPEN-CUP VISCOMETER. FLASH POINT

STANDARDS: ASTM D1310, D 3143

For the determination of open cup flash points of volatile flammable materials having flash points between 0 and 175 °F
Supplied complete with cup, water bath, thermoregulated electronic heating device, thermometers ASTM 9C -5 to +110 °C and ASTM 57C -20 to +50 °C.
The tester is equipped of a gas flame feeder.

Power supply: 230V 1ph 50-60Hz 700W
Dimensions: 200x300x400 mm approx.
Weight: 10 kg approx.

B094-01 KIT

B094 KIT
PENSKY-MARTENS DIGITAL FLASH POINT

STANDARDS: EN 22719 I ASTM D93 I AASHTO T73 I IP 34, 35
ISO 2719

Used for the determination of the flash point of petroleum products by the Closed Cup Test, with a Flash Point between 40 °C to 360 °C.
Supplied complete with stirrer, shield for radiations, cast iron bath, electronic heater with digital thermoregulator two thermometers:
ASTM 9C -5 + 110 °C div. 0.5 C,
and ASTM 10C +90 +370 °C div. 2 °C
The stirrer allows to perform both "A" and "B" methods.
The tester is equipped of a gas flame feeder.

Power supply: 230V 1ph 50Hz 700W
Weight: 10 kg approx.

B093 KIT

B094-01KIT
PENSKY-MARTENS FLASH POINT TESTER

Similar to mod. B094KIT, but with **electric** thermoregolator (not digital) and the stirrer performs **only** method "A"

B094 KIT

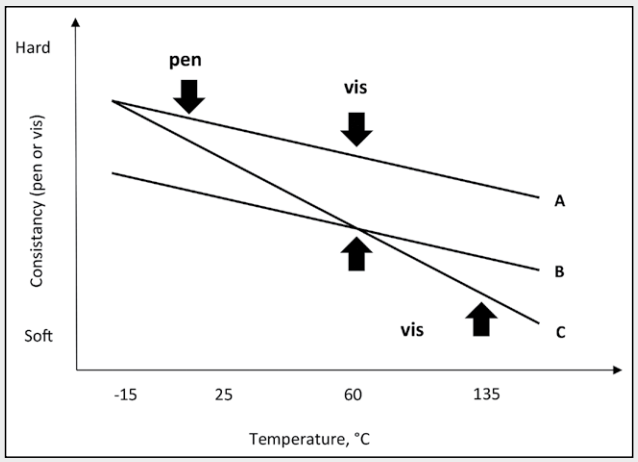
SPARES

B092-10 Thermometer ASTM 9C
B092-11 Thermometer ASTM 57C
B094-10 Thermometer ASTM 10C

BITUMEN SUPERPAVE EQUIPMENT

Bitumen, as with all civil construction materials, is characterized by its mechanical properties. The first classification used in the past, and actually still working in many Countries nowadays, is based on **empirical properties**, such as penetration, softening point, breaking point and ductility. The importance of a performance analysis has been developed only in the last 20 years: by adopting empirical test procedures, bitumen mechanistic behaviour is not investigated, the test procedures are influenced by the operators and innovative binders cannot be properly tested.

Also, the traditional classification (such as penetration or viscosity grade) provides ambiguous results.



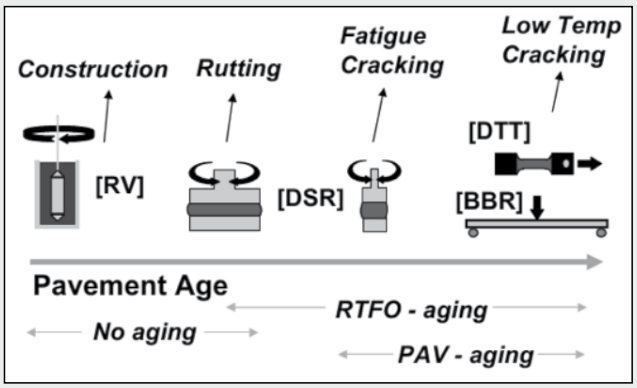
Example of emprical test comparison

In fact, two bituminous binders may have the same properties at different test temperature and much different behaviour at other ones.

The need to understand the mechanical properties and relation between the material and the damage that occurs during the service life of road pavement (low temperature cracking, fatigue cracks and rutting deformations) was the motivation behind the development of a new classification system known as **Superpave**: Superpave is an acronym for **Su**perior **Per**forming Asphalt **Pave**ments and it is a new, comprehensive asphalt mix design and analysis system, developed by Strategic Highway Research Program (SHRP) to improve the performance and durability of roads. This method is different from the previous one and it is based on **PERFORMANCE**: focusing on bituminous binder, the modern classification introduced by Superpave is based on **Performance Grade (PG)**.

A unique feature of the Superpave system is that the tests are performed at temperatures and aging conditions that more realistically represent those encountered by in-service pavements. The Superpave PG binder specification requires the testing of the asphalt binder under project's expected climatic and aging conditions in order to help in reducing pavement distress. SHRP researchers developed new equipment standards as well as incorporated equipment used by other industries to develop the binder tests.

SUPERPAVE EQUIPMENT	PURPOSE
Dynamic Shear Rheometer **(DSR)**	Measure properties at high and intermediate temperatures
Rotational Viscosimeter **(RV)**	Measure properties at high temperatures
Bending Beam Rheometer **(BBR)** and Direct Tension Tester **(DTT)**	Measure properties at low temperatures
Rolling Thin Film Oven **(RTFO)**	Simulate hardening during asphalt production phase
Pressure Aging Vessel **(PAV)**	Simulate hardening during pavement life



PG Testing Procedure

The new performance-based classification system introduces the **binder rheology based innovative testing conditions that real replicate the binder behaviour** from the construction phase including the concept of properties evolution due to ageing. Employing the new Superpave approach measures physical properties that can be related directly to field performance utilizing engineering principles. The key detail is that the Superpave tests characterize asphalt at a wide range of temperatures and aging. Superpave characterizes them at the actual pavement temperatures that they will experience, and at the periods of time when the asphalt distresses are most likely to occur.

B085-07N
DSR
DYNAMIC SHEAR RHEOMETER

NEW

STANDARDS: EN 13702, 14770, 16659 | ASTM D7175, D4402, D4402M, D7405 | AASHTO T316, T350, M332, T315, M320

The Dynamic Shear Rheometer apparatus is used to characterize the **viscoelastic behavior of bituminous binders**, such as flow properties (shear viscosity from flow tests) and dynamic properties (viscoelastic modulus and phase angle from oscillation tests).

Different testing temperatures, especially with low temperatures, are possibile with a rapid temperature control due to **peltier thermo-stating**,
Further measuring systems and cone-plate measuring systems according to the standard DIN are available.

Software for tests according to EN, ASTM and AASHTO allows:
- automatic and fast execution of all bitumen tests
- Automated evaluation and analysis of results according with AASHTO
- Estimation of **Performance Grade**
- Different test types for original binders, RTFO and PAV
- **Grade Determination** and **PASS/FAIL** conditions
- Bitumen Wizard for computer-assisted test execution
- Display and analysis of measuring data
- pre set profiles for automatic test execution

Complete with peltier temperate control, exchangeable basic plate (Ø 25 mm), exchangeable basic plate (Ø 8 mm), measuring plate (Ø 25 mm), measuring plate (Ø 8 mm), set of trimming tools rubber moulds (Ø 25 mm and 8 mm) soft ware and 20 ml calibration liquid.

The Rheometer requires to be connected to a PC, which is not included.

TECHNICAL SPECIFICATION

- Torque range: 0.1 to 150 mNm
- Torque resolution: 0.002 mNm
- Bearing: mechanical bearing
- Speed resolution: 0.015 rpm
- Speed range: 0...1000
- Frequency range: 0.001...10Hz
- Temperature range, total: -60 °C to 375 °C
- Temperature range, Peltier: -10 °C to +180 °C
- Temperature accuracy: ± 0.02 °C

Power supply: 110V or 230V 1ph 50-60Hz
Dimensions: 800x400x700 mm
Weight: 45 kg approx.

B085-07N

B085-05
BBR
BENDING BEAM RHEOMETER

STANDARDS: EN 14771 | ASTM D6648 | AASHTO T313

Bending Beam Rheometer is engineered to perform flexural tests on asphalt binder and similar specimens. These tests consist of a constant force being applied to a specimen in a chilled bath in order to derive specific rates of deformation at various temperatures.

B085-05

TECHNICAL FEATURES

- Integral stainless steel frictionless construction
- Load cell 500 g with mechanical overload protection
- Linear Variable Displacement Transducer (LVDT) 0.25 in (6.35 mm)
- Two independent platinum RTD for precise temperature control
- Liquid bath:
  stainless steel construction
  temperature range: -40 to 25 °C
  Cools Ethylene Glycol - water - methanol mix (recommended for safety) to -40 °C.
- Compressed air: 0.34 MPa clean, dry air supply required
- Control, acquisition and analysis software
- Computer interface card
- Daily calibration routines
- Displays and graphs real time load, displacement and bath temperature

The BBR System includes: complete calibration kit with carrying case, 5 specimen molds with accessories, PC, accessories.

Power supply: 230V 1ph 50-60Hz **Weight:** 110 kg approx.

B091M
PAV
PRESSURE AGEING VESSEL

STANDARDS: EN 14769 | ASTM D6521 | AASHTO R28

PAV to simulates in-service oxidative aging that occurs in asphalt binders during service after 5 to 10 years (long-term aging). The sample is exposed to high pressure and temperature for 20 hours (selectable up to 99). The Pressure Ageing Vessel (PAV) features 100% compliance with the laboratory standards related to aging the bitumen. The unit consists of a stainless steel vertical pressure vessel (AISI 304 with ASME and CE certifications) enclosed in a cabinet with encased band heaters. A source of compressed air with a pressure of at least 2.1 MPa and a pressure regulator generates and maintains the aging condition required.

MAIN FEATURES

- Sturdy stainless steel frame and vessel.
- Fast pre-heating system selectable up to 60 °C in order to reduce the conditioning time.
- Timer for setting time and date to start the machine at the desired time.
- Innovative cooling system.
- Fully automatic, Semi-Automatic and Manual tests.
- Temperature and pressure monitored in real time.
- Integrated 7' colour Touch screen controller.
- Pressure monitored in real time by transducer and controlled to 2.1 ± 0.1 MPa.
- CE and ASME certification.

The unit is equipped with a 7'' colour Touch screen controller with front panel user interface with easy to use step-thru operation. The user-friendly software allows the operator to carry out the test in different modes:

- **AUTOMATIC:** It's possible to select from 4 different temperatures (85, 90, 100, 110 °C) and 2 different testing time (20 or 65 hours).
- **SEMI-AUTOMATIC:** It's possible to select a temperature from 60 to 120 °C and run the test for 20 or 65 hours as in the automatic mode;
- **MANUAL:** This mode can be used in research and it allows to manually select the temperature from ambient to 130 °C and the testing time from 1 to 99 hours.

Temperature and pressure can be monitored in real time, thanks to a platinum RTD probe and a pressure transducer. Data logs of both temperature, aging time and pressure are saved on USB stick at the end of the test.
A pre-heat mode allows to reach a maximum of 60 °C before introducing the sample in safety conditions reducing the conditioning time of the sample that can reach faster the test temperature. Thanks to an innovative heating system and the pre-heating mode the test can start in around 1 hour.
The instrument is supplied complete with a sample rack for the simultaneous testing of ten specimens, ten specimen pans as per standards, but without compressed air source, 2.1Mpa minimum pressure.

NEW

B091M

TECHNICAL SPECIFICATION

- Operating pressure: 2.1 ± 0.03 Mpa (304 psi)
- Programmable temperature range: from ambient temperature to 130 °C, res: ± 0.1 °C
- Programmable pre-heating function: up to 60 °C
- Test temperature uniformity: ± 0.5 °C
- Testing time: up to 99 hours
- Safety equipment in all test conditions: Over pressure relief valve and Over temperature limit switch.

Power supply: 230V 1Ph 50Hz 10A
Dimensions: 450x650x500 mm approx.
Weight: 80 Kg approx.

ACCESSORY

B091M-11 PRESSURE REGOLATOR to connect the compressed air tank to the PAV, for an adeguate inlet pressure.

SPARES

B091M-10 Sample rack, for testing up to 10 samples at the same time

B064-04 Stainless steel container, diameter 140x9.5 mm

B091M-10

B091M1
PAV - RESEARCH VERSION

Same to B091M but implemented with an electronic pressure valve to adjust the test pressure from ambient to 2.4 MPa, regulated from the control panel.

B091M-01
VDO
VACUUM DEGASSING OVEN

STANDARDS: EN 14769 | ASTM D6521 | AASHTO R28

The long-term aging of bitumen and bituminous binders obtained by a Pressure Ageing Vessel (PAV), generates air bubbles which must be removed in according with EN 14769, ASTM D6521 and AASHTO R28 standards. The Vacuum Degassing Oven, (VDO) consists of a stainless still vacuum vessel with a hinged lid to conserve space and access the vacuum chamber. It can hold up to 8 specimen containers. The unit allows selectable working temperature range from ambient to 200 °C with a resolution of ± 0.1 °C, measured by a platinum RTD probe. The VDO guarantees the required operating pressure of 15 ± 1 kpa for the achievement of vacuum.

NEW

B091M-01

MAIN FEATURES

- Sturdy stainless steel frame.
- Temperature is measured by Platinum RTD.
- Pressure release valve.
- Over temperature limit switch.
- Fully automatic, Semi-Automatic and Manual test;
- Temperature and pressure monitored in real time.
- Automatic release of the pressure at the end of the test.
- Fast heating and vacuum system to reach set point.
- USB port on front unit with software upgrades and data storage.
- 7” colour touch screen controller with front panel user interface for temperature, vacuum, set points and actual values.

The unit is equipped with a 7’’ colour Touch screen controller indicating: temperature and pressure in real time and current stage of each process. The user-friendly software allows the operator to carry out the test in different modes:

- **AUTOMATIC:** Maintains the temperature constant at 170 °C for 30 minutes as required by the standards
- **SEMI-AUTOMATIC:** Selectable test temperature from ambient to 200 °C and the test runs for 30 minutes as in automatic mode
- **MANUAL:** Selectable both test temperature from ambient to 200 °C and time up to 99 minutes for research purposes

At the end of the test is possible to obtain uniform bitumen samples that can be used for further analysis to identify Performance Grade (such as DSR, DTT and BBR) or conventional bitumen properties (such as penetration, ductility, softening point among others)

TECHNICAL SPECIFICATION

- Operating pressure: 15 ± 1 Kpa, res: ± 0.1 Kpa
- Test temperature: 170 ± 4 °C, res: ± 0.1 °C
- Working temperature range: Ambient °C to 200 °C
- Power supply: 230V 1ph 50Hz
- Dimensions: 430x450x470 mm approx
- Weight: 30 kg approx.

SPARE

B091M-20 Sample holder for 4 Ø 70x45 mm sample cup and for 8/10 Ø 55x35 mm sample cup

NEEDED ACCESSORIES

V122-05 Sample cup, brass made, Ø 55x35 mm
V122-06 Sample cup, brass made, Ø 70x45 mm

B091M-20

Backside of **B091M-20**

DYNAMIC VISCOSITY BY ROTATIONAL VISCOMETERS

NEW

STANDARDS: EN 13302 I ASTM D2196 I ASTM D4402 I AASHTO T316

A rotational viscometer is used to measure the dynamic viscosity of bitumen at elevated temperatures. The torque on the apparatus-measuring geometry, rotating in a thermostatically controlled sample holder containing a sample of asphalt, is used to measure the relative resistance to rotation. The torque and speed are used to determine the viscosity of the bitumen, expressed in pascal seconds (Pa.s), millipascal seconds (mPa.s), or centipoise (cP).

2 models available:

B085-21N
STANDARD ROTATIONAL VISCOMETER

Supplied with standard stand, spindles bayonet adaptor, temperature probe PT100, datalogger software, connecting cables, power supply cable.

B085-22N

B085-21N

B085-22N
ROTATIONAL VISCOMETER HIGH PERFORMANCE

Huge viscosity range. Supplied with rack stand, spindles bayonet adaptor, temperature probe PT100, datalogger software, connecting cables, power supply cable. It gives the possibility of programming and recording methods for the test. Optional direct control of temperature unit B085-33N

MAIN FEATURES

- High accuracy ± 1% on full scale
- High repeatability ± 0.2%
- Direct measure with time to stop
- User and locked mode
- Data recording and USB transfer
- 7" touch screen display
- Torque gage on display
- Printer connection
- Compatible with Advanced Software

Power supply: 110-240V 50-60Hz
Dimensions: Head: 180x135xH250 mm
Stainless steel rod: Length 500 mm
Hardened steel stand: 400x250xH10 mm
Weight: 6.5 kg approx.

TECHNICAL SPECIFICATIONS	B085-21N	B085-22N
Unlimited rotation speed	0.3 and 250 rpm – free selection	between 0.3 and 1.500 rpm – free selection
Torque Range	0.05 to 13 mNm	0.05 to 30 mNm
Viscosity range	15 to 60 M mPa.s (M for millions)	2 to 140 M mPa.s (M for millions)
PT100 probe to indicate temperatures	between -50°C to 300°C	between -50°C to 300°C
Display showing	viscosity, speed, torque, shear stress, time, temperature, shear rate	viscosity, speed, torque, shear stress, time, temperature, shear rate
Choice of viscosity unit	cP/Poises or mPa.s/Pa.s	cP/Poises or mPa.s/Pa.s
Languages	English, Italian, Spanish, German, French, Russian, Turkish	English, Italian, Spanish, German, French, Russian, Turkish
Connections	PC and Printer	PC and Printer

NEEDED ACCESSORIES

In order to perform test according to EN 13302 and ASTM D4402:

B085-29
BATH WITH TEMPERATURE CONTROLLER UP TO 200 °C
Temperature range from 5 °C to 200 °C
Complete with 12 liters tank and lid.
Power supply: 230V 50Hz 2060W
Dimensions: 500x400x500 mm
Weight: 12 kg approx.

or

B085-33N
TEMPERATURE CONTROL DEVICE UP TO 300°C
Electric heating device to reach a sample conditioning temperature of 300°C, performing the test according to the ASTM and EN standard requirements. It can be controlled by the advanced software (B085-26N) when used in combination with B085-22N.
The integrated control unit allows to set the test temperature and perform the test with an accuracy of ± 0.2°C.
Power supply: 110-240V 50-60Hz
Dimensions: 610x340xH650 mm
Weight: 16 kg approx.

B085-33N

B085-35 CONTAINER for small sample volumes for spindle TR8 (int. Ø 25 mm)

B085-36 CONTAINER for small sample volumes for spindle TR9, TR10, TR11 (int. Ø 19 mm)

B085-34N SPINDLE COMPLETE SET (TR8, TR9, TR10 and TR11) composed of:

			VISCOSITY RANGE IN mPa.s	
SPINDLE	TR	SHEAR RATE	B085-21N	B085-22N
B085-34N1	8	0.92N	14 to 3M	2 to 7M
B085-34N2	9	0.34N	75 to 16M	12 to 37M
B085-34N3	10	0.28N	146 to 31M	24 to 72M
B085-34N4	11	0.25N	300 to 64M	50 to 149M


B085-34N

B085-29

ACCESSORIES

B085-26N
ADVANCED SOFTWARE FOR B085-22N
This advanced software allows the remote control of the viscosimeter through a PC, in particular:
- Creation and saving of methods, data transfer and processing.
- Use of mathematical tools for data analysis.
- Creation of free program and report editing.
- New graphical tools allowing the customised view of curves, tables and analysis results.
- Control of temperature device (B085-33N) and creation of temperature ramp.

B085-25N
STANDARD SOFTWARE FOR B085-21N
Same as B025-26N but without the possibility to control the temperature device (B085-33N) and to create temperature ramps.

B085-37 CONTAINERS' SUPPORT
B085-38 CIRCULAR LEVEL
B085-39N SPINDLE SET FROM R2 TO R7
B085-40N EXTERNAL TEMPERATURE PROBE
V174 CRUCIBLE TONGS


B085-39N

V174
B085-37
B085-35
B085-36
B085-38

DYNAMIC VISCOSITY DETERMINATION

B088N
VISCOMETER BATH

STANDARDS: EN 12595 | ASTM D2170

This viscometer bath is used to determine both the Dynamic and Kinematic viscosity of liquid asphalts, keeping the capillary type viscometers at a uniform temperature.
Consisting of:
- Borosilicate glass container 15 liters capacity
- Additional tempered glass container
- Stainless steel base with insulating cork sheet
- Stainless steel control box with selector and digital temperature reading
- Stainless steel lid with five holes for capillaries

Temperature range: room to 150 °C
Allows to simultaneous temperate five capillaries.
Viscometers and thermometers **are not included**.

Power supply: 230V 1ph 50-60Hz 1200W
Dimensions: 350x350x520 mm
Weight: 15 kg approx.

MAIN FEATURES

- Extremely precision (± 0.02 °C stability).
- 4.3" LCD display.
- PID controller.
- PT 100A probe included.
- Overheating alarm system and security water level.
- Motor stirrer, heating element, cooling coil.

B088N

ACCESSORIES

B088-03N SILICONE OIL, type 50 cSt, for tests with B088N bath with temperature range: 100 °C up to 150 °C. Can of 20 kg
B088-05N HOLDER, stainless steel made, for Cannon-Manning and Asphalt Institute viscometers
B088-06N HOLDER, stainless steel made, for Cannon-Fenske viscometers
B088-07N HOLDER, stainless steel made, for Zeitfuchs cross-arm viscometers
B088-08N HOLDER, stainless steel made, for Cannon BS reverse flow viscometers
B088-12 KINEMATIC VISCOSITY THERMOMETER, range 58.5 to 61.5 °C, type ASTM 47C
B088-13 KINEMATIC VISCOSITY THERMOMETER, range 133.5 to 136.5 °C, type ASTM 110C

B088-01N
VACUUM VISCOMETER BATH

STANDARDS: EN 12596 | ASTM D2171 | AASHTO T202 | IP 222

This Vacuum Viscometer Bath is specially designed for tests that require ultra – precise temperature and vacuum control, or processes that need to be followed visually. All wetted parts are made of stainless steel, providing resistance against all usual bath fluids. The bath can be operated from ambient +5 (with a cooling system) up to +230 °C (41...446 °F). The set point can be set in steps of 0.01°C. The system overall accuracy is within ± 0.01 °C. After the temperature control is stable, the offset can even be adjusted with± 0.005 °C. The Bath is already equipped with the digital vacuum controller, the vacuum manifold to offer 4 positions and all tubing to perform the test. This system further offers high precision and feedback regulation on the vacuum, within 0,5 mm Hg (or mBar) of its set point.

Power supply: 230V, 50-60Hz
Dimensions: 720 x 400 x 590 mm
Weight: 50 Kg approx.

TECHNICAL SPECIFICATIONS

- Temperature Range: Ambient to 230°C;
- Temperature Stability: ± 0.01°C;
- Bath Volume: 40 litres;
- Pressure Range: 30 to 430 mBar (negative pressure);
- Pressure Accuracy: ± 0.5 mBar;
- Digital Vacuum Controller;
- 4 viscometer positions;
- Selectable readout via setup: mm Hg, mBar, PSI

B088-01N

SPARES

B088-16N Vacuum pressure regulator, for precise control during test. 230 V, 50-60 Hz
B088-17N Vacuum manifold, to obtain vacuum to the viscometers introduced into the bath

KINEMATIC VISCOSITY DETERMINATION

STANDARDS: EN 12595 I ASTM D2170 I AASHTO T201

CANNON-MANNING VACUUM VISCOMETERS

To determine the viscosity of bitumen at 60 °C.
Supplied complete with calibration certificate.

Model	Viscosity range		
B088-20	0.036	to	0.8
B088-21	0.12	to	2.4
B088-22	0.36	to	8
B088-23	1.2	to	24
B088-24	3.6	to	80
B088-25	12	to	240

Model	Viscosity range		
B088-26	36	to	800
B088-27	120	to	2400
B088-28	360	to	8000
B088-29	1200	to	24000
B088-30	3600	to	80000

Note: to measure the viscosity with the Cannon-Manning viscometers, the B088-01N bath, the B088-05N holder and asphalt institute vacuum viscometers are also needed.

ASPHALT INSTITUTE VACUUM VISCOMETERS

To determine the viscosity of bitumen at 60 °C.
Supplied complete with calibration certificate.

Model	Viscosity range		
B088-34	42	to	800
B088-35	180	to	3200
B088-36	600	to	12800
B088-37	2400	to	52000
B088-38	9600	to	1400000
B088-39	38000	to	5800000

CANNON-FENSKE OPAQUE VISCOMETERS, REVERSE-FLOW TYPE

To determine the kinematic viscosity of bitumen, distillation residues of opaque liquid asphalts, asphalt cements at 135 °C, and road oils at 60 °C. Supplied complete with calibration certificate.

Model	Approx. constant mm^2/s^2	Viscosity range mm^2/s^2		
B088-50	0.002	0.4	to	2
B088-51	0.004	0.8	to	4
B088-52	0.008	1.6	to	8
B088-53	0.015	3	to	15
B088-54	0.035	7	to	35
B088-55	0.1	20	to	100
B088-56	0.25	50	to	200
B088-57	0.5	100	to	500
B088-58	1.2	240	to	1200
B088-59	2.5	500	to	2500
B088-60	8	1600	to	8000
B088-61	20	4000	to	20000
B088-62	45	10000	to	40000
B088-63	100	20000	to	80000

Note:
to measure the kinematic viscosity with the Cannon-Fenske viscometers , the B088N or the B088-01N baths and the B088-06N holder are also needed.

Note:
to measure the kinematic viscosity with the BS viscometers, the B088N or the B088-01N baths and the B088-08N holder are also needed.

ZEITFUCHS CROSS-ARM VISCOMETERS

To determine the kinematic viscosity of bitumen, distillation residues of liquid asphalts, asphalt cements at 135 °C, road oils.
Supplied complete with calibration certificate.

Model	Approx. constant mm^2/s^2	Viscosity range mm^2/s		
B088-70	0.003	0.6	to	3
B088-71	0.01	2	to	10
B088-72	0.03	6	to	30
B088-73	0.1	20	to	100
B088-74	0.3	60	to	300
B088-75	1	200	to	1000
B088-76	3	600	to	3000
B088-77	10	2000	to	10000
B088-78	30	6000	to	30000
B088-79	100	20000	to	100000

Note:
to measure the kinematic viscosity with the Zeitfuchs cross-arm viscometers, B088N or B088-01N and corresponding holders are also needed.

CANNON BS-IP-RF FLOW REVERSE VISCOMETERS

To determine the kinematic viscosity of bitumen, distillation residues of liquid asphalts, asphalt cements at 135 °C,road oils.
Supplied complete with calibration certificate.

Model	Approx. constant mm^2/s^2	Viscosity range mm^2/s		
B088-80	0.003	0.6	to	3
B088-81	0.01	2	to	10
B088-82	0.03	6	to	30
B088-83	0.1	20	to	100
B088-84	0.3	60	to	300
B088-85	1	200	to	1000
B088-86	3	600	to	3000
B088-87	10	2000	to	10000
B088-88	30	6000	to	30000
B088-89	100	20000	to	100000
B088-90	300	60000	to	300000

B024-10
RADIAL-FLOW FALLING HEAD PERMEAMETER

STANDARD: EN 12697-40

Used to determine the time taken for 4 liters of water to dissipate through an annular area of the surfacing of a pavement under known conditions.

Consisting of:

- acrylic tube 125 mm inside diameter, 560 mm long, marked at 1 liter and at 5 liters
- internal rod with rubber ball valve
- wooden base with sealing gasket

Dimensions: 800x450x680 mm
Weight: 8 kg approx.

B024-10

B024-05
CONICAL SIEVE 0.355 mm MESH

STANDARD: EN 15366:2010

Used to verify the absorption degree of mineral oils and hydrocarbons from granulate products spread on the road during winter time.

B024-05

B024
PERMEAMETER
FOR DRAINING PAVEMENTS IN SITU

STANDARD: ITALIAN HIGHWAY SYSTEM, COMPARABLE TO MPW OF BELGIUM

Mainly used in situ to perform and to check the permeability and drainage on road carpets, concrete pavements, tamped earth etc. The test consists in filling the cylinder with water, after ermetically positioning it on the carpet under test and then in calculating the time needed by a certain quantity of water to be absorbed by the same. The instrument is composed of a bottomless plexiglass cylinder 140 mm inside diameter, fitted on a base. The cylinder has two black calibration lines: one at zero point and one at 250 mm.

Dimensions:
260x260x425 mm
Weight: 8 kg approx.

B024-01

B024

ACCESSORY

B024-01
WEIGHT KG 5, anular shape, to apply on the base of the permemeter, to improve its adherence to the material under test.

B099-10
SAND PATCH EQUIPMENT

STANDARDS: EN 13036-1 | ASTM E965 | NF P98 216-1

Road and airfield surface characteristics.
Measurement of pavement surface to determine the average macrotexture depth using a volumetric patch technique.
The equipment comprises:
Spreader disc with handle and rubber coated surface. Wind shield
Soft brush. Screw-adjusted compass 500 mm graduated rule.
Metallic cylinder for spheres volume measurement.
Two glass pyknometers with metallic screw top and pouring hole
Three graduated cylinders 10.25 and 50 ml cap. Knee-guard
Carrying case

Weight: 4 kg approx.

B099-10

ACCESSORIES

B099-15 GLASS SPHERES, size 180/212 microns to EN 13036-1 Pack of 5 kg.
B099-16 NATURAL SAND 300/150 microns, 25 kg bag. ASTM E965.
B099-17 NATURAL SAND 150/75 microns, 25 kg bag. ASTM E965

SAMPLING OF ASPHALT ROAD CORES
DETERMINATION OF PHISICAL PROPERTIES AND COMPOSITION

STANDARD: EN 12697-27

C319
PAVEMENT CORE DRILLING MACHINE

Technical details, other models of machines, coring bits etc. described in section "C" p. 356

C319

B098N
TRAVELLING BEAM DEVICE

Used to detect and check any irregularity in both bituminous and concrete road surfaces. The unit consists essentially of a 3 metre long beam fixed on two rigid wheels at the extremities. In the middle of the beam a sensing unit comprising a wheel connected to an indicator provides a magnification of 4:1 and measures deviations of the surface. The deviations are shown on a scale calibrated in increments of 2 mm up to 10 mm and 5 mm up to 25 mm.
The beam is supplied as three sub-assemblies which are quickly assembled on site.

Dimension: 790x3200x1080 mm approx.
Weight: 55 kg approx.

ACCESSORIES

B098-01N
AUTOGRAPHIC RECORDING DEVICE

When connected to the Travelling Beam Device mod. B098N, it provides a permanent record of the surface profile.
It records up to 1000 metre surface on the special chart paper rolls.
Supplied complete with 10 chart rolls and 2 fibre-tipped pens.

B098-03N DYE-MARKER with paint bottle, used to identify suspect areas.

B098-05 WOODEN CARRYING CASE to house the Travelling Beam Device. **Dimensions:** 1480x680x510 mm approx.

SPARES

B098-11 Pack of 10 chart rolls for approx. 1000 metre run.
B098-12 Fibre-tipped pen for use with the recorder.
B098-13 Dye-marker paint bottle.

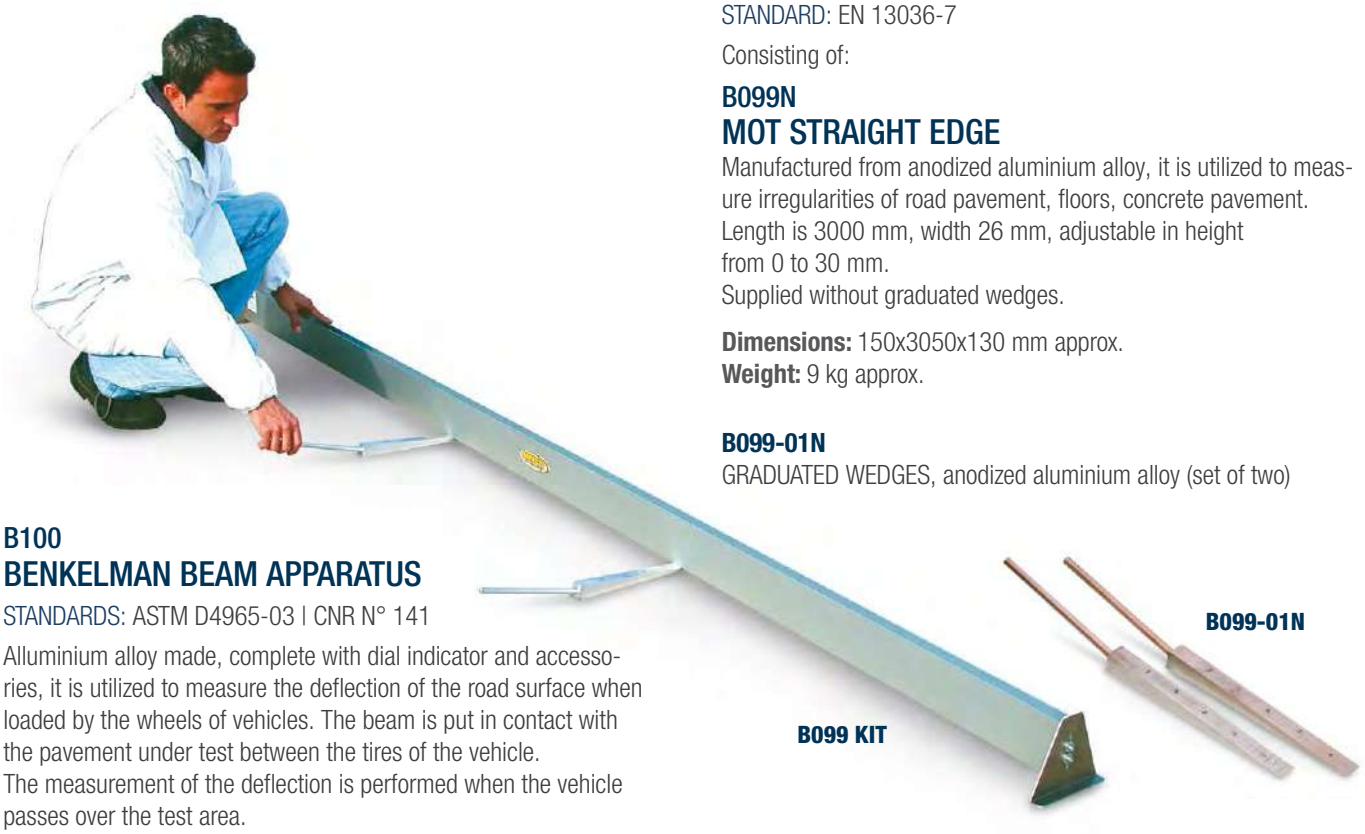
B111
NON NUCLEAR ELECTROMAGNETIC DENSITY GAUGE, INFRARED TEMPERATURE SENSOR

The Electromagnetic Density Gauge is a non nuclear sensing device that allows field density real time measurement of asphalt. This technically advanced instrument for quality control allows operators to immediately identify spots with low pavement density and trigger corrective actions leading to more uniform pavements.

The Electromagnetic densimeter allows:

- Pavement tests.
- Real time measurements, in a continous mode.
- LCD visualization of:
  Average density.
  % Maximum density.
  % Air voids.
- Non Nuclear device, so maximum safety for operator
- Storing up to 999 measurement data records and RS-232 computer interface.
- Infrared sensor for an accurate measurement of the road surface (optional).
- Rechargeable batteries for 32h continous usage.
- Charging supply for standard 230V 50Hz or 12Vcc.

Dimensions: 229x406x152 mm
Weight: 5 kg approx.



B099 KIT
MOT STRAIGHT EDGE WITH 2 WEDGES

IRREGULARITY MEASUREMENT OF PAVEMENT SURFACE

STANDARD: EN 13036-7

Consisting of:

B099N
MOT STRAIGHT EDGE

Manufactured from anodized aluminium alloy, it is utilized to measure irregularities of road pavement, floors, concrete pavement.
Length is 3000 mm, width 26 mm, adjustable in height from 0 to 30 mm.
Supplied without graduated wedges.

Dimensions: 150x3050x130 mm approx.
Weight: 9 kg approx.

B099-01N

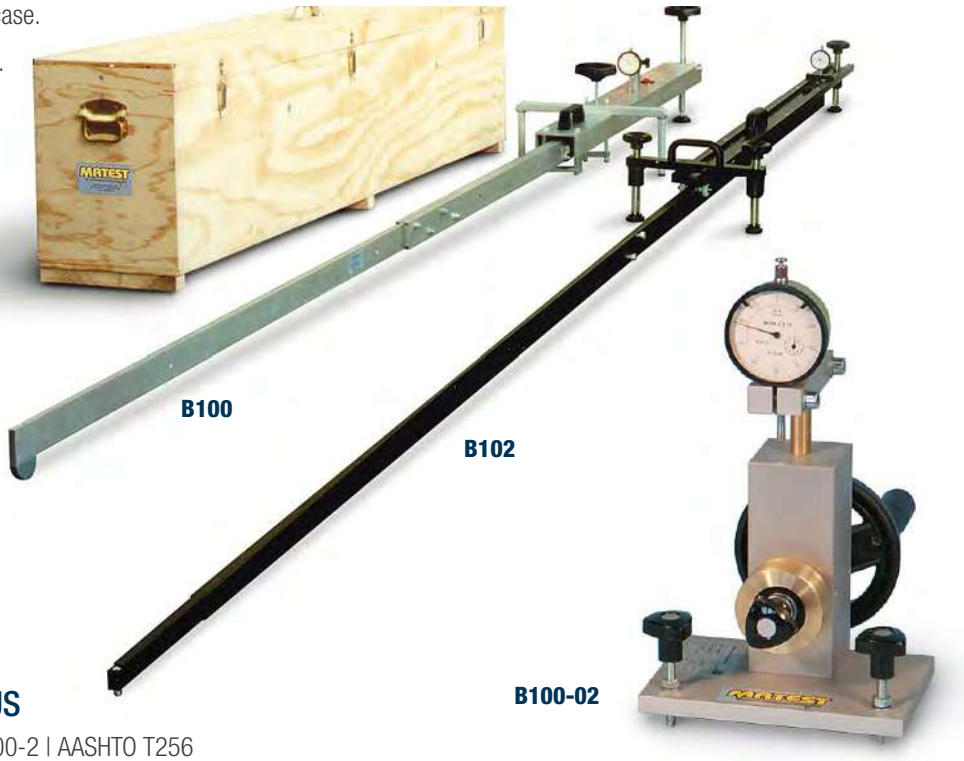
GRADUATED WEDGES, anodized aluminium alloy (set of two)

B100
BENKELMAN BEAM APPARATUS

STANDARDS: ASTM D4965-03 | CNR N° 141

Alluminium alloy made, complete with dial indicator and accessories, it is utilized to measure the deflection of the road surface when loaded by the wheels of vehicles. The beam is put in contact with the pavement under test between the tires of the vehicle.
The measurement of the deflection is performed when the vehicle passes over the test area.
Lenght of the Benkelman beam is 2500 mm.
Beam fulcrum ratio 4:1
Supplied complete with wooden carrying case.

Dimensions: 430x1800x350 mm approx.
Weight: 16 kg approx.



B102
BENKELMAN BEAM APPARATUS

STANDARD: ASTM D4965-03 | NF P98-200-2 | AASHTO T256

Basically similar to mod. B100 but manufactured according to the French Specifications. Beam fulcrum ratio 2:1
Complete with wooden carryng case.

Dimensions: 430x1800x350 mm approx.
Weight: 16 kg approx.

ACCESSORY

B100-02

BENKELMAN INDICATOR GAUGE CALIBRATION UNIT, complete for mod. B100 and B102. To verify the accuracy of the apparatus.

B103-10
BEARING PLATE 600 MM DIAMETER CAST ALUMINIUM WITH REINFORCING RIBS

STANDARD: NF P94-117-1

The plate is equipped with a central device to measure the static deformation of road pavements (EV2) with the Benkelman Beam, and the bearing capacity of a soil in-situ.
The plate foresees also three screwed lateral holes for three point measurements of the bearing capacity of a soil in-situ.
Supplied complete with coupling device to the hydraulic jack.

Weight: 25 kg approx.

B103-10

B103-05 KIT

B102

USE EXAMPLES OF THE ALUMINIUM BEARING PLATE:

B103-05 KIT
PLATE BEARING EQUIPMENT, 200KN CAPACITY

STANDARD: NF P94-117-1

To determine the static deformation of flexible road pavement (EV2) in the centre of the loading plate.
Used with the Benkelman Beam apparatus mod. B102

The equipment consists of:

B103-10 Bearing plate 600 mm dia. cast aluminium with reinforcing ribs and coupling device.
S225-01 Hydraulic loading jack 200 kN capacity, complete with **double speed hand pump ensuring fast approach**, rubber pipe with fast connector, set of extension rods of different lenghts, carrying case.
S225-02 Precision pressure gauge 0 - 200 kN, div. 1 kN
S226-13 Upper spherical seat.
Total weight: 70 kg approx.

Note: each item can be ordered separately

ACCESSORY

B102 BENKELMAN BEAM APPARATUS according to Standards:
ASTM D4965-03 I NF P98-200-2
AASHTO T256

B102

Use examples of the aluminium bearing plate Ø 600 mm for bearing tests of a soil in-situ with the 200 kN plate bearing equipment mod S225 KIT (see p. 516 of the catalogue).

S225 KIT + B103-10

A113
SKID RESISTANCE AND FRICTION TESTER
MEASUREMENT OF SKID RESISTANCE OF AN ASPHALT SURFACE

STANDARDS: EN 13036-4 | EN 1097-8 | BS 7976 | ASTM E303

The apparatus is suitable for both site and laboratory applications to perform two types of tests:
- For measuring pavement (road asphalt) surface frictional and skid resistance properties.
- For polished stone value tests on aggregates (curved specimens) from accelerated polishing tests.

For further technical details, see p. 56

The tester is supplied **without** rubber sliders and accessories that have to be ordered separately.

Case dimensions: 730x730x330 mm
Weight: 32 kg approx

A113

ACCESSORIES

A110-03 MOUNTED RUBBER SLIDER, TRL rubber, 76 mm width for site use (road surface), complete with conformity certificate.

A110-01 MOUNTED RUBBER SLIDER, TRL rubber, 32 mm width for Polished Stone Value tests (laboratory), complete with conformity certificate.

A110-05 MOUNTED RUBBER SLIDER, 4S rubber, 76 mm width (ceramics, marbles, paving tiles, sidewalk surface) complete with conformity certificate.
Standards: EN 13036-4 / BS 7976

A110-11 METAL BASE PLATE for Polished Stone Value tests in laboratory, and for tests on natural stones and concrete block pavers. Supplied **without** specimen clamping devices (to be ordered separately).

A110-12 CLAMPING DEVICE for Polished Stone Value tests in Laboratory.

A110-13 CLAMPING DEVICE for tests on natural stones (EN 1341, 1342); for concrete block pavers (EN 1338) and skidding tests on wooden floor (EN 1339).

A110-20 PINK LAPPING FILM (10 sheets) for Skid Calibration.


A113
in carrying case

A110-11 + A110-12

A110-03

A110-01

A128N
ACCELERATED POLISHING MACHINE
DETERMINATION OF THE POLISHED STONE VALUE

STANDARDS: EN 1097-8, EN 1341, 1342, 1343 | BS 812:114
NF P18-575 | CNR N.105

It measures the resistance of road aggregates, paving stones and paving blocks to the polishing action of vehicle tyres on a road surface. The specimens are manufactured with suitable moulds and located on the Road Wheel.
Supplied complete with 2 rubber wheels (one for corn and one for flour emery), set of 4 specimen moulds and 2 mould covers, while control stone, corn and flour emery have to be ordered separately (see accessories).
Technical details and accessories: see p. 58

Power supply: 230V 50Hz 1ph 750W
Dimensions: 1800x820x600 mm
Weight: 175 kg approx.

A128N

SECTION B

ASPHALT | BITUMEN | PAVETEST

Bituminous mixture, also known as asphalt mixture, is mainly composed by aggregates and bitumen, an infinite variety of mixtures being possible. This section is divided into three parts and shows the whole range of equipment for analyzing each component of the bituminous mixture.

ASPHALT. The first part is dedicated to the asphalt testing machines used to provide a solution for the whole “asphaltic path”: mixing, compacting, modelling and testing. The equipment meets the needs of those who want to perform quality control or experimentation of new asphalt mixtures.

BITUMEN. This section shows equipment required for bitumen testing: these include machines to study the rheological properties of bitumen as well as the features of bituminous emulsion. The last part of this section provides better solutions to perform field tests on road surface.

PAVETEST. Pavetest’s range of pavement dynamic testing systems both complements and completes Matest’s Asphalt and Bitumen business unit. All our products comply with the principal international standards.

CDAS
CONTROL AND DATA ACQUISITION SYSTEM

Pavetest's compact Control and Data Acquisition System (CDAS) delivers unparalleled performance, real time control and ultimate versatility in acquisition and provide a flexible and user friendly testing solution.
It provides excellent waveform fidelity from integrated acquisition and control functions, with low level sampling at speeds of up to 192,000 samples per second simultaneously on all channels and 20 bit resolution over the full dynamic input signal range.

MAIN FEATURES

- Directly communicates with the TestLab software, providing automatic test execution and data processing.
- Compact high reliability data acquisition and control.
- Up to 5 kHz data acquisition and feedback control provides excellent waveform fidelity.
- Up to 64 times oversampling gives superior low noise performance.
- Normalized (±10 V) analog data acquisition inputs provide flexibility to use any transducer in any channel.

B206 CDAS 16 channels

EASY DATA PROCESSING WITH THE INCLUDED SOFTWARE

The CDAS includes the TestLab software - supplied on USB flash drive - complete with relevant Method files (based on the test configurations supplied) and calibration files for all the transducers supplied. Software and test methods are expandable for future requirements.

AVAILABLE MODELS

B205
8 Channel CDAS - Acquisition 8 CH, 20 bit resolution
- Sampling rate up to 192 kHz (all channels)
- Smoothing up to 64 times over-sampling
- Calibration on power up
- Control Axis 2
- Communication USB or Ethernet

B206
16 Channel CDAS - Acquisition 16 CH, 20 bit resolution
- Sampling rate up to 192 kHz (all channels)
- Smoothing up to 64 times over-sampling
- Calibration Automatically on power up
- Control Axis 4
- Communication USB or Ethernet

Dimensions: 110(h) x 325(d) x 265(w) mm
Power Supply: 90-264V 50-60Hz 1ph 240W
Weight: 5 kg approx.

TECHNICAL FEATURES

CONTROL:
- High speed, (18 bit) digital servo-control, up to 4 axis.
- Digital closed loop update sampling rate of 2.5 kHz.
- Computer programmable, Proportional, Integral and Derivative (PID) control algorithm.
- Adaptive Level Control (ALC) algorithm for best dynamic peak accuracy.
- 3 feedback control modes. E g. force, position and on-specimen strain.
- "Bumpless transfer" between control modes.

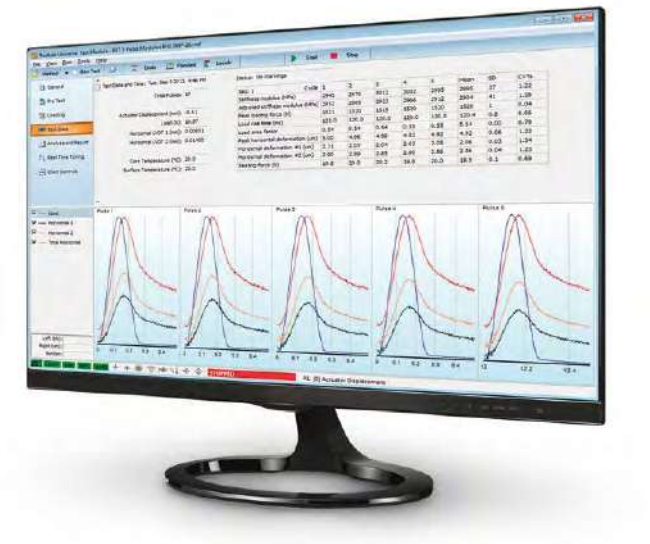
ACQUISITION:
- Analog inputs are automatically calibrated on power up.
- Simultaneous sampling of all channels.
- 16 Analog (± 10 Volt) input channels.
- Up to 64 times over sampling (set to 8 by default).
- 20 bit digital resolution **(approx. 1/1.000.000)**, no auto ranging required.
- Sampling rate up to 192.000 samples/see.

TESTLAB SOFTWARE

Developed with ultimate flexibility in mind, TestLab test and control software caters to all levels of operator experience. By using pre-programmed **Method files**, an inexperienced operator can run a range of international test methods without the need for any programming.
Moreover, a test **Wizard**, available with popular tests, can guide the operator step by step based on a recipe book approach.
Most importantly, the experienced engineer and/or researcher need not be constrained by the functions and analysis in the method files provided. The operator may clone, modify and/or generate his/her own method file to suit their specific requirements. The Excel based data analysis offers the operator the flexibility to implement alternative analysis and customize reporting facilities.
TestLab allows for real time graphing of results and configurable real time transducer levels display with unprecedented clarity of results and analytical power.

MAIN FEATURES

- Open architecture software allows user to inspect calculations and results.
- Integrated data result post processing feature with MS Excel.
- Standard and user customizable test reporting.
- Real time graphing of results and configurable real time transducer.
- Flexible and user-friendly with unprecedented clarity of results and analytical power.
- Full access for advanced user to specify their own calculations, test results and charting.



TESTLAB, A NEW APPROACH

TestLab is an open architecture user programmable software application. Our engineers have taken the time to review all the relevant international test standards and used TestLab **Test Designer** to program method files according to these standards. Basically, any of these tests can be designed, cloned and/or modified by the user within TestLab. The user is no longer restricted to the test applications provided at time of purchase the possibilities are only limited by the skill and imagination of the user.

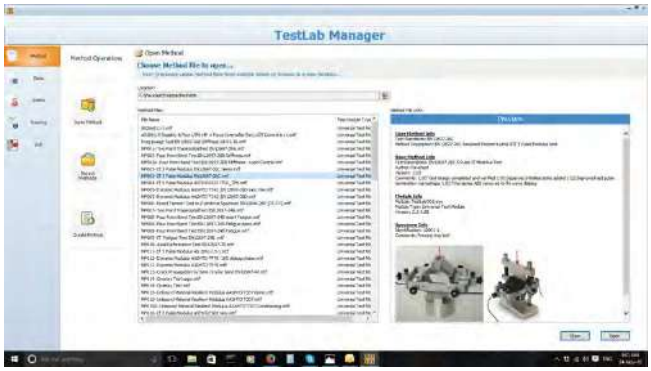
TESTLAB MANAGER

The Testlab materials testing software is a universal approach to materials testing and is designed to interface the CDAS – Control and Data Acquisition Systems - and the wide range of Pavetest machines. A Testlab Manager interface allows users to easily and efficiently locate the necessary method files to load and execute.

TEST METHOD SELECTION

The operator can run pre-programmed Method files, in accordance to the requested Standards, or configure an application test and then save that configuration to a customised Method file. This includes the transducer and calibration allocations, control parameters, termination conditions and any other items, which allow users to enter data. Method files may easily be “cloned”, adapted and saved to be used at a later stage with pre-set preferences.

Testlab Manager



Selection of Method Files

UPGRADE YOUR UNIVERSAL TESTING MACHINE

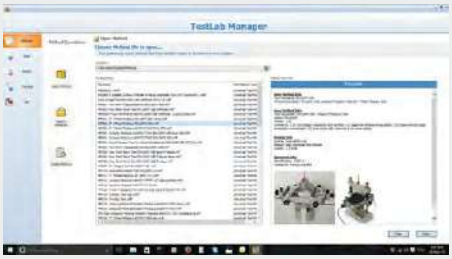
It is a well-known fact that the controller and software is one of the most important aspect of any system and the main reason testing machines become outdated or obsolete. The original machine manufacturer often charge outrageous prices to upgrade the Control and Data Acquisition System and Software, knowing the customer has very little choice.

Pavetest has now made it easier than ever to upgrade third party servo-hydraulic/pneumatic dynamic testing machines, including but not limited to IPC Global, Cooper, Interlaken, MTS and Instron machines, to Pavetest's leading-edge Control and Data Acquisition System (CDAS) and world acclaimed TestLab software.

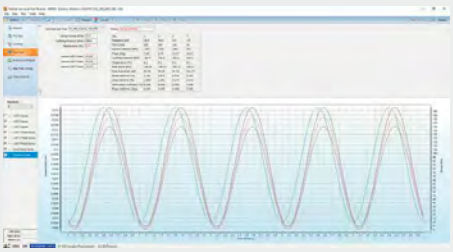
MAIN FEATURES

- TestLab Software provides powerful and flexible solution.
- Comprehensive suite of pre-programmed Method Files.
- Ability to create your own Method Files.
- Adaptable for existing transducers.
- In-line signal conditioners.
- Interfaces to most third party Hydraulic Power Supplies.

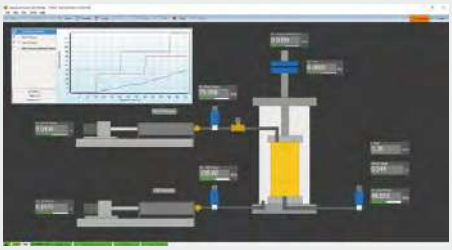
TESTLAB PC SOFTWARE



Selection of Method Files



Test Methods

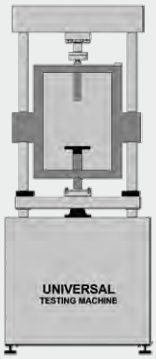


Typical dashboard screen

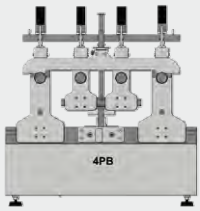
CDAS and HPS interface

THIRD PARTY TESTING MACHINES

Servo Pneumatic test machine



Servo Hydraulic test machine



4 PT Beam test machine

UPGRADE BENEFITS

This immediately offers the user access to a comprehensive suite of pre-programmed Method Files and/or the opportunity to create their own Method Files, to suit their individual needs. Pavetest can also provide interface cables and signal conditioners to adapt existing transducers to the Pavetest CDAS and offer additional transducers, already fitted with in -line signal conditioners to suit existing and new testing applications.

For servo-hydraulic systems; the Pavetest microprocessor controlled HPS interface unit allows Pavetest to interface our CDAS to most third party Hydraulic Power Supplies.

Our 40 plus years' experience with servo-controlled systems and instrumentation places us in a strong position to restore your outdated system to current day standards.

MODULAR CONCEPT

Both the CDAS hardware and TestLab software use a modular approach allowing users to add new functionality to perform additional materials tests.

AVAILABLE FOR ALL LANGUAGES

TestLab has a complete inbuilt language translation editor catering for translation of all languages.

RENEWED PERFORMANCE

TestLab provides new and advanced acquisition and control capabilities for your old testing machine.

COMPLETE INSTALLATION AND TRAINING

Pavetest can provide a complete onsite installation, commissioning and training for your upgrade package including supply of additional jigs, method files and transducers.

ORDERING INFO

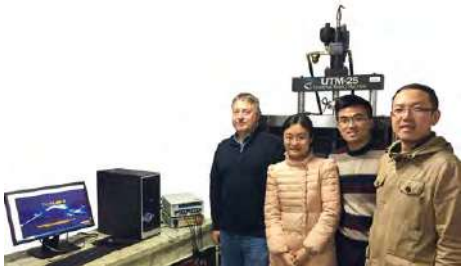
B205 8 channel CDAS
or
B206 16 channel CDAS
B205-01 HPS interface box
B205-02 6 pin DIN (male) to 7 pin XLR (female) adaptors cable
B205-03 6 pin DIN (female) to 7 pin XLR (male) adaptors cable

8 Channel Pavetest CDAS with Frame Control Interface.

EXAMPLE OF SYSTEMS UPGRADED BY PAVETEST

Interlaken UTMs equipment upgraded by Pavetest, AAT, USA.

IPC Global UTM5P and UTM14P equipment upgraded by Pavetest, Fulton Hogan, Australia.



IPC Global UTM-25 equipment upgraded by Pavetest, SEU, China.

16 KN SERVO-PNEUMATIC DYNAMIC TESTING SYSTEM

TWO MODELS AVAILABLE:

B220-01 KIT
DTS-16 WITH MANUAL CROSSHEAD

B220-02 KIT
DTS-16 WITH MOTORIZED CROSSHEAD

The DTS-16 Dynamic Testing System is a servo-pneumatically controlled testing machine utilizing digital control of a pneumatic servo valve to provide accurate loading wave shapes up to 70 Hz. The DTS-16 can be operated in tension, compression dynamic loading and is suited to testing a diverse range of materials such as asphalt, soil, unbound granular materials, fibres and plastics.
The DTS-16 is underpinned by Pavetest's leading edge CDAS digital controller, TestLab software and a full complement of accessories, hardware and software in perfect unison.

MAIN FEATURES

- Compact, robust 2-Column load frame.
- Precision engineered.
- Optional Motorized crosshead positioning.
- Fully configurable to suit a large range of testing applications.
- Digital Servo-Pneumatic control.
- 4 axis control and 16 Channel Control and Data Acquisition System.

The machines includes:

B220-11 20 kN Load frame with manual crosshead, 16 kN Servo-pneumatic actuator with its LVDT (30 mm stroke), ± 20 kN load cell

or

B220-12 20 kN Load frame with motorized crosshead, 16 kN Servo-pneumatic actuator with its LVDT (30 mm stroke), ± 20 kN load cell

B206 16 Channel Control and Data Acquisition System (CDAS) & TestLab software

B270-12 Air reservoir assembly with membrane dryer

It requires pressurized air, minimum 7 bar (not included).

Model	B220-01 KIT	B220-02 KIT
B220-11	▼	
B220-12		▼
B206	▼	▼
B270-12	▼	▼

B220-02 KIT
16 kN Servo-Pneumatic dynamic testing system (motorized crosshead) with **B221N** Temperature controlled cabinet

TECHNICAL SPECIFICATIONS

Load frame
- Between Columns 345 mm
- Vertical Space 650 mm

Servo actuator
- Capacity ± 16 kN
- Frequency up to 70 Hz
- Stroke 30 mm
- Air supply clean dry air
- Pressure 800-900 kPa
- Minimum rate up to 5 litres/sec

Power Supply: 90-264V 50-60Hz 1ph 240W (B220-11)
230V 50Hz 1ph 100W (B220-12)
230V 50Hz 1ph 1450W (B221)

Dimensions: 1262(h) x 400(d) x 470(w) mm B220-11 load frame
1262(h) x 400(d) x 510(w) mm B220-12 load frame
2170(h) x 840(d) x 760(w) mm load frame with temperature controlled cabinet

Weight: 80 kg load frame B220-11 load frame
125 kg load frame B220-12 load frame
160 kg temperature controlled cabinet

B220-02 KIT
DTS-16 detail

B220-12
20 kN Load frame with motorized crosshead

TECHNICAL FEATURES

- **Optional motorized crosshead.**
  A motorized crosshead allows an easier test set-up in terms of accessories positioning without using any extension rods.
- **Latest technology.**
  The DTS-16 advantage revolves around the Control Data Aquisition System (CDAS) and TestLab Software.
- **Durable powder coated aluminium base plate** with stainless steel work platen.
- **Air reservoir assembly with membrane dryer.**
  It allows a great insurance against damages to the servo-valve in case of moisture in the compressed air.

RECOMMENDED ACCESSORIES

B221N	Temperature controlled cabinet: -20 °C to +70 °C to suit DTS-16 or 4PBA
B250-07 KIT	Temperature measuring kit comprising:
▪ **B292-01**	Temperature transducer (-80 °C to +80 °C) (2 pieces)
▪ **B250-10**	Dummy asphalt specimen
▪ **B250-11**	100 mm “O” ring (3 pieces)
▪ **B250-12**	Thermal conducting grease (about 56 g)
H009-01EN	PC complete with LCD monitor 22”, keyboard, mouse, cables and installation of Testlab software

We can upgrade your existing UTM (also from other manufacturers)

For test configurations and related jigs, please consult p.182-192

B270-12
Air reservoir assembly with membrane dryer

B250-07 KIT
Temperature measuring kit

B230
30 KN SERVO-HYDRAULIC DYNAMIC TESTING SYSTEM (DTS-30)

The DTS-30 Dynamic Testing System is a servo-hydraulic testing machine utilizing digital control of a high performance servo valve to provide accurate loading wave shapes up to 100 Hz. The DTS-30 can be operated in tension, compression dynamic loading and is suited to testing a diverse range of materials such as asphalt, soil, unbound granular materials, fibres and plastics. The DTS-30 is underpinned by Pavetest's leading edge CDAS digital controller, TestLab software and a full complement of accessories, hardware and software in perfect unison.
The DTS-30 Dynamic Testing System is compact, fully integrated, user and environmentally friendly.

MAIN FEATURES

- Compact, robust load frame.
- Small footprint; 90 cm x 135 cm, including hydraulic power supply and climatic chamber.
- Reaction frame embedded in the test chamber.
- Portable temperature control unit.
- Fully configurable to suit a large range of testing applications.
- Digital Servo-Hydraulic control.
- Dynaflo™ HPS provides dynamic speed control of the pump motor ensuring quiet operation.
- 4 axis control and 16 channel data acquisition as standard.

The machine includes:

- Rigid two column load frame
- 30 kN Servo-hydraulic actuator (100 mm Stroke)
- 2.2 kW Hydraulic Power Supply
- 16 Channel Control and Data Acquisition System (CDAS) & TestLab software
- Load cell (± 30 kN)
- 100 mm actuator LVDT

B230 30 KN
Servo-Hydraulic
Dynamic Testing System with **B231** temperature controlled cabinet

TECHNICAL SPECIFICATIONS

Load frame
- Between Columns 600 mm
- Vertical Space 800 mm

Servo actuator
- Capacity ± 30kN static, ± 25kN dynamic
- Frequency up to 100Hz
- Stroke 100 mm

Hydraulic Power Supply
- Pressure up to 160 bar, user defined
- Flow rate up to 7.5 litres/min
- Dimensions: 650(h) x 550(d) x 450(w) mm
- Power Supply: 230V 50-60Hz 1ph 2.5kW

Power Supply:
230V 50-60Hz 1ph 2.5kW (B230)
230V 50Hz 1ph 1.3kW (B231)
230V 50Hz 1ph 3.1kW (B232)

Dimensions:
2100(h) x 1220(d) x 800(w) mm load frame
2100(h) x 1800(d) x 800(w) mm with temperature controlled cabinet

Weight:
430 kg approx. load frame
650 kg approx. load frame with temperature controlled cabinet and oil-filled HPS

TECHNICAL FEATURES

- **The DTS-30 fatigue rated, servo-hydraulic actuator utilizes metal labyrinth bearings and seals.**
  The labyrinth bearings and seals are designed to reduce friction and maintain low operating temperatures.
  The bearings experience little-to-no wear, operate at high speeds and offer a long service life.
- **A bottom loading machine.** Before this current crop of universal testing machines, many dynamic testing machines were bottom loading. More recently, the Asphalt Mixture Performance Tester (AMPT) changed the mindset of the testing community by highlighting the benefits of a bottom loading machine.
- **Portable temperature control unit.** The temperature control unit attaches to the test chamber using a magnetic seal and can be wheeled away when not required or for servicing. It can be removed without dismantling the machine or disrupting the testing program.

NEEDED ACCESSORIES

B231 Temperature controlled cabinet:
-20 °C to +80 °C to suit DTS-30 or DTS-130

or

B232 Temperature controlled cabinet:
-40 °C to +80 °C to suit DTS-30 or DTS-130

B233 Temperature controlled cabinet:
-50 °C to +100 °C to suit DTS-30 or DTS-130

These temperature controlled cabinets may be supplied with humidity control, if required.

RECOMMENDED ACCESSORIES

H009-01EN PC complete with LCD monitor 22", keyboard, mouse, cables and installation of Testlab software

B250-07 KIT Temperature measuring kit comprising:
- **B292-01** Temperature transducer (-80 °C to +80 °C) (2 pieces)
- **B250-10** Dummy asphalt specimen
- **B250-11** 100 mm O ring (3 pieces)
- **B250-12** Thermal conducting grease (about 56 g)

We can upgrade your existing UTM (also from other manufacturers)

For test configurations and related jigs, please consult p. 182-192

Can't see the Control and Data Acquisition System (CDAS)? That's because **it's housed neatly, in the cabinet in front of the machine**.
You won't see a tangle of cables either; they enter the cabinet through the floor of the test chamber or through the back of the cabinet and connect to the CDAS.
The door of the cabinet can be held ajar to allow transducers to be re-allocated or opened completely for servicing. Unused transducers can also be stored out of harm's way.
Moreover, the DTS-30 reaction frame is symmetrical; **the servo-hydraulic actuator and reaction shaft can be interchanged to make the DTS-30 top loading**.

B206 16 Channel CDAS

B240
130 KN SERVO-HYDRAULIC DYNAMIC TESTING SYSTEM (DTS-130)

The DTS-130 Dynamic Testing System is a servo-hydraulic testing machine utilizing digital control of a high performance servo valve to provide accurate loading wave shapes up to 100 Hz. The DTS-130 is Pavetest's highest capacity Dynamic Testing System and completes the range of standard universal testing machines. The system can be operated in tension, compression dynamic loading and is suited to testing a diverse range of engineering materials and/or large asphalt specimens at very cold temperatures.
The DTS-130 is underpinned by Pavetest's leading edge CDAS digital controller, TestLab software and a full complement of accessories, hardware and software in perfect unison.

MAIN FEATURES

- Robust two column load frame.
- Double acting servo hydraulic, equal area type with low friction, long life bearings and seals.
- Portable temperature control unit.
- Fully configurable to suit a large range of testing applications.
- Digital Servo-Hydraulic control.
- Dynaflo™ HPS variable frequency drive (VFD) provides dynamic speed control of the pump motor ensuring quiet operation.
- 4 axis control and 16 channel data acquisition as standard.

The machine includes:

- Rigid two column load frame
- 130 kN Servo-hydraulic actuator (100 mm Stroke)
- 10 kW Hydraulic Power Supply
- 16 Channel Control and Data Acquisition System (CDAS) & TestLab software
- Load cell (± 130 kN)
- 100 mm actuator LVDT

B240
130 kN Servo-Hydraulic Dynamic Testing System with **B231** temperature controlled cabinet

TECHNICAL SPECIFICATIONS

Load frame:
- Horizontal Space: 60 cm
- Vertical Space: 100 cm

Servo actuator:
- Capacity: ± 130kN Static ± 100kN Dynamic
- Frequency: Up to 100Hz
- Stroke: 100 mm

Hydraulic Power Supply:
- Pressure: Up to 210 bar, user defined
- Flow rate: 20 litres/min
- Dimensions: 1150 (h) x 600 (d) x 1100 (w) mm
- Power supply: 380V 50Hz or 208V 60Hz 12kW 3ph

Power Supply:
380V 50Hz 3ph + neutral 12kW or
208V 60Hz 3ph + 12kW (B240)
230V 50Hz 1ph 1.3kW (B231)
230V 50Hz 1ph 3.1kW (B232)

Dimensions:
3005 (h) x 1070 (d) x 1090 (w) mm load frame
3005 (h) x 1630 (d) x 1090 (w) mm with temperature controlled cabinet

Weight:
680 kg approx. load frame
1360 kg approx. load frame with temperature controlled cabinet and oil-filled HPS

B240 130 kN Servo-Hydraulic Dynamic Testing System with **H009-01EN** complete PC, **B231** Temperature controlled cabinet, **B240-03** Exchanger oil/water, HPS (hydraulic power supply)

ACCESSORIES		B240-02 Exchanger oil/air	B240-03 Exchanger oil/water *
B240-04	Chiller for water refrigeration (recommended)		▼
B240-05 or **B240-06**	Set of hoses to connect frame - pumping unit Lg. 3 m (needed) Set of hoses to connect frame - pumping unit Lg. 8 m	▼ ▼	▼ ▼
B240-07 or **B240-08**	Set of hoses to connect pumping unit - Exchanger oil/air Lg. 5 m (needed) Set of hoses to connect pumping unit - Exchanger oil/air Lg. 10 m	▼ ▼	
B240-09 or **B240-10**	Set of hoses to connect Exchanger oil/water - Chiller Lg. 5 m (recommended) Set of hoses to connect Exchanger oil/water - Chiller Lg. 10 m		▼ ▼

* (complete with set of hoses to connect pumping unit Exchanger oil/water)

The **Hydraulic Power Supply (HPS)** utilizes a variable flow pump with a working pressure up to 210 Bar. The customer can choose either water (heat exchanger) or air (Electric fan) oil cooling. Features include; low oil, over temperature and dirty filter indication, remote starting and user selectable working pressure (via TestLab).

B231 Temperature controlled cabinet:
-20 °C to +80 °C to suit DTS-30 or DTS-130

or

B232 Temperature controlled cabinet:
-40 °C to +80 °C to suit DTS-30 or DTS-130

B233 Temperature controlled cabinet:
-50 °C to +100 °C to suit DTS-30 or DTS-130

These temperature controlled cabinets may be supplied with humidity control, if required.

We can upgrade your existing UTM (also from other manufacturers)

RECOMMENDED ACCESSORIES

H009-01EN PC complete with LCD monitor 22", keyboard, mouse, cables and installation of Testlab software

B250-07 KIT Temperature measuring kit (refer to p. 177)

For test configurations and related jigs, please consult p. 182-192

TWO PIECE TEMPERATURE CONTROLLED CABINET

Pavetest offers a range of temperature controlled cabinet to complement our **DTS-30** and **DTS-130** servo-hydraulic Dynamic Testing Systems (DTS). **Pavetest is the first manufacturer to adopt a two piece temperature controlled cabinet;** comprising an insulate cabinet and a temperature control unit. The cabinet is permanently mounted on the dynamic testing machines, whilst the temperature control unit can be wheeled away when not required, leaving the back of the chamber open to accomodate longer jigs/specimens that do not require a controlled environment. The temperature control unit attaches to the cabinet using a magnetic seal. This isolates the cabinet from mechanical vibrations caused by the refrigeration unit and circulation fans whilst maintaining an air tight seal between the inside and outside of the chamber. This concept also makes servicing, replacing or upgrading the temperature control unit virtually effortless, because it can be removed with-out dismantling the machine or disrupting the testing program.

MAIN FEATURES

- Two piece concept makes servicing, replacing or upgrading the temperature control unit effortless.
- Flexible temperature sensor ensures the temperature near the specimen is accurately controlled.
- Operator can monitor, set, adjust or “Auto tune” the temperature controller via the PC.
- Heavy duty stainless steel construction.
- Powerful re-circulation fans ensure even temperature through-out the chamber.
- Triple Glazed, Argon filled, Lo E glass door with built in heater.

Two piece temperature controlled cabinet

ORDERING INFORMATION

B231 Temperature controlled cabinet:
-20 °C to +80 °C to suit DTS-130
or
B232 Temperature controlled cabinet:
-40 °C to +80 °C to suit DTS-130
B233 Temperature controlled cabinet:
-50 °C to +100 °C to suit DTS-30,
supplied with humidity control, if required

Other temperature ranges and operating voltage/frequency available on request.

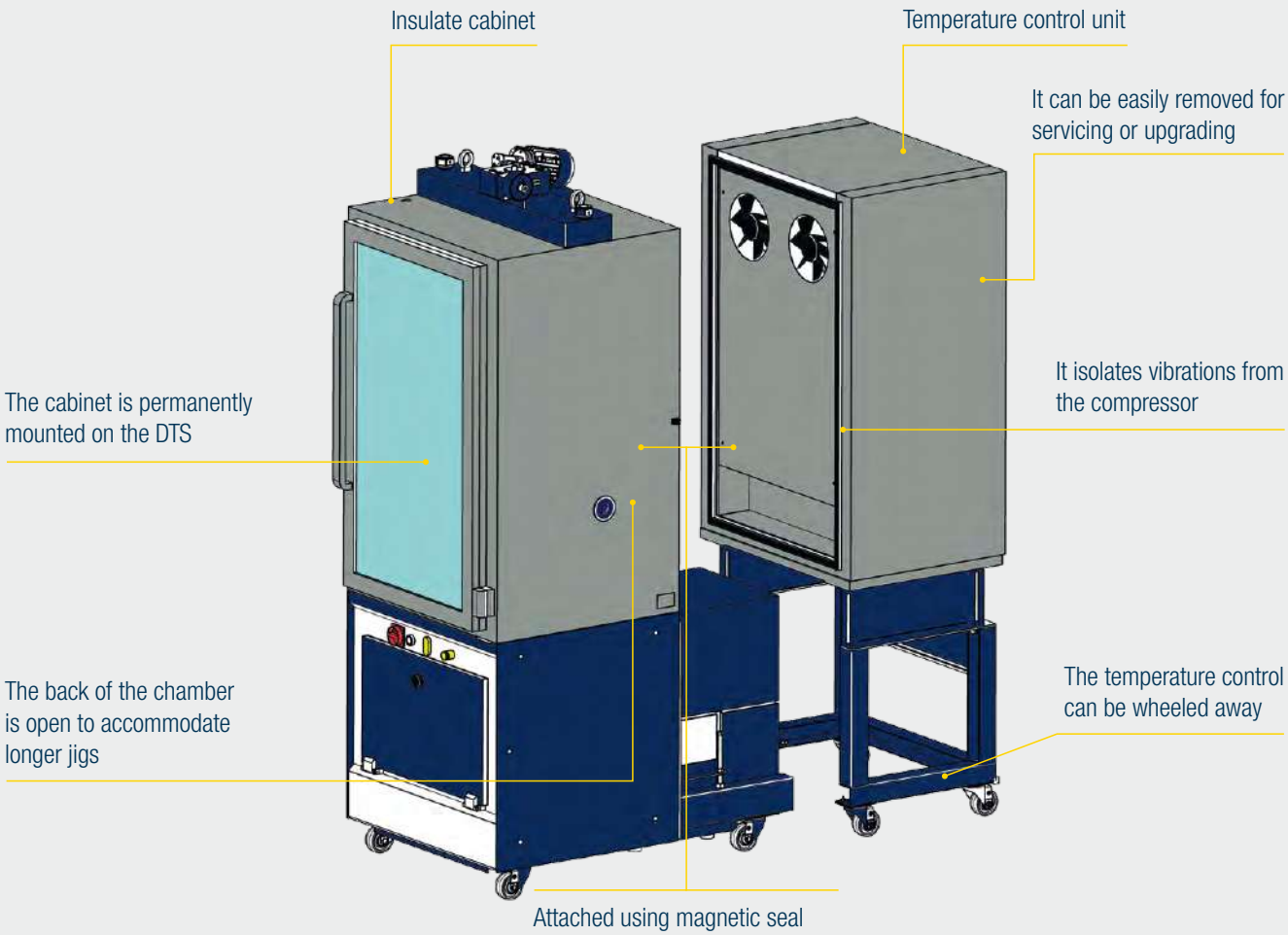
The temperature controller can be programmed using the virtual pendant within TestLab software, via a serial link between the temperature controller and the Control and Data Acquisition System (CDAS). This allows the operator to monitor, set or adjust a constant temperature or ramp without touching the temperature controller, including invoking the "Auto tune" function. This feature is particularly useful for the TSRST test, where programming the temperature controller is not a simple task.

Temperature controller sensor

Pavetest has introduced some additional features to improve the functionality of our temperature controlled cabinets. **The sensor for the temperature controller is mounted on a flexible arm** which allows the operator to locate the sensor in the vicinity of the test specimen; providing accurate temperature control where it's needed most; right near the specimen.

Cabinet switches and temperature controllers

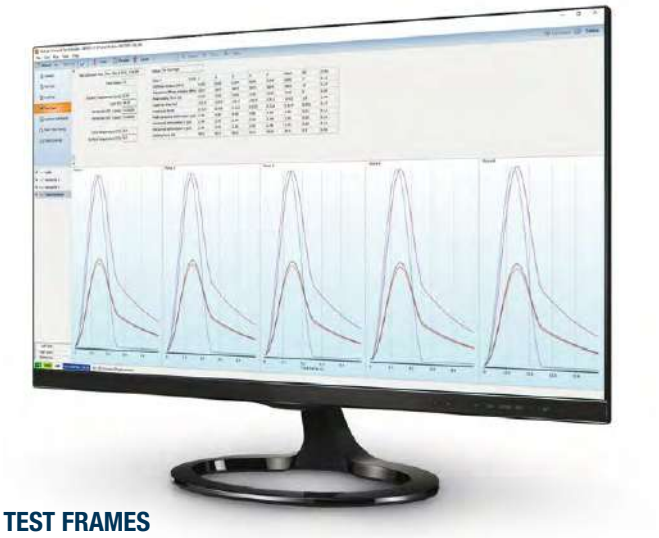
A TWO PIECE TEMPERATURE CONTROLLED CABINET



DYNAMIC TEST CONFIGURATIONS

B250 KIT
INDIRECT TENSILE MODULUS - IDTM

STANDARDS: AASHTO TP31 Resilient modulus of bituminous mixtures by indirect tension
ASTM D4123 Indirect Tension Test for Resilient Modulus of Bituminous Mixtures
AS/NZS 2891.13.1 Resilient modulus of asphalt - Indirect tensile method
EN 12697-26 Annex C - Indirect tension to cylindrical specimens (IT-CY)



B250 KIT Indirect Tensile Modulus
Comprises:

B250-01 Basic IDT Jig
B250-08 Yoke
B250-09 Assembly for B250 KIT
B290-01 LVDT (0.2 mm) (2 pieces)

TEST FRAMES

Manual DTS-16 I Motorized DTS-16 (B221)
DTS-30 I DTS-130 (B231 or B232)

ACCESSORIES

B250-03 Asphalt proving ring
B250-04 100 mm diameter PVC specimen
B250-05 150 mm diameter PVC specimen
B250-06 KIT Torque screwdriver (B250-13) with hexagonal head 4 mm (B250-14)

B251 KIT
INDIRECT TENSILE FATIGUE - IDTF

STANDARD: EN 12697-24 Annex E – Indirect tensile test on cylindrical shaped specimens

B251 KIT Indirect Tensile Fatigue
Comprises:

B250-01 Basic IDT Jig
B290-03 LVDT, double ball ended (3.75 mm) (2 pieces)
B251-01 LVDT mounting strip gluing jig

TEST FRAMES

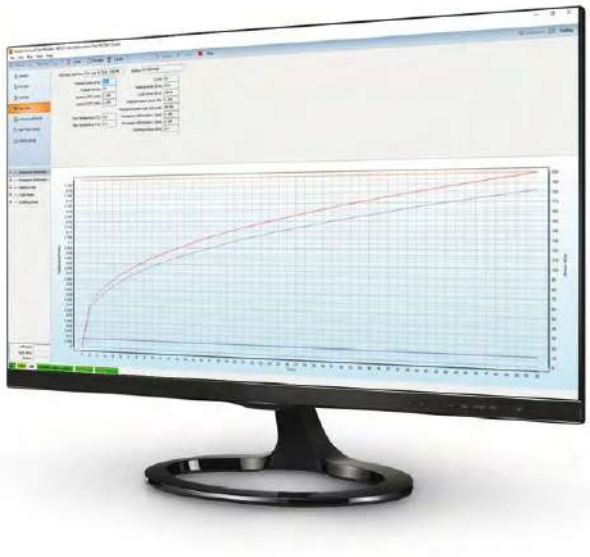
Manual DTS-16 I Motorized DTS-16 (B221)
DTS-30 I DTS-130 (B231 or B232)

ACCESSORIES

B251-51 Pair of LVDT mounting strip to suit 100 mm specimen (**needed** accessory)
And/or
B251-52 Pair of LVDT mounting strip to suit 150 mm specimen (**needed** accessory)
B201-52 5 Minute, two part epoxy 24 ml

B260 KIT
UNIAXIAL CYCLIC COMPRESSION - UCC

STANDARD: EN 12697-25 Cyclic compression. Test Method A - Uniaxial cyclic compression test with confinement
TP Asphalt-StB 25A1: Dynamic punching test on mastic asphalt
TP Asphalt-StB 25A2: Dynamic punching test on rolled asphalt



B260 KIT Uniaxial cyclic compression
Comprises:

B260-01 Base assembly
B260-02 Chamfered top platen
B290-02 LVDT (10 mm) (2 pieces)

TEST FRAMES

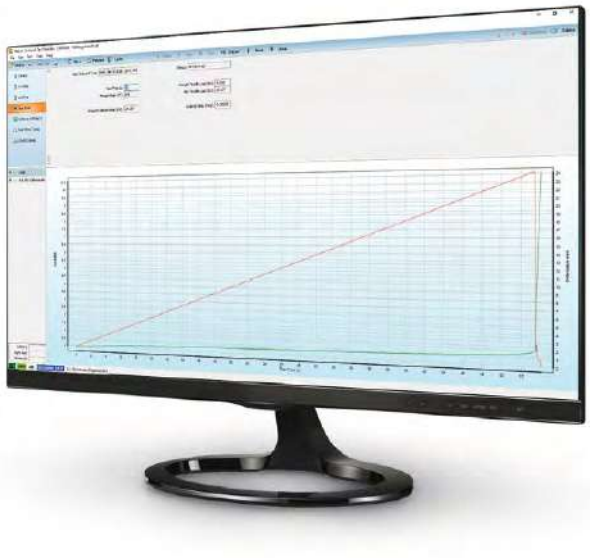
Manual DTS-16 I Motorized DTS-16 (B221)
DTS-30 I DTS-130 (B231 or B232)

ACCESSORY

B260-05 Upper loading platen in accordance with method A2 EN 12697-25
B260-06 56.4 mm top loading platen for TP Asphalt-STB Part 25A1
B260-07 80 mm top loading platen for TP Asphalt-STB Part 25A2

B260-10
PULL OFF TENSION JIG

STANDARD: TP Asphalt-StB – Part 81, Adhesive pull strength of thin asphalt layers



B260-10 Pull off tension jig

TEST FRAMES

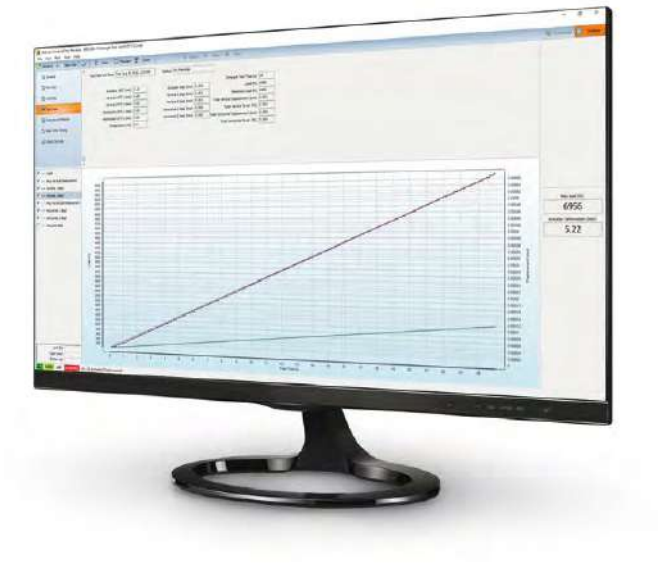
DTS-30 (B231 or B232)

ACCESSORY

B261-01 DTS-30 Tension base (needed)

B253 KIT
INDIRECT TENSILE MODULUS, CREEP COMPLIANCE AND STRENGTH USING ON-SPECIMEN TRANSDUCERS - IDTOS

STANDARDS: ASTM D7369 Resilient Modulus of Bituminous Mixtures by Indirect Tension Test
AASHTO T322 Creep Compliance and Strength of Hot-Mix Asphalt (HMA) Using the Indirect Tensile Test Device



B253 KIT Indirect Tensile modulus, creep compliance and strength using on-specimen transducers

Comprises:

B250-01 Basic IDT Jig
B253-01 AASHTO T322 LVDT mounting Jig
B290-04 Miniature LVDT (1 mm) (4 pieces)
B253-02 AASHTO T322 gauge point template (100 mm specimen)
B253-03 AASHTO T322 gauge point template (150 mm specimen)

TEST FRAMES

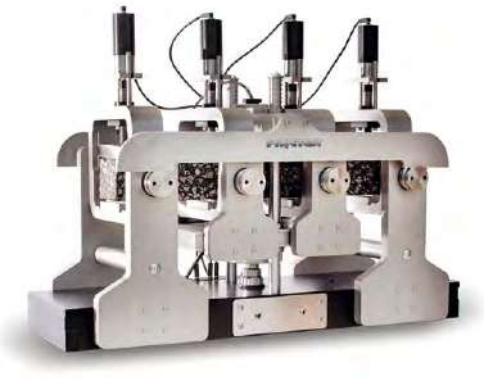
Manual DTS-16 I Motorized DTS-16 (B221)
DTS-30 I DTS-130 (B231 or B232)

ACCESSORIES

B253-53 Gauge point (24 **needed** pieces)
B201-52 5 Minute, two part epoxy 24 ml

B212
FOUR POINT BENDING FOR USE WITH PAVETEST B230 - 4PB

STANDARDS: AASHTO T 321 Fatigue Life of Compacted Hot-Mix Asphalt (HMA) Subjected to Repeated Flexural Bending
ASTM D7460 Fatigue Failure of Compacted Asphalt Concrete Subjected to Repeated Flexural Bending
AG:PT/T233 & ASTM 03 Fatigue life of compacted bituminous mixes subject to repeated flexural bending
EN 12697-24 Annex D - Four point bending test on prismatic shaped specimens
EN 12697-26 Annex B - Four point bending test on prismatic specimens (4PB-PR)



TEST FRAMES

DTS-30 (B231 or B232)

ACCESSORIES

B210-02 4PB PVC Beam
B210-03 4PB Reference beam

B280 KIT
TWO POINT BENDING (2PB) TO SUIT B230 - 2PB

STANDARDS: EN 12697-24 Annex A - Two-point bending test on trapezoidal shaped specimens (2PB-TR)
EN 12697-26 Annex A - Two point bending test on trapezoidal specimens (2PB-TR)

B280 KIT Two Point Bending (2PB) to suit B230.
Comprises:

B280-01 2PB Jig
B280-51 2PB Mounting plate (25 mm apex)
B280-52 2PB Mounting plate (50 mm apex)
B280-53 2PB Mounting plate (base)

TEST FRAMES

DTS-30 (B231 or B232)

ACCESSORIES

B290-05 LVDT (2 mm) (**needed** accessory)
B280-02 Two point Bending (2PB) gluing jig (**needed** accessory)
B201-52 5 Minute, two part epoxy 24 ml

B261 KIT
PERMANENT DEFORMATION - PD

STANDARD: AS/NZS 2891.12.1 Determination of the permanent compressive strain characteristics of asphalt - Dynamic creep test
TP Asphalt-StB – Part 25B Uniaxial pressure-fatique testing. Determination of deformation behavior of roller asphalt during heat

B261 KIT

B262 KIT

B261 KIT Permanent deformation
Comprises:

B260-01 Base assembly
B260-03 100 mm top platen
B290-02 LVDT (10 mm) (2 pieces)

TEST FRAMES

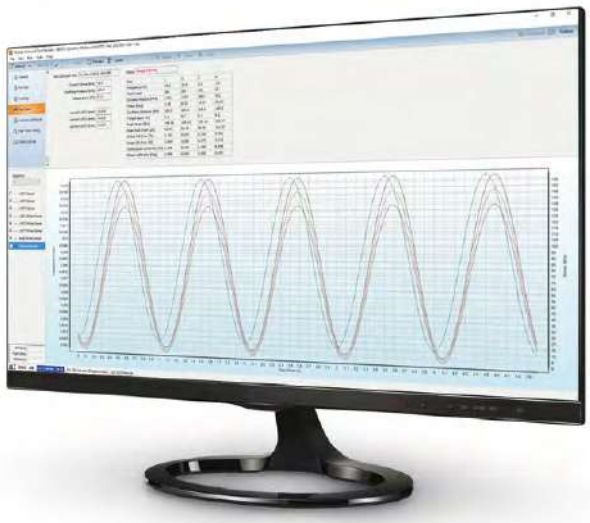
Manual DTS-16 I Motorized DTS-16 (B221)
DTS-30 I DTS-130 (B231 or B232)

ACCESSORY

B260-04 150 mm top platen

B255 KIT
DYNAMIC MODULUS - E*

STANDARD: AASHTO T342 Determining Dynamic Modulus of Hot Mix Asphalt (HMA)



B255 KIT Dynamic modulus
Comprises:

B200-02 105 mm bottom loading platen
B200-03 105 mm top loading platen
B253-04 AASHTO T342 LVDT mounting jig (3 pieces)
B290-06 LVDT (1 mm) (3 pieces)
B253-05 Screwdriver hex bit with spherical head size 2 mm

TEST FRAMES

DTS-30 | DTS-130 (B231 or B232)

ACCESSORIES

B202 Gauge Point Fixing Jig
B203 Dynamic Verification Device
B253-53 Gauge point (24 **needed** pieces)
B201-52 5 Minute, two part epoxy 24 ml

DYNAMIC MODULUS ON SMALL SPECIMENS | DTS-30/130

To test 38 mm (diameter) x 110 mm (h) specimens with DTS-30/130, the following items are required

B200-05 Bottom loading platen for 38 x 110 mm (Ø x h) specimen
B200-06 Top loading platen for 38 x 110 mm (Ø x h) specimen
B253-04 AASHTO T342 LVDT mounting jig (3 pieces)
B290-06 LVDT (1 mm) (3 pieces)
B253-53 Gauge point (24 needed pieces)
B253-05 Screwdriver hex bit with spherical head size 2 mm
B202 Gauge Point Fixing Jig
B202-02 Spacer for 110 mm specimen height to be used with gauge point fixing jig B202
B202-03 38 mm and 50 mm diameter specimen - extension for gauge point fixing jig plungers B202

B203 Dynamic Verification Device (optional)
B201-52 5 Minute, two part epoxy 24 ml (optional)

To test 50 mm (diameter) x 135 mm (h) specimens with DTS-30/130, the following items are required:

B200-07 Bottom loading platen for 50 x 135 mm (Ø x h) specimen
B200-08 Top loading platen for 50 x 135 mm (Ø x h) specimen
B253-04 AASHTO T342 LVDT mounting jig (3 pieces)
B290-06 LVDT (1 mm) (3 pieces)
B253-53 Gauge point (24 needed pieces)
B253-05 Screwdriver hex bit with spherical head size 2 mm
B202 Gauge Point Fixing Jig
B202-01 Spacer for 135 mm specimen height to be used with gauge point fixing jig B202
B202-03 38 mm and 50 mm diameter specimen - extension for gauge point fixing jig plungers B202

B203 Dynamic Verification Device (optional)
B201-52 5 Minute, two part epoxy 24 ml (optional)

B271 KIT
CYCLIC TRIAXIAL COMPRESSION - CCT

STANDARD: EN 12697-25 Cyclic compression. Test Method B - Triaxial cyclic ompression test

B271 KIT Cyclic triaxial compression
Comprises:

B270-01 Triaxial cell, suitable for Ø 100 mm, up to 200 mm height specimens
B270-02 Triaxial cell external LVDT mounting jig
B293-01 Pressure transducer (± 300 kPa)
B270-06 110 mm diameter top loading platen for EN 12697-25B
B270-15 110 mm diameter base pedestal for 100 mm height specimen

TEST FRAMES

Manual DTS-16 I Motorized DTS-16 (B221)
DTS-30 I DTS-130 (B231 or B232)

ACCESSORIES

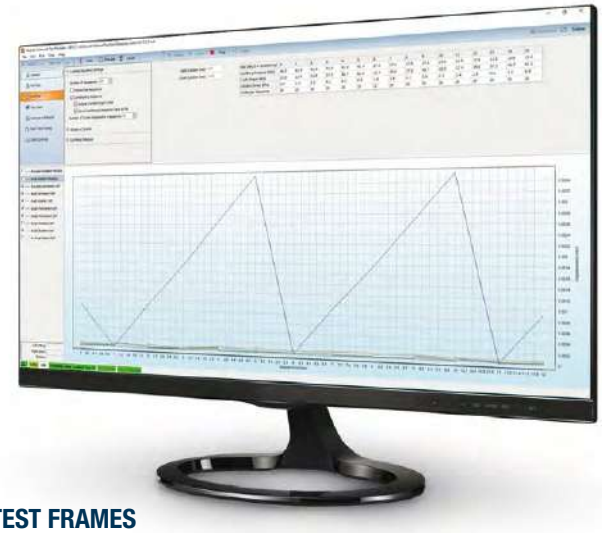
B290-02 Displacement transducer (10 mm) (2 pieces **needed**)
B270-04 Air reservoir assembly confining pressure upgrade kit (**needed** accessory for DTS-16)

or

B270-03 Air reservoir assembly with confining pressure control (**needed** accessory for DTS-30/130)
B270-17 Ø 200 mm base plate (**needed** accessory for DTS-30)
B270-18 Membrane stretcher for asphalt specimen Ø 100 mm
B201-53 Ø 100 mm rubber membrane 0.3 mm thickness (pack of 10)
S311-03 Ø 100 mm sealing ring (10 pieces)
S316-03 Ø 100 mm porous disc (2 pieces) needed for AASHTO T307
Requires pressurized air, minimum 7 bar (not included)

B272 KIT
TRIAXIAL RESILIENT MODULUS - TRM

STANDARD: AASHTO T307 Determining the resilient modulus of soils and aggregate materials



B272 KIT Triaxial resilient modulus
Comprises:

B270-01 Triaxial cell, suit able for Ø 100 mm, up to 200 mm height specimens
B270-02 Triaxial cell external LVDT mounting jig
B293-02 Pressure transducer (± 600 kPa)
S315-07 100 mm diameter bottom platen
S314-03 100 mm diameter top platen

TEST FRAMES

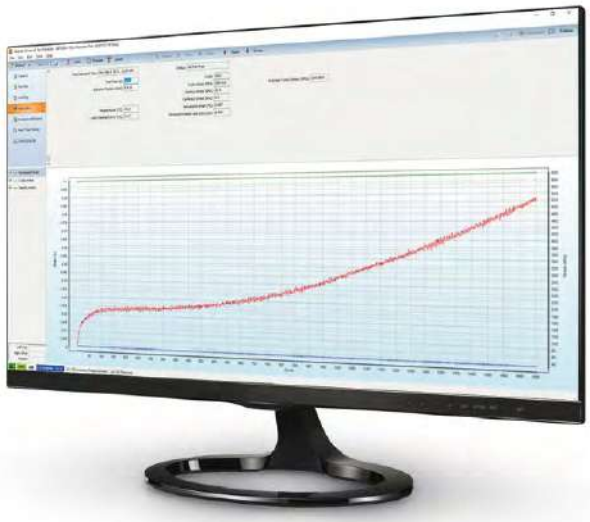
Manual DTS-16 I Motorized DTS-16 (B221)
DTS-30 I DTS-130 (B231 or B232)

ACCESSORIES

Same accessories of B271 KIT

B274-KIT
TRIAXIAL TESTING KIT

STANDARDS: AASHTO T378-17 Standard Method Test for Determining the Dynamic Modulus and Flow Number for Hot Mix Asphalt (HMA)
AASHTO T378 Standard Method of Test for Determining the Dynamic Modulus and Flow Number for Asphalt Mixtures



B274 KIT Triaxial testing Kit
Comprises:

B270-01 Triaxial cell, suitable for Ø 100 mm x up to 200 mm tall
B293-01 Pressure transducer (± 300kpa)
B200-03 105 mm top loading platen
B270-16 Ø 105 mm base pedestal for 150 mm height specimen

ACCESSORIES

B200-01 AMPT LVDT 2.00 mm (3 needed)
B270-04 Air reservoir assembly confining pressure upgrade jig (needed for DTS-16)
or
B270-03 Air reservoir assembly with confining pressure control (needed for DTS-30/130)
B253-53 Gauge point (24 pieces needed)
B201-52 5 minute, two part epoxy 24 ml
S311-03 Sealing ring Ø 100 mm
B201-53 100 mm rubber membrane 0.3 mm thickness (pack of 10)
B202 Gauge point fixing jig
B203 AMPT dynamic verification device
B200-10 Latex membrane material cut in Ø 100 mm discs (needed for AASHTO T378)

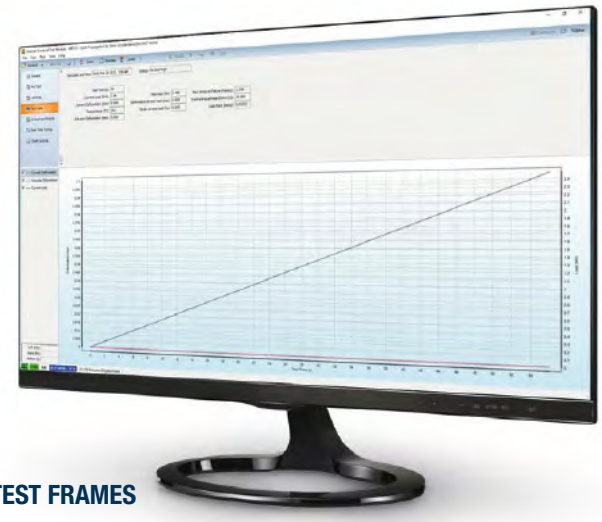
Requires pressurized air, minimum 7 bar (not included)

TEST FRAMES

Manual DTS-16 | Motorized DTS-16 (B221)
DTS-30 | DTS-130 (B231 or B232)

B254 KIT
SEMI-CIRCULAR BENDING - SCB

STANDARD: EN 12697-44 Tensile Strength and Fracture Toughness-Crack Propagation



B254 KIT EN SCB testing kit
Comprises:

B254-01 SCB jig
B254-51 Pair of SCB wear plates

ACCESSORIES

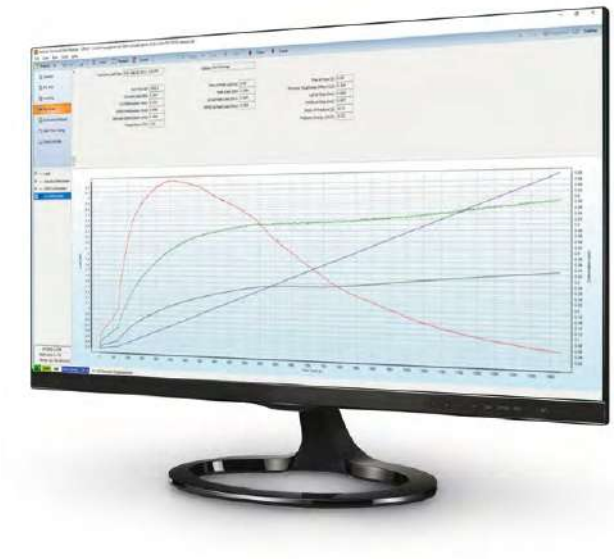
B250-01 Basic Indirect Tensile Jig (**needed** accessory)
B290-07 Deformation gauge
B290-02 Displacement transducer (10 mm) (2 optional pieces)

TEST FRAMES

Manual DTS-16 | Motorized DTS-16 (B221)
DTS-30 | DTS-130 (B231 or B232)

B254-02 KIT
AASHTO | ASTM SCB TESTING KIT

STANDARDS: AASHTO TP 124 Determining the fracture potential of asphalt mixtures using semicircular bend geometry (SCB) at intermediate temperature
ASTM D8044 Evaluation of asphalt mixture cracking resistance using the semi-circular bend test (SCB) at intermediate temperature
AASHTO TP105 Determining the fracture energy of asphalt mixtures using the semicircular bend geometry (SCB)



TEST FRAMES
DTS-30 | DTS-130

B254-02 KIT AASHTO | ASTM SCB testing kit
Comprises:

B208 SCB frame
B254-10 Roller support
B254-02 Springs and roller

OPTIONAL ACCESSORIES for AASHTO TP 124, ASTM D8044

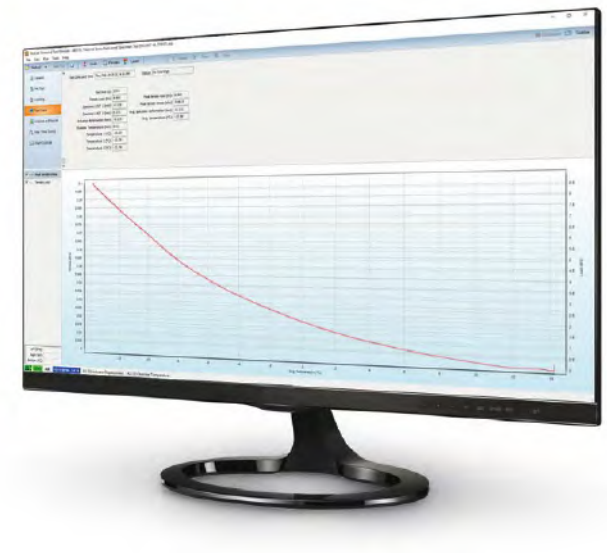
B290-02 LVDT (10mm) (1 or 2)
B254-11 LVDT mounting assembly (q,ty according to B290-02)
B254-12 Positioning device

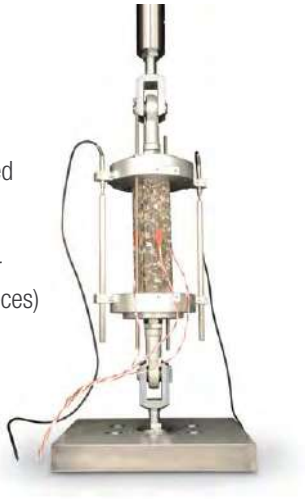
NEEDED ACCESSORIES for AASHTO TP105

B254-13 Gauge point template
B254-14 LVDT mounting hardware (2 **needed**)
B254-15 LVDT mounting frame (2 **needed**)
B253-53 Gauge point (2 **needed**)
B290-05 LVDT 2.00 mm (2 needed) or
B290-06 LVDT 1.00 mm (2 needed)
B290-07 SCB deformation gauge or
B290-16 Epsilon (model 3541) clip-on gauge CMOD transducer -1/+2.5 mm + **C090-18** Knife edge (pack of 24 only for B290-16)

B282 KIT
THERMAL STRESS RESTRAINED SPECIMEN TEST - TSRST

STANDARDS: AASHTO TP10 Thermal Stress Restrained Specimen Tensile Strength
EN 12697-46 Low Temperature Cracking and Properties by Uniaxial Tension
TP Asphalt-StB 46A Cold properties: uniaxial tensile stress test and thermal stress restrained specimen test





B282 KIT Thermal Stress Restrained Specimen Test

Comprises:

- **B282-01** TSRST Temp Transducer (-80°C to +80°C) (3 pieces)
- **B282-02** Rod End (2 pieces)
- **B282-03** Clevis Yoke and Pin (2 pieces)
- **B282-04** Platen (2 pieces)
- **B282-05** LVDT Holder (2 pieces)
- **B282-06** Invar Rod (250 mm long) (2 pieces)
- **B282-07** Multi tack adhesive squares

TEST FRAMES

DTS-30 I DTS-130 (B232)

ACCESSORIES

- **B290-09** Displacement transducer (5 mm) (2 pieces **needed**)
- **B261-01** B230 tension base (**needed** accessory for DTS-30)
- **B282-08** TSRST specimen gluing jig (1 piece **needed**)
- **B201-52** 5 minute, two part epoxy 24 ml

B284-01
DISK SHAPED COMPACT TENSION TEST KIT - DC(T)

STANDARD: ASTM D7313-07a Determining fracture energy of asphalt aggregate mixtures using the disk-shaped compact tension geometry

B284-01 Disk Shaped Compact Tension Test Kit

TEST FRAMES

DTS-30 I DTS-130 (B231 or B232)

ACCESSORIES

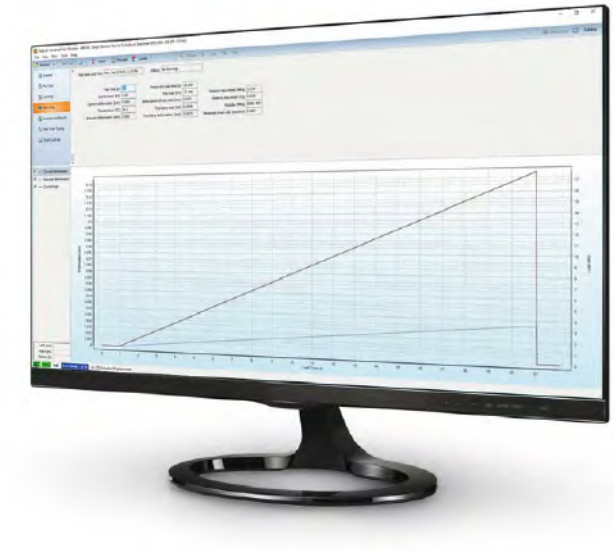
- **B261-01** B230 tension base (**needed** accessory for DTS-30)
- **B290-07** Deformation gauge (**needed** accesory)

or

- **B290-12** Epsilon Clip-On gauge 12.5 mm +1/-7 mm (**needed** accesory)
- **C090-18** Knife edge (Pack of 24) only for B290-12

B264 KIT
DIRECT TENSION TESTING KIT - DTT

STANDARDS: EN 12697-26 Annex E - Test applying direct tension to cylindrical specimens (DT-CY) or to prismatic specimens (DT-PR)
EN 12697-26 Annex D - Direct tension-compression test on cylindrical specimens (DTC-CY)
AASHTO TP 107-14 Standard Method of Test for Determining the Damage Characteristic Curve of Asphalt Mixtures from Direct Tension Cyclic Fatigue Tests



B264 KIT Direct tension testing kit
Comprises:
B261-02 Spherical seat coupling (2 pieces)
B261-03 100 mm tension platen (2 pieces)

TEST FRAMES
DTS-30 | DTS-130 (B232)

ACCESSORIES

B253-04 LVDT mounting (3 pieces **needed**) jig
B290-06 LVDT (1 mm) (3 pieces **needed**)
B253-05 Screwdriver hex bit with spherical head size 2 mm
B201-52 5 Minute, two part epoxy 24 ml
B202 Gauge point fixing jig
B202-04 Spacer for 130 mm specimen height to be used with B202 (optional)
B253-53 Gauge Point (24 pieces)
B261-01 B230 tension base (**needed** accessory for DTS-30)

AASHTO TP 107-14 ON SMALL SPECIMENS | DTS-30/130

To test 38 mm (diameter) x 110 mm (h) specimens with DTS-30/130 unit, the following items are required:

B200-11 38MM AMPT tension platen (2 pieces needed)
B261-02 Spherical seat coupling
B202 Gauge Point Fixing Jig
B202-02 Spacer for 110 mm specimen height to be used with gauge point fixing jig B202
B202-03 38 mm and 50 mm diameter specimen - extension for gauge point fixing jig plungers B202
B253-04 LVDT mounting (3 pieces needed) jig
B290-06 LVDT (1 mm) (3 pieces needed)
B253-05 Screwdriver hex bit with spherical head size 2 mm
B201-52 5 Minute, two part epoxy 24 ml
B253-53 Gauge Point (24 pieces)

To test 50 mm (diameter) x 135 mm (h) specimens with DTS-30/130 unit, the following items are required:

B200-12 50MM AMPT tension platen (2 pieces needed)
B261-02 Spherical seat coupling
B202 Gauge Point Fixing Jig
B202-01 Spacer for 135 mm specimen height to be used with gauge point fixing jig B202
B202-03 38 mm and 50 mm diameter specimen - extension for gauge point fixing jig plungers B202
B253-04 LVDT mounting jig (3 pieces needed)
B290-06 LVDT (1 mm) (3 pieces needed)
B253-05 Screwdriver hex bit with spherical head size 2 mm
B201-52 5 Minute, two part epoxy 24 ml
B253-53 Gauge Point (24 pieces)

B204 KIT
OVERLAY KIT ACCORDING TO ASTM WK26816

STANDARD: ASTM WK26816 New Test Method for Determining the Susceptibility of Asphalt Mixtures to Cracking

B204 KIT Overlay kit according to ASTM WK26816
Comprises:
B204-01 Overlay jig
B204-02 Pair of overlay tester (OT) specimen plates
B204-03 OT specimen preparation jig according to ASTM WK26816

TEST FRAMES

Manual DTS-16 I Motorized DTS-16 (B221)
DTS-30 I DTS-130 (B231 or B232)

NEEDED ACCESSORIES

B261-01 DTS-30 tension base
B261-02 Spherical seat coupling
B290-05 LVDT 2.00 mm or **B290-06** LVDT 1.00 mm

B204-01 KIT
OVERLAY KIT ACCORDING TO TEX-248-F

STANDARD: TxDOT Designation. TEX-248-F Test Procedure for Overlay Test

B204-01 KIT Overlay kit according to TEX-248-F
Comprises:
B204-01 Overlay jig
B204-02 Pair of overlay tester (OT) specimen plates
B204-13 OT specimen preparation jig according to TEX-248-F

TEST FRAMES

Manual DTS-16 I Motorized DTS-16 (B221)
DTS-30 I DTS-130 (B231 or B232)

NEEDED ACCESSORIES

B261-01 DTS-30 tension base
B261-02 Spherical seat coupling
B290-05 LVDT 2.00 mm or **B290-06** LVDT 1.00 mm

B210 KIT
STAND-ALONE SERVO-PNEUMATIC FOUR POINT BENDING (4PB) SYSTEM

STANDARDS: EN 12697-24 Annex D I EN 12697-26 Annex B I AASHTO T321 I ASTM 03 I ASTM-D7460

The Pavetest Servo-pneumatic Four Point Bending (4PB) System is a servo-pneumatic testing machine utilizing digital control of a high performance servo valve to provide accurate loading wave shapes up to 60Hz. The 4PB system can be operated in haversine or sinusoidal, controlled stain or sinusoidal controlled stress mode to determine the flexural stiffness/modulus and resistance to fatigue of asphalt beams of various sizes.

MAIN FEATURES

- Robust four point loading frame.
- Backlash free rotation and translation on all load and reaction points.
- Fully configurable to suit a large range of testing applications.
- High performance servo-valve.
- Long life pneumatic actuator.
- Digital Servo-pneumatic control.
- 2 axis control and 8 channel data acquisition.

B210-01
Servo-pneumatic four point apparatus

B210 KIT comprises:

- **B210-01** Servo-pneumatic Four Point Bending (4PB) Device with 10 mm actuator LVDT, ± 5 kN load cell. and 2 mm On-specimen LVDT
- **B205** 8 Channel Control and Data Acquisition System (CDAS) & TestLab software
- **B270-12** Air reservoir assembly with membrane dryer

It requires pressurized air, minimum 7 bar (not included)

The 4PB System is underpinned by Pavetest's **leading edge CDAS digital controller**, TestLab software and a full complement of accessories, hardware and software in perfect unison.

TECHNICAL SPECIFICATIONS

Load frame

- Outer clamp span 355.5 mm (14") and 420 mm
- Nominal beam size(s): 50 mm (h) x 50 mm (w)
  50 mm (h) x 63.5 mm (w)
  70 mm (h) x 70 mm (w)
  70 mm (h) x up to 85 mm (w)

Servo actuator

- Capacity ± 5 kN
- Frequency Up to 60Hz;
- Stroke 10 mm
- Air supply clean dry air
- Pressure 800-900 kPa
- Minimum rate up to 5 litres/sec

On-specimen transducer

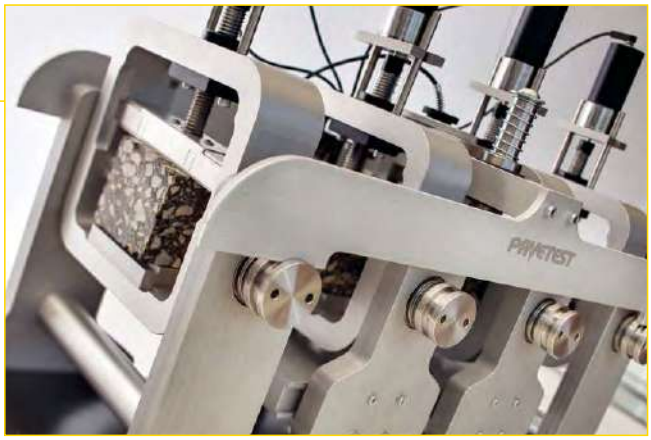
- Range ± 1 mm
- Resolution 0.0002 µm
- Accuracy Better than 5 µm

Power Supply: 90-264V 50/60Hz 1ph 240W (B210 KIT)
Dimensions: 590(h) x 250(d) x 570(w) mm (B210-01)
410(h) x 250(d) x 570(w) mm (B212)
Weight: 45 kg approx. (B210-01)
35 kg approx. (B212)

NEEDED ACCESSORIES

B210-02 4PB PVC Beam
B210-03 4PB Reference beam
B250-07 KIT Temperature measuring kit comprising:
- **B292-01** Temperature transducer (-80 °C to +80 °C) (2 pieces)
- **B250-10** Dummy asphalt specimen
- **B250-11** 100 mm O ring (3 pieces)
- **B250-12** Thermal conducting grease (about 56 g)

B210-02 PVC Beam



B210-01 Servo-pneumatic four point apparatus, detail

RECOMMENDED ACCESSORIES

B221 Temperature controlled cabinet: -20 °C to +70 °C to suit DTS-16 or 4PBA

H009-01EN PC complete with LCD monitor 22", keyboard, mouse, cables and installation of Testlab software

4PBA on DTS16:
B210-01 Servo-pneumatic Four Point Bending (4PB) device with 10 mm actuator LVDT, ± 5 kN load cell and 2 mm Onspecimen LVDT (sharing CDAS with DTS 16)

It requires pressurized air (not included).

4PBA on DTS30:
B212 4PB JIG (sharing CDAS with DTS 30)

4PBA on DTS130:
B210-01 Servo-pneumatic Four Point Bending (4PB) device with 10 mm actuator LVDT, ± 5 kN load cell and 2 mm Onspecimen LVDT (sharing CDAS with DTS 130)
B270-12 Air reservoir assembly with membrane dryer

It requires pressurized air (not included).

B270-12
Air reservoir assembly with membrane dryer

The specimen is securely clamped using servo-motor driven ball screws **to maintain the prescribed clamping force** and accommodate any compliance of the specimen between the clamping surfaces, during the test. The clamping force is controlled by regulating the motor current.

An **on-specimen** (LVDT) **displacement transducer** is used **to measure and control the deflection** at the centre of the beam with respect to the outer load/reaction points, as prescribed in the relevant standards.

Specimen alignment guide

Specimen height spacer to adjust the height of the specimen

A low profile, high performance stainless **steel ring torsion load cell** is used **to measure and control the load.**

The servo-pneumatic system uses **a bottom loading pneumatic actuator coupled to a high performance servo valve**, with PID closed-loop control and run time adaptive control to achieve/maintain the requested strain/stress for the duration of the test.

Inner and outer clamp control switches, located on the front of the device, are used to activate and release the inner and outer specimen clamps. The four specimen yokes provide **backlash free rotation and translation** at all load and reaction points.

B200
AMPT | SPT
ASPHALT MIXTURE PERFORMANCE TESTER
COMPACT, FULLY SELF CONTAINED, PRECISION ENGINEERED UNIT

The Pavetest AMPT is a servo-hydraulically controlled testing machine specifically designed to perform the three asphalt tests developed under NCHRP Projects 9-19 and 9-29; Dynamic Modulus, Flow Number and Flow Time. It is also the prescribed equipment in AASHTO T378-17 Standard Method Test for Determining the Dynamic Modulus and Flow Number for Hot Mix Asphalt (HMA) using the Asphalt Mixture Performance Tester (AMPT). In addition, the Pavetest AMPT can also perform Direct Tension Cyclic Fatigue, Indirect Tensile Dynamic Modulus, Incremental Repeated Load Permanent Deformation, Semi-circular bend, and Overlay Testing of Asphalt Mixtures.
The Pavetest AMPT is underpinned by Pavetest's leading edge CDAS digital controller, TestLab software and a full complement of accessories, hardware and software in perfect unison.

MAIN FEATURES

- Thermoelectric (TE) Heating/Cooling
  More reliable and environmentally friendly than mechanical refrigeration & heating elements.
- The unit can be equipped with water cooled TE heating/cooling technology (optional).
- Magnetically mounted on-specimen transducer system, based on loose core LVDTs or optional epsilon extensometers.
- Gauge point fixing jig facilitates gluing gauge points and the (top and bottom) platens for proposed AMPT Direct Tension Cyclic Fatigue (S-VECD) Test.
- Dynamic Verification Device.
- Dynaflo™ HPS provides dynamic speed control of the pump motor ensuring quiet operation.
- Optional built-in, silent, air compressor with associated air preparation equipment.

The machine includes:

- 8 Channel Control and Data Acquisition System (CDAS) & TestLab software
- 30 mm Actuator LVDT
- Load cell (± 20 kN)
- Pressure transducer (± 300 kPa)
- Temperature transducer (-80 °C to + 80 °C)
- Magnetically mounted on-specimen LVDT (2 mm) (3 pieces)
- 105 mm bottom loading platen
- 105 mm top loading platen

It requires pressurized air, minimum 7 bar (not included).

B200 AMPT/SPT Asphalt Mixture Performance Tester

TECHNICAL SPECIFICATIONS

Load capacity:	19kN (Static) - 17kN (Dynamic)
Actuator stroke:	30 mm
Specimen size:	100 mm (diameter) x 150 mm (h)
Temperature range:	0 °C to 70 °C (B200) -10 °C to 70 °C *(B200L)
Confining pressure:	0 to 225 kPa
Noise level:	Less than 70 db at 2 m
Power Supply:	230V 50-60Hz 1ph 3.5kW (B200 I B200L)
Dimensions:	1510(h) x 680(d) x 1200(w) mm 1870(h) x 680(d) x 1200(w) mm with raised cell
Weight:	330 kg approx. (including oil)

* At an ambient temperature of +23 °C

Asphalt specimen
with on-specimen LVDTs and load cell

NEEDED ACCESSORIES

B201 KIT AMPT Consumables kit. Comprises:

- **B253-53** Gauge point (24 pieces)
- **B201-52** 5 Minute, two part epoxy 24 ml
- **S311-03** 100 mm Sealing Rings (Pack of 10)
- **B201-53** 100 mm Rubber membrane 0.3 mm thickness (Pack of 10)
- **B200-10** Latex membrane material cut in 100mm diameter discs (needed for AASHTO T378)
- **B200-04** 100 mm AMPT tension platens (2 **needed** pieces) for S-VECD test

B200-04 100 mm AMPT tension platens

OPTIONAL ACCESSORIES

B270-18 Membrane stretcher for asphalt specimen Ø 100 mm (optional)

B200-09 Spacer to enable 130mm tall specimens to be tested in tension/compression (S-VECD test on small specimens)

B200-13 AMPT silent air compressor

B200-13X AMPT silent air compressor 230V 60Hz

RECOMMENDED ACCESSORIES

B202 Gauge Point Fixing Jig

B202-04 Spacer for 130 mm specimen height to be used with gauge point fixing jig B202

B203 AMPT Dynamic Verification Device

H009-01EN PC complete with LCD monitor 22", keyboard, mouse, cables and installation of Testlab software

B202 Gauge point fixing jig

B203 AMPT Dynamic Verification Device

TESTING KITS

B204 KIT Overlay kit according to ASTM WK26816. Comprises:

- **B204-01** Overlay jig
- **B204-02** Pair of Overlay Tester (OT) specimen plates
- **B204-03** OT specimen preparation jig according to ASTM WK26816

B204-01 KIT Overlay kit according to TEX-248-F. Comprises:

- **B204-01** Overlay jig
- **B204-02** Pair of overlay tester (OT) specimen plates
- **B204-13** OT specimen preparation jig according to TEX-248-F

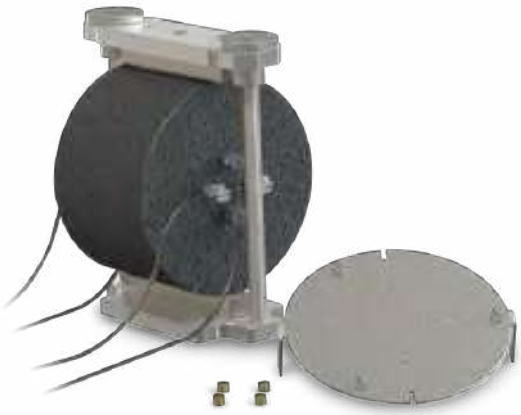
B207-01 KIT AMPT Indirect Tensile (IDT) kit. Comprises:

- **B207-01** AMPT IDT Jig
- **B253-01** LVDT mounting Jig
- **B253-03** Gauge point template (150 mm specimen)
- **B290-04** AMPT Miniature LVDT (1 mm) (4 pieces)
- **B253-53** Gauge point (32 pieces)
- **B207-02** Cable gland (4 pieces)

B254-02 KIT AASHTO TP124 I ASTM D8044 SCB testing kit. Comprises:

- **B208** SCB frame
- **B254-10** Roller support
- **B254-02** Springs and roller

B254-02 KIT AASHTO TP124 I ASTM D8044 SCB testing kit



B207-01 KIT AMPT indirect tensile kit

B204 KIT Overlay kit according to ASTM WK26816

CDAS - Control and Data Acquisition System

Pavetest's compact Control and Data Acquisition System (CDAS) delivers unparalleled performance, real time control and ultimate versatility in acquisition.
The AMPT has a stand-alone CDAS, which is common to all Pavetest systems.

B205 CDAS 8 channels

SMALL SPECIMENS ACCESSORIES | AMPT

For dynamic modulus on 38 mm (diameter) x 110 mm (h) specimen:

B200-05 Bottom loading platen for 38 x 110 mm (Ø x h) specimen

B200-06 Top loading platen for 38 x 110 mm (Ø x h) specimen

B202 Gauge Point Fixing Jig

B202-02 Spacer for 110 mm specimen height to be used with gauge point fixing jig B202

B202-03 38 mm and 50 mm diameter specimen - extension for gauge point fixing jig plungers B202

B253-53 Gauge point (32 pieces)

B201-52 5 Minute, two part epoxy 24 ml

S311 Sealing ring Ø 38 mm (10 pcs)

S310 Rubber membrane Ø 38 mm (10 pcs)

B270-20 Membrane stretcher for asphalt specimen Ø 38 mm

For S-VECD test on 38 mm (diameter) x 110 mm (h) specimen:

B200-11 38MM AMPT tension platen (2 pieces needed)

B202 Gauge Point Fixing Jig

B202-02 Spacer for 110 mm specimen height to be used with gauge point fixing jig B202

B202-03 38 mm and 50 mm diameter specimen - extension for gauge point fixing jig plungers B202

For dynamic modulus on 50 mm (diameter) x 135 mm (h) specimen:

B200-07 Bottom loading platen for 50 x 135 mm (Ø x h) specimen

B200-08 Top loading platen for 50 x 135 mm (Ø x h) specimen

B202 Gauge Point Fixing Jig

B202-01 Spacer for 135 mm specimen height to be used with gauge point fixing jig B202

B202-03 38 mm and 50 mm diameter specimen - extension for gauge point fixing jig plungers B202

B253-53 Gauge point (32 pieces)

B201-52 5 Minute, two part epoxy 24 ml

S311-01 Sealing ring Ø 50 mm (10 pcs)

S310-01 Rubber membrane Ø 50 mm (10 pcs)

B270-21 Membrane stretcher for asphalt specimen Ø 50 mm

For S-VECD test on 50 mm (diameter) x 135 mm (h) specimen:

B200-12 50MM AMPT tension platen (2 pieces needed)

B202 Gauge Point Fixing Jig

B202-01 Spacer for 135 mm specimen height to be used with gauge point fixing jig B202

B202-03 38 mm and 50 mm diameter specimen - extension for gauge point fixing jig plungers B202

B202 Gauge Point Fixing Jig + accessories for small specimens preparation

B215
OVERLAY TESTER

The Pavetest Overlay Tester is a servo-pneumatic controlled testing machine utilizing digital control of a high performance servo valve to provide accurate loading wave shapes up to 60Hz, specifically designed to determine the susceptibility of asphalt mixtures to cracking according to Texas DOT test procedure Tex-248-F and proposed ASTM Standard WK 26816.

The machine applies cyclic loading to a specimen that is cut from a 150 mm diameter sample into the shape of a rounded end beam. The system comprises a load frame, with one fixed and one moving plate, temperature control system, Control and Data Acquisition System (CDAS) and optional silent air compressor. The specimen is glued to two plates and this assembly is placed in the machine for testing. This is intended to simulate the action of movement under an asphalt overlay to assess how failure might occur in the field due to factors such as thermal expansion / contraction and reflective cracking.

The Pavetest Overlay Tester is underpinned by Pavetest's leading edge CDAS digital controller, TestLab software and all the necessary accessories, hardware and software in perfect unison.

MAIN FEATURES

- Compact, fully self contained, precision engineered unit.
- Thermoelectric (TE) Heating/Cooling - More reliable and envronmentally friendly than mechanical refrigeration & heating elements.
- Optional silent, air compressor including membrane dryer.
- Built in verification (Dial gauge).
- Integral stand with wheels.

The machine includes:

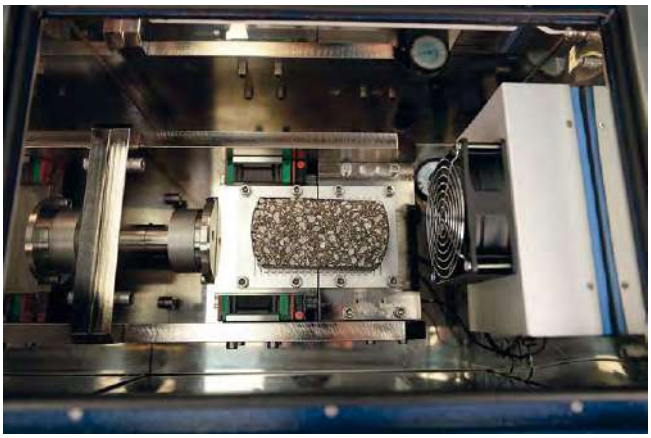
- Load frame with one fixed and one moving plate
- 15 kN Servo-pneumatic actuator (10 mm stroke)
- 8 Channel Control and Data Acquisition System (CDAS) & TestLab software
- Load cell (± 15kN)
- 10 mm displacement transducer
- Thermoelectric Heating/Cooling system
- Temperature transducer -80 °C to + 80 °C

It requires pressurized air, minimum 7 bar (not included)

B215 Overlay tester

TECHNICAL SPECIFICATIONS

Load Capacity:	Up to 16 kN (Static)
Actuator stroke:	10 mm
Temperature range:	10 to 60 °C
Noise Level:	Less than 70 db at 2 m
Power supply:	110/230V 50-60Hz 1ph 750W (B215)
Dimensions:	980 (h) x 475 (d) x 1085 (w) mm
Weight:	150 kg approx.



B215 Overlay tester: detail

TECHNICAL FEATURES

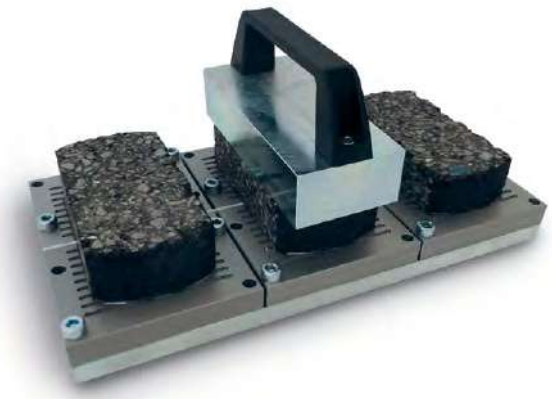
- **Temperature controller.** The overlay tester is fitted with a temperature controller, which controls the heating/cooling provided by the thermo-electric unit fitted to the machine.
- **The specimen preparation jig allows allows users to properly locate and glue the specimen on plates.** It can accomodate up to three sets of platens. It includes 2 mm teflon strip, which helps aligning the specimen plates and eliminate the need to saw the glue afterwards, and a dead weight.
- **The Overlay Tester main unit comes fully assembled.** It can be placed on the folding stand supplied, complete with wheels.

NEEDED ACCESSORIES

B204-02 Pair of specimen plates
B204-03 OT specimen preparation jig according to ASTM WK 26816
B204-13 OT specimen preparation jig according to Tex-248-F

Note: The quantity depends on the customer's need.

Detail of the wheels



B204-03 Specimen preparation jig

B204-02 Specimen plates

OPTIONAL ACCESSORIES

B204-11 Silent air compression 750W
B204-11X Silent air compression 750W 230V 60Hz

TSRST-MULTI

MULTI STATION THERMAL ASPHALT SYSTEM

STANDARDS:
AASHTO TP10-1993 Standard test method for Thermal Stress Restrained Specimen Tensile strength
EN 12697-46:2012 Test methods for hot mix asphalt Part 46: Low temperature cracking and properties by uniaxial tension tests

FIRST STAND ALONE SERVO-HYDRAULIC TSRST

MAIN FEATURES

- Up to three working stations (electromechanical and/or servo-hydraulic stations).
- Servo-hydraulic actuator: 30 kN static, 25 kN dynamic, double acting, fatigue rated and equal area type with long life Labyrinth bearings & seals.
- Dynaflo™ Hydraulic Power Supply: Variable Frequency Drive 2.2 kW pump motor; Silent operation.
- Ability to clone, modify and/or generate user's own method file(s) to suit their specific requirements.
- Programmable test **Wizard** to guide the operator step by step based on a recipe book approach.
- Temperature controller programmed via PC software.

TSRST-MULTI STATION

PAVETEST TSRST-MULTI:
THE NEXT GENERATION OF MULTI-STATION THERMAL ASPHALT SYSTEM

The **Thermal Stress Restrained Specimen Test** (TSRST) is used to determine the low temperature cracking susceptibility of asphalt concrete. In the early 1990s the TSRST was developed by Oregon State University (OSU) as part of the Strategic Highway Research Program. The test method became AASHTO TP10.

FIRST STAND-ALONE SERVO-HYDRAULIC TSRST ON THE MARKET

With up to three servo-hydraulic testing station in one unit, Pavetest TSRST-Multi is **the first stand-alone servo-hydraulic low temperature** cracking asphalt testing system **on the market** able to test up to three different specimens simultaneously, under the same temperature conditions.

FLEXIBLE

Designed with flexibility in mind, **Pavetest** TSRST-multi can use different combinations of servo-hydraulic and/or electro-mechanical testing stations with **no need for a compressed air supply**.

VERSATILE

Pavetest versatile TSRST-Multi can be used to evaluate:

- Uniaxial tension stress test (UTST)
- Thermal stress restrained specimen test (TSRST)
- Relaxation time, using the relaxation test (RT)
- Tensile creep tests (TCT)
- Unixial cyclic tension stress test (UCTST)
- Unixial thermal stress & strain test (UTSST) it requires additional hardware

POWERFUL

Equipped with Pavetest's leading edge Control and Data Acquisition System (CDAS) and TestLab software, the user can control up to 3 testing stations in one unit, with unparalleled performance and ultimate versatility.

EASY TO OPERATE

Pavetest TestLab software makes it easy to operate the system because it enables the operator to program the temperature controller with ease.

SAFE

Pavetest TSRST-Multi employs a reliable refrigeration system, capable of cooling at a rate of 10° per hour. **Mechanical refrigeration eliminates the need for liquid nitrogen**, offering a completely safe working environment for the operator.

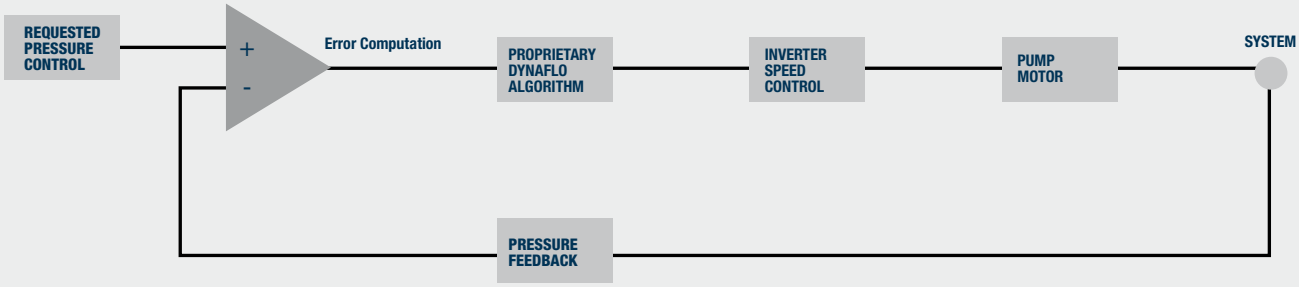
QUIET

The Electro-mechanical and/or dynamically controlled **hydraulic power supply are almost silent during testing**.

DYNAFLO™

The servo-hydraulic station(s) are powered by the Dynaflo Hydraulic Power Supply (HPS). The **Dynaflo HPS is an innovative concept based on "inverter" technology**: An inverter is used to control the speed of the pump motor to control hydraulic oil flow based on the requirements; **reducing noise** and **heat generation**, rendering the HPS silent in most applications. It also **improves** the **longevity of the pump** because it only works as hard as it needs making it quiet, cool and long lasting.

THE DYNAFLO™ CONCEPT



The **environmental chamber** is constructed from **top quality stainless steel**; stylish, durable and easy to clean.

Mechanical refrigeration capable of cooling at -10 °C per hour down to -40 °C; no need for liquid nitrogen.

The **modular concept** allows the system to be configured in any combination of, **up to three electro-mechanical and/or servo-hydraulic stations,** without the need for compressed air supply.

The **high performance digital temperature controller** can be programmed through the software; eliminating the arduous task of setting the controller using the tiny buttons on the controller.

Triple glazed, low-e glass door offers excellent insulation without compromising visibility.

Internal lighting ensures good visibility under all conditions.

Uniquely **low coefficient** of **thermal expansion invar rods** offer accurate measurement and control over the full temperature spectrum.

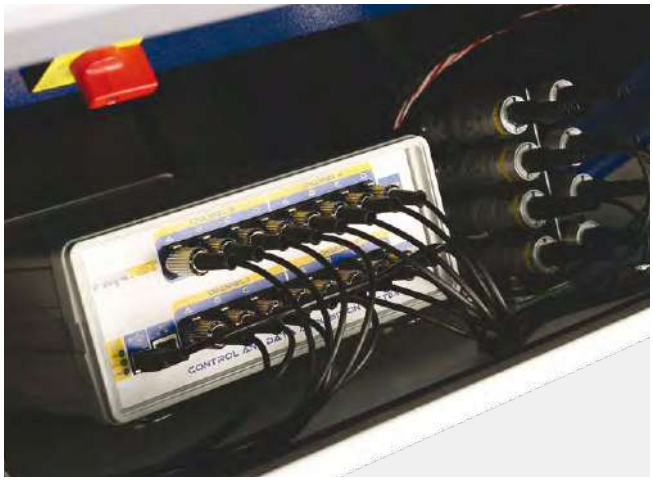
Small footprint makes best use of precious laboratory space.

Axial alignment is achieved using self-aligning couplings.

Only requires **electrical power** for easy installation.

Fully integrated digital **control and data acquisition system** (CDAS).

CONTROL AND DATA ACQUISITION SYSTEM (CDAS)



B206 16 CHANNEL CDAS

CONTROL:

- High speed, (18 bit) digital servo-control, 4/6 axis.
- Digital closed loop update sampling rate of 2.5 kHz.
- Computer programmable, Proportional, Integral and Derivative (PID) control algorithm.
- Adaptive Level Control (ALC) algorithm for best dynamic peak accuracy.
- 3 feedback control modes. E g. force, position and on-specimen strain.
- "Bumpless transfer" between control modes.

ACQUISITION:

- Analog inputs are automatically calibrated on power up.
- Simultaneous sampling of all channels.
- 16 Analog (±10 Volt) input channels.
- Up to 64 times over sampling (set to 8 by default).
- 20 bit digital resolution (no auto ranging required).
- Sampling rate up to 192,000 samples/see.

COMMUNICATION:

- USB or Ethernet

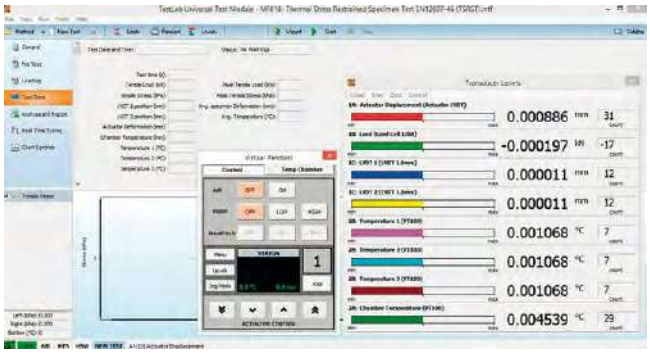
ENVIRONMENTAL CHAMBER

- REFRIGERATION RANGE: -40 °C to + 40 °C, capable of cooling at a rate of 10 °C per hour.
- Optional: -50 °C to + 40 °C version.

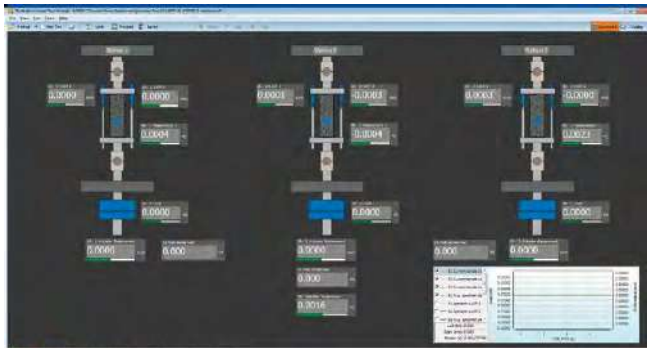
Real Time Dashboard display shows transducer levels, computed data and charted data before, during and after the test has completed.

Dynamic image update feature shows visual image representation of specimen failure Multi- axes representation for clear visual presentation of test status for each axes.
Very user friendly presentation simplifies specimen setup in the machine.

The dashboard display feature of Testlab provides the user with an intuitive visual representation of the current status of both the machine and test method. The dashboard shows live transducer level measurements along with nominated key test data information and real time chart updates. This feature is individually customisable for each method file. Pavetest has already available dashboard designs for the more sophisticated tests including multi station TSRST.



TestLab Universal Test Module



TSRST-Multi Dashboard

TECHNICAL SPECIFICATIONS

External dimensions load frame (including environmental chamber):
1853(h) x 1020(d) x 1230(w) mm

Hydraulic Power Supply (for Servo-hydraulic station(s):
700(h) x 520(d) x 570(w) mm

Weight load frame: 200 kg approx. without the selected stations configuration

Electrical requirement for:
Servo-hydraulic station (each): 230V 50-60Hz 1ph 2.2kW

Electro-mechanical station (each):
100-230V 50-60Hz 1ph 0.75kW

Refigeration unit: 380-420V 50Hz 3ph 2.5kW

Loading frame(s)

- Rigid two column frame
- Width of work space: 240 mm
- Height of work space (between the two platens): 285 mm

Electro-mechanical actuator(s)

- 25kN static with ± 50 mm stroke (100 mm)
- Internal displacement transducer

Servo-hydraulic actuator

- 30kN static, 25kN dynamic, double acting, fatigue rated, servo hydraulic actuator, equal area type with long life seals & bearings
- ± 50 mm stroke (100 mm)
- Internal displacement transducer
- Close coupling of servo valve to actuator for best servo performance
- 10 µm pressure line filter at actuator for ultimate contamination control
- 0.5 lt hydraulic accumulator with 40 Bar pre-charge for best pressure line regulation at servo-valve.
- High response, VCD direct drive, servo-valve: -3 db @ 350 Hz, ± 5% amplitude (performance curves available on request)

Load cell(s)

- Low profile Precision Transducers load cell, ± 30kN, 0.1%. Normalized output with in-line signal conditioning

Hydraulic power supply

- Working pressure of up to 160 Bar (low pressure adjustable)
- High/Low pressure selectable from control pendant
- Variable flow rate up to 7.5 liter/min
- Variable Frequency Drive (VFD) 2.2kW pump motor; speed based on demand
- 3 µm return line filtration
- Low oil, over temperature and dirty filter displayed
- Remote starting
- Pressure gauge
- Air cooling (Electric fan)

B282-08 TSRST specimen gluing jig (needed accessory)

Simple and easy to use gluing jig for preparing TSRST specimens. The jig provides for perfect alignment and adjustment for different sized specimens. The clamping force is easily set and ensures the end plates are glued perpendicular to the specimen.

ORDERING INFORMATION

The basic MULTI TSRST includes the main frame, the CDAS, the climatic chamber, the refrigeration unit and at least one between the electro-mechanical or servo-hydraulic station. All available configurations are summarized in the following table:

	ELECTROMECHANICAL STATION	SERVO-HYDRAULIC STATION
B282-10	1	-
B282-11	2	-
B282-12	3	-
B282-13	-	1
B282-14	1	1
B282-15	2	1

Note:
Multiple stations configuration (B282-11, B282-12, B282-14, B282-15) allow to run tsrst tests with all stations simultaneously. In this configurations, utst, rt, tct, utsst and utcst tests are performed on one station at a time. With combined configuration (electromechanical and servo-hydraulic) utcst must be performed with servo-hydraulic station.

TO PERFORM

- Uniaxial tension stress test (UTST)
- Thermal stress restrained specimen test (TSRST)
- Relaxation time, using the relaxation test (RT)
- Tensile creep tests (TCT)
- Uniaxial cyclic tension stress tests (UCTST)**
- Uniaxial thermal stress & strain test (UTSST)***

** Only applicable to servo-hydraulic work station(s)
*** Additional hardware required

ACCESSORIES

B282-08 TSRST specimen gluing jig (**needed**)
B282-18 TSRST proof test assembly (optional)

Disk Shaped Compact Tension test:
B284-01 Disk-shaped compact tension test jig
B282-02 Rod ends (2 pieces **needed**)
B290-07 SCB deformation gauge (**needed**)
or
B290-12 Epsilon (model 3541) clip-on gauge cmod transducer +1/-7 mm (Alternative to B290-07)
C090-18 Knife edge (pack of 24) only for B290-12

B225
STS-25 STATIC TESTING SYSTEM
THE MOST VERSATILE TESTING MACHINE IN THE MARKET

NEW

STANDARDS: ASTM D7313-07a | AASHTO TP105-13 | AASHTO TP124 | ASTM D8044 | ASTM WK 26816 | AASHTO T 314-12
AASHTO TP10-1993 | TxDOT_ Tex-248-F

The Pavetest 25kN Static Testing System (STS-25) is an electro-mechanical servo-controlled testing machine utilizing digital control of a high performance electro-mechanical actuator to provide accurate loading rates up to 50mm/minute, designed to perform a range of static tests; including: Overlay, SCB, DCT, TSRST and DTT
The STS-25 is underpinned by Pavetest's leading edge CDAS digital controller, TestLab software and a full complement of accessories hardware and software in perfect unison.

MAIN FEATURES

- Compact, fully self-contained, precision engineered unit.
- Precision electro-mechanical actuator (silent operation).
- Suitable for a range of testing protocols.
- A range of two piece climatic chambers.
- Operator can monitor, set and "Auto tune" the temperature controller via the PC.
- Optional swivel stand allows the unit to be oriented vertically or horizontally.

The machine includes:

- Rigid two column load frame
- 25 kN electro-mechanical actuator (30 mm stroke)
- 8 channel Control and Data Acquisition System (CDAS) & TestLab software
- Load cell (± 30 kN)
- 30 mm actuator LVDT

B225 STS-25 Static Testing System

Horizontal configuration complete
with swivel stand B225-04

TECHNICAL FEATURES

- **Electro-mechanical unit.** The machine applies constant rate of loading to a specimen that is placed in the load frame.
- **The system comprises** a load frame, with a load cell, integral displacement transducer, insulate cabinet, Control and Data Acquisition System (CDAS). The insulated chamber with small glass door reduces heat loss whilst providing uninterrupted view of the specimen.
- **Versatile.** An optional swivel stand allows the unit to be oriented vertically or horizontally; to suit the application.
- **Portable temperature control unit.** We offer three models of temperature control unit, with different temperature ranges, to cover a number of international testing standards.

NEEDED ACCESSORIES

B225-01 Temperature controlled cabinet - TE UNIT.
+10 °C to +60 °C TO SUIT STS-25
or
B225-02H Temperature controlled cabinet - REFR. UNIT.
Horizontal configuration: -20 °C to +80 °C to suit STS-25
or
B225-03H Temperature controlled cabinet - REFR. UNIT.
Horizontal configuration: -40 °C to +80 °C to suit STS-25
or
B225-02V Temperature controlled cabinet - REFR. UNIT.
Vertical configuration: -20 °C to +80 °C to suit STS-25
or
B225-03V Temperature controlled cabinet - REFR. UNIT.
Vertical configuration: -40 °C to +80 °C to suit STS-25

TECHNICAL SPECIFICATIONS

Load Capacity:	Up to 25kN
Actuator stroke:	30 mm
Testing space:	400 mm
Loading rate:	0.3mm/min. to 50mm/min.
Temperature range:	10 to 60 °C (thermoelectric unit) -20 to 80 °C or -40 to 80 °C (refrigeration unit)
Mains Power:	230V 50-60Hz 1ph (B225) 230V 50-60Hz 1ph (thermoelectric unit) 230V 50Hz 1ph (refrigeration unit)

Temperature
controlled unit- REFR. UNIT

Temperature controlled cabinet - TE UNIT

OPTIONAL ACCESSORIES

H009-01EN PC 22" with lcd screen
B250-07-KIT Temperature measuring KIT
B225-04 swivel stand (only for B225-01)

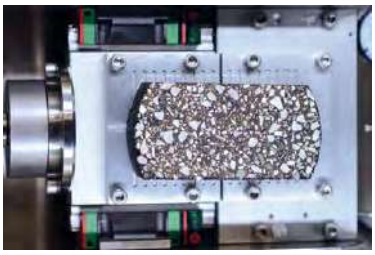
For test configuration and related jigs, please consult p. 182-192

B215EM
ELECTRO-MECHANICAL OVERLAY TESTER

STANDARDS: ASTM WK 26816 Standard Test Method for Determining the Susceptibility of Asphalt Mixtures to Cracking Using the Overlay Tester
TxDOT Tex-2 48-F –Test Procedure for Overlay Test

The Pavetest Overlay Tester is an electro-mechanical servo-controlled testing machine utilizing digital control of a high performance electro-mechanical actuator to provide accurate loading rates up to 50 mm/minute, designed to determine the susceptibility of Asphalt Mixtures to cracking. Applies tension in a **cyclic triangular waveform** to a constant maximum displacement of 0.6 mm (0.026). The sliding block reaches the maximum displacement and then returns to its initial position in 10 sec. (one cycle). The unit is underpinned by Pavetest's leading edge CDAS digital controller, TestLab software and a full complement of accessories hardware and software in perfect unison.

Horizontal configuration



B215EM Electro-Mechanical Overlay Tester

B204-03 Specimen preparation jig

B204-02 Specimen plates

NEEDED ACCESSORIES

B225-01 Temperature controlled cabinet - te unit: +10 °C to +60 °C

or

B225-02H Temperature controlled cabinet - refr. unit. Horizontal configuration: -20 °C to +80 °C

B204-14 Overlay jig

B290-02 OT LVTD (10 MM) to be used with Electro-mechanical Overlay Tester

B204-02 Pair of Overlay Tester (OT) specimen plates

B204-03 OT Specimen preparation jig according to ASTM 26816

or

B204-13 OT Specimen preparation jig according to TxDOT_tex-248-F

OPTIONAL ACCESSORY

H009-01EN PC 22" with lcd screen

B225-09
DTT DIRECT TENSION TESTER

STANDARDS: AAHSTO T 314-12 Determining the Fracture Properties of Asphalt Binder in Direct Tension

The Pavetest DTT Direct Tension Tester is an electro-mechanical servo-controlled testing machine utilizing digital control of a high performance electro-mechanical actuator to provide accurate loading rates up to 50 mm/minute, designed to determine the fracture properties of Asphalt binder in Direct Tension (DTT). The unit is underpinned by Pavetest's leading edge CDAS digital controller, TestLab software and a full complement of accessories hardware and software in perfect unison.

B225-09 DTT Direct Tension Tester

Horizontal configuration

B225-10

Temperature
controlled unit- REFR. UNIT

NEEDED ACCESSORIES

B225-03H Temperature controlled cabinet - refr. unit.
Horizontal configuration: -40 °C to +80 °C

B225-10 Direct Tension jig complete with 25 mm on specimen displacement transducer.

OPTIONAL ACCESSORY

H009-01EN PC 22" with lcd screen

STS-25 - Ordering info

Sigla	Testing Kit/Jig/Accessories	Relevant standard(s)	With temperature controlled cabinet	Accessories
DC(T)	B284-01	ASTM D7313-07a	"(10°C greater than the low temperature PG of the asphalt binder) B225-02H or B225-02V or B225-03H or B225-03V	B290-07 needed or B290-12 + C090-18 needed
SCB	B254-02-KIT (B208+B254-10+B254-02)	AASHTO TP124 ASTM D8044	(25°c) B225-01+ optional B225-04 or B225-02V or B225-03V	B254-16 needed B290-02 (1or 2) optional B254-11 (according to B290-02 q.ty) optional B254-12 optional
SCB	B254-02-KIT (B208+B254-10+B254-02)	AASHTO TP105-13	(22°C greater than the low temperature PG of the asphalt binder) B225-02V or B225-03V	B254-16 needed 2 x B253-53 needed B254-13 needed 2 x B254-14 needed 2 x B254-15 needed 2 x B290-05 or 2 x B290-06 needed B290-07 or B290-16 + C090-18 needed
OT	B204-14	ASTM WK26816	(25°c) B225-01+ optional B225-04 or B225-02H or B225-03H	3 x B204-02 needed B204-03 needed B290-02OT needed
OT	B204-14	Tex 248F	(25°c) B225-01+ optional B225-04 or B225-02H or B225-03H	3 x B204-02 needed B204-13 needed B290-02OT needed
DTT	B225-10	AASHTO T314-12	(+6° to -40 °C) B225-03H	none
TSRST	B282-01-KIT (3 x B282-01+2 x B282-02 +1 x B282-21+1 x B282-09 +2 x B282-04+2 x B282-05 +2 x B282-06+B282-07)	AASHTO TP10	(-50°C to +10°C, capable of cooling at a rate of 10°C per hour) B225-03V	2 x B290-09 needed B282-08 needed B201-52 optional

OUR CLIENTS ARE OUR BEST ADVERTISEMENT.


MATEST
MATEST
MIN
MAX

SECTION C
CONCRETE

The accurate and satisfactory test of fresh and hardened concrete are essential elements for any type of building construction. The final quality of the concrete utilized in the structure depends on many variables like: workability, consistency, setting time, volumetric mass, air content, compressive strength, temperature, linear variations, etc.

Matest offers a complete range of testing and research equipment on concrete to satisfy all the above quality variables, in compliance with the EN, ASTM and most popular International Standards. In the second part of this section a complete range of instruments are available for non-destructive tests, to investigate and evaluate the progressive ageing and durability of concrete structures exposed to chemical attacks, air pollution, and time.

COMPRESSION AND FLEXURAL TESTING MACHINES

Matest has the widest and most complete range of compression and flexural testing machines today available on the global market, making Matest leading manufacturer of testing machines.
The versatility and flexibility of Matest testing machines allow the end-user to select and combine compression/flexural groups in order to meet custom requirements.

The next pages describe:

1) General features of the compression frames with different control and measuring systems (p. 217-218)

2) Compression testing machines, four columns prestressed frame, conforming to Standards:
ASTM C39 I BS 1610 I AASHTO T22 I NF P18-411
(p. 230...259)

3) Compression testing machines, four columns **tested for high stability frame**, conforming to Standards:
EN 12390-4 I and BS 1881 I DIN 51220 and the determination of the automatic secant compression **elastic modulus** on concrete with pace rate control also when releasing the load, conforming to Standards:
ASTM C469 I ISO 6784 I UNI 6556 I DIN 1048 (p. 261...281)

4) Flexural testing machines, conforming to Standards:
EN 12390-5, EN 1340:4 I ASTM C78, C293 I BS 1881:118
AASHTO T97 (p. 288...309)

5) Combined Groups for Compression, Flexural, Splitting, Block tests; cement compression/flexural frames, suitable to personalize and satisfy any specific requirement (p. 310)

COMPRESSION TESTING MACHINES

It is technically well-known that the welded frames may have structural unexpected values and problems, while the four columns configuration guarantees tensional uniformity at all load levels.

Matest manufactures **compression machines four columns frame only**, and supplies two basic frame designs:

MACHINES WITH FOUR COLUMNS PRESTRESSED FRAME

STANDARDS: ASTM C39 | BS 1610 | NF P18-411
AASHTO T22

Models described at p. 230...259

MACHINES WITH FOUR COLUMNS TESTED FOR HIGH STABILITY FRAME

STANDARDS: EN 12390-4 | BS 1881 | DIN 51220

Models described at p. 261...281

MAIN FEATURES

- Extremely strong and oversized load frame ensuring high rigidity and stability.
- Precision lapped upper ball-seat with compression platen.
- Compression platens are ground finish and surface hardened over 55 HRC.
- Designed to meet International Specifications: EN, ASTM, AASHTO, BS, NF, DIN.
- Available with 1300kN, 1500kN, 2000kN, 3000kN, 4000kN, 5000kN capacity to test cubes, cylinders and blocks.
- Both hand-operated and motorized versions with one or two gauges.
- Hydraulic device to stop the piston's stroke at its max excursion to avoid pumping the piston out of the cylinder.
- Available with automatic digital servo-controlled console and electronic digital display measuring system.
- Optional safety guards.

HYDRAULIC SYSTEM

Piston has a large diameter: this allows the hydraulic circuit to work at low pressure with a longer life of the working components and higher precision in the results. Piston is ground and lapped, and a high quality packing set of three elements is used. Motorized models are equipped with a dial device to display, pre-select and control the flow allowing an uniform load rate as requested by the Standards. A fast approach ram action device avoids dead times during the stroke of the ram. Power pump is multipiston, assuring continuity of delivery, now with **improved performances and more silent**.
A movement indicator shows instant by instant the piston excursion during the compression test.
A hopper covering the piston is conceived to avoid the powder of the broken specimen to enter into the cylinder of the press and damage the packing set.

NEW

LOAD MEASUREMENT SYSTEMS

A) GAUGES

The gauges are Bourdon tube type. They include max. load pointer, zero adjustment and mirror face to avoid parallax errors. Low pressure gauge is fully protected from overload by a pressure control device.

(A)

B) CYBER-PLUS Evolution, EIGHT analog channels system, for the acquisition, display and processing of test data, with software and printout of results and certificates.
Resolution up to 500.000 divisions.
TOUCH-SCREEN COLOUR display, same as PC.
Technical details: see mod. C109N, p. 222...228

B) C109N

BB) DIGITEC, TWO analog channels system, for the acquisition, display and processing of test data with software (accessory) and printout of results and certificates.
Technical details: see mod: C108N, p. 219...221

BB) C108N

C) SERVO-PLUS Evolution, automatic servo-controlled system, to provide fully automatic tests throughout all phases, with the support of the Cyber-Plus Evolution electronic technology.
Technical details: see mod: C104N, p. 222...228

C) C104N

C104-04 NEW
CONSOLE, **lined** with sound-proofing material for noise reduction, new design.

C104-04

CC) AUTOTEC, automatic servo-controlled system, to provide fully automatic tests throughout all phases, with the support of the Digitec electronic technology
Technical details: see mod. C098N, p. 219...221

CALIBRATION AND PRECISION

All testing machines are calibrated with high accuracy electronic instruments and are guaranteed in CLASS "1" (max. error ≤ than ± 1%).
Also starting from 1% of the full range.
A Calibration Certificate is supplied along with the machine.

CC) C098N

C108N DIGITEC | C098N AUTOTEC

Two-channels computerised graphic display system to control and manage all sorts of automatic (Autotec C098N) and semi-automatic (Digitec C108N) testing machines, for acquisition, display, processing, printing and saving test data and certificates, with software for remote control from PC.

SUITABLE TO UPGRADE OR COMPLETE YOUR CONCRETE OR MORTAR COMPRESSION AND FLEXURE TESTING MACHINES (also from other manufacturers).

APPLICATIONS

Compression on concrete

Flexure on concrete

Splitting on concrete cubes and cylinders

Compression and Flexure on Mortars

SPECIFICATIONS DIGITEC | AUTOTEC

- **2 analogue-digital channels** accepting sensors, transducers or load cells at 2 mV/V, allows the connection to two different compression/flexure frames.
- Simple and immediate parameters set up and test execution, menu driven interface.
- Rapid approaching, touching on and breaking of the specimen under direct pump control (Autotec C098N)
- Automatic control of the pace rate (Autotec C098N)
- Continue load display.
- Breaking load detection.
- Automatic elaboration of the specific resistance value.
- Permanent file up to 1000 tests and file of 100 different types of specimens.
- Graphic display with high resolution: 192x64 pixels.
- Selectable measuring force: kN, lb
- Languages: English, French, German, Spanish, Italian, Polish, Czech, Turkish.
- **Class 1** starting from 10% of maximum value, on request from 1% of maximum value.
- **± 0.5% load accuracy.**

TECHNICAL STRUCTURE

- Acquisition and data processing system at 24 bit, effective resolution: 17 bit.
- Operator interface composed by 5 multi-functions pushbuttons; function ico ns shown on the display.
- Different programmable safety devices for the machine or the specimen as the possibility to introduce a percentage of the maximum value reached during the text execution, thermal protection of the motor and different other settable alarms.
- The firmware contains a memory of the most used specimens: area, weight, specific weight.
- Possibility of personalization for special sized samples.
- RS232 interface: it allows the data transfer during the test or the test results directly to PC (via Microsoft Hyperterminal) or the remote control of the system by means of the UTM2 software (accessory).

Menu

The display shows date and time, currently applied load and single load, latest effected tests, pace rate control, rapid commands functions, configuration in use, analogue channel and activated alarm.

Test setup

Test execution with pace rate controller

Max load alarm setting

Channel configuration/calibration

Functions icons (test selection, file, alarms visualisation)

MODELS

C108N
DIGITEC

Two channels unit for data acquisition and elaboration, as described.

Power supply: 230V 1ph 50-60Hz
Dimensions: 260x250x210 mm
Weight: 4 kg

C108N

C098N
AUTOTEC

Two channels servo controlled system for a fully automatic execution of the test.
The system comprises:
- Digitec C108N data acquisition unit
- Multi-piston electric pump with variable flow (see mod. C114) driven by a microprocessor (reliable and noiseless system, also for intensive and extended use)

Power supply: 230V 1ph 50Hz
Dimensions: 420x290x950 mm
Weight: 60 kg approx.

C098N

C098-01N
AUTOTEC
FOR TWO FRAMES

Two channels servo controlled system, complete with three way hydraulic valve for the optional to connection of two testing frames.

C098-01N

ACCESSORIES

C127N	On board graphic printer on thermo-paper
C127-11	Spare roll of thermo-paper for printer

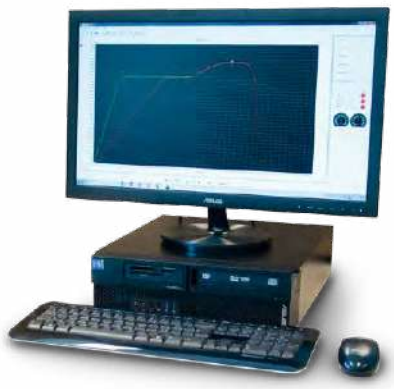
SOFTWARE

For the remote execution of the test and the automatic transfers and filing of the results on a computer

C109-10	Software for COMPRESSION test on Concrete
C109-11	Software for FLEXURAL test on Concrete
C109-12	Software for SPLTTING TEST on Concrete specimens
E163	Software for COMPRESSION test on Mortars
E164	Software for FLEXURAL test on Mortars
C123	Software “Servonet” for all the tests listed above. Suitable to be used only with the Autotec system.

H009-01 EN
PERSONAL COMPUTER

Complete with LCD, monitor 22”, keyboard, mouse, connection cables. The supply of the PC includes the installation of the purchased software.


H009-01 EN

PRESSURE TRANSDUCER
Used with both Digitec and Autotec, supplied along with proper connection cable and relative calibration certificate.
Available models: see p. 318

C116-09N

ULTIMATE DESIGN, TIME-PROVEN SYSTEM, TRUSTY PERFORMANCES

CYBER-PLUS EVOLUTION NEW

SEMI-AUTOMATIC APPLICATIONS

- Compression & flexural tests on concrete
- Compression & flexural tests on mortar
- Tensile, compression and bending tests on steel
- Splitting tensile tests on concrete cubes and cylinders

SERVO-PLUS EVOLUTION NEW

FULLY AUTOMATIC APPLICATIONS

- Strain, ductility and post-breaking behaviour
- Deflection on fiber reinforced concrete beams
- Punching test on sprayed concrete specimens with energy absorption measurement

ADVANCED SERVO-PLUS EVOLUTION NEW

SOPHISTICATED AND RESEARCH APPLICATIONS

In addition Advanced Servo-Plus Evolution can perform:

- Elastic modulus on rocks, concrete and mortar
- Triaxial tests on rock specimens

SERVO-PLUS RESEARCH NEW

HIGH PERFORMANCE SERVO-PLUS SERVO-STRAIN

Performing tests in load, displacement and strain rate control:

- Compression, flexure and splitting tensile
- Elastic modulus and fiber reinforced concrete and shotcrete
- Triaxial test on rocks and Stress-path test procedure
- Suitable also for dynamic tests, at low frequencies up to 0.1 Hz

C099N
INVERTER DEVICE NEW

- **Improved motor efficiency** with important reduction of absorbed power and electric consumption.
- **Reduction of noise pollution** thanks to a balanced and efficient delivery of the flow rate.
- **Improved piston speed** for a faster approach to reach the specimen with the result of having a considerable reduction in the overall test time.
- Improved reliability and life of the hydraulic pump thanks to a **decreased heating and mechanical stress**.
- **Better sensitivity** of load, deformation and speed adjustment.
- Accepts both 50Hz and 60Hz supply.

C099N inverter

CONSOLE NEW

SILENT.STYLISH.STANDOUT.

- New console **with pumping unit lined with sound proofing material** in order to reduce noise.
- The design allows for the inverter integration.
- **The semi-automatic version (C104-06) grants an automatic speed selection by eliminating the manual pace-rate adjustment at minimum.**
- The only manual intervention required by the operator is the opening and closing of the dump valve for the hydraulic circuit.

C109N Cyber-plus +
C104-06 console +
C099N inverter +
C114 pumping unit

Note:
The Inverter device may be mounted only on those machines equipped with **Servo-Plus or Servo-Plus Evolution** systems.
With the Inverter device it is necessary to include also the Console C104-04 (fully automatic) or the Console C104-06 (semi-automatic).

C099-01
BARCODE SCANNER NEW

BARCODE

This instrument allows specimen file and identification by barcodes reading.
It can be connected cyber-plus / servo-plus control panels by USB, to automatically register specimen code and add it as a description of the test for all tests done with compression and flexure machines. Supplied complete with USB cable.

TECHNICAL SPECIFICATIONS

- Codification capacity: UPC/EAN, UPC/EAN with supplements, Code 128, UCC/EAN 128, Code 39, Code 39 Full ASCII, Code 128 Full ASCII, Codabar, Interleaved 2 of 5, Code 93, MSI, Code 11, ISBN, ISSN, usw, etc…;
- Reader type: bidirectional;
- Light: 650 nm wavelength, laser-diode;
- Resolution: 0.10 mm;
- Reading distance: 3…400 mm;
- Reading angle: inclination angle 45°, elevation angle 60°;

Dimensions: 81x97x165 mm
Weight: 136 g

C109N CYBER-PLUS | C104N SERVO-PLUS

An electronic evolution with 8 analog inputs for compression and flexural testing machines on concrete and mortar.

Designed with the latest technology, an innovative PC-like Touch Screen system, employed to control and manage all sorts of automatic (Servo-Plus Evolution C104N) and semi-automatic (Cyber-Plus Evolution C109N) testing machines.
To update or complete your compression and flexural testing machine on concrete and mortar (also on Non-Matest brands)

APPLICATIONS


Compression on concrete


Flexure on concrete


Splitting on concrete cubes and cylinders


Compression and Flexure on Mortars


Tensile on steel

MAIN FEATURES

- The control unit Cyber/Servo-Plus Evolution runs like a standard PC based on Windows operating system.
- The touch-screen graphical user-friendly interface allows an easy set up of the parameters and an immediate execution of the test.
- High resolution color display, ¼ VGA, offers all the functions of a PC for the management and analysis of data, test results, and graphs.

ITOUCH TECHNOLOGY
ONE TECHNOLOGY, MANY SOLUTIONS

iT TECH is Matest brand-new concept which aims to offer innovative and user-friendly technology to control and manage the most advanced material testing machines for the construction industry. This technology is the core feature of Matest control unit, a PC-based and touch screen system which is modular, flexible and multi-functions.

iT TECH stands for:
- INNOVATION
- ICON INTERFACE
- INTERNET CONNECTION
- INDUSTRIAL TECHNOLOGY

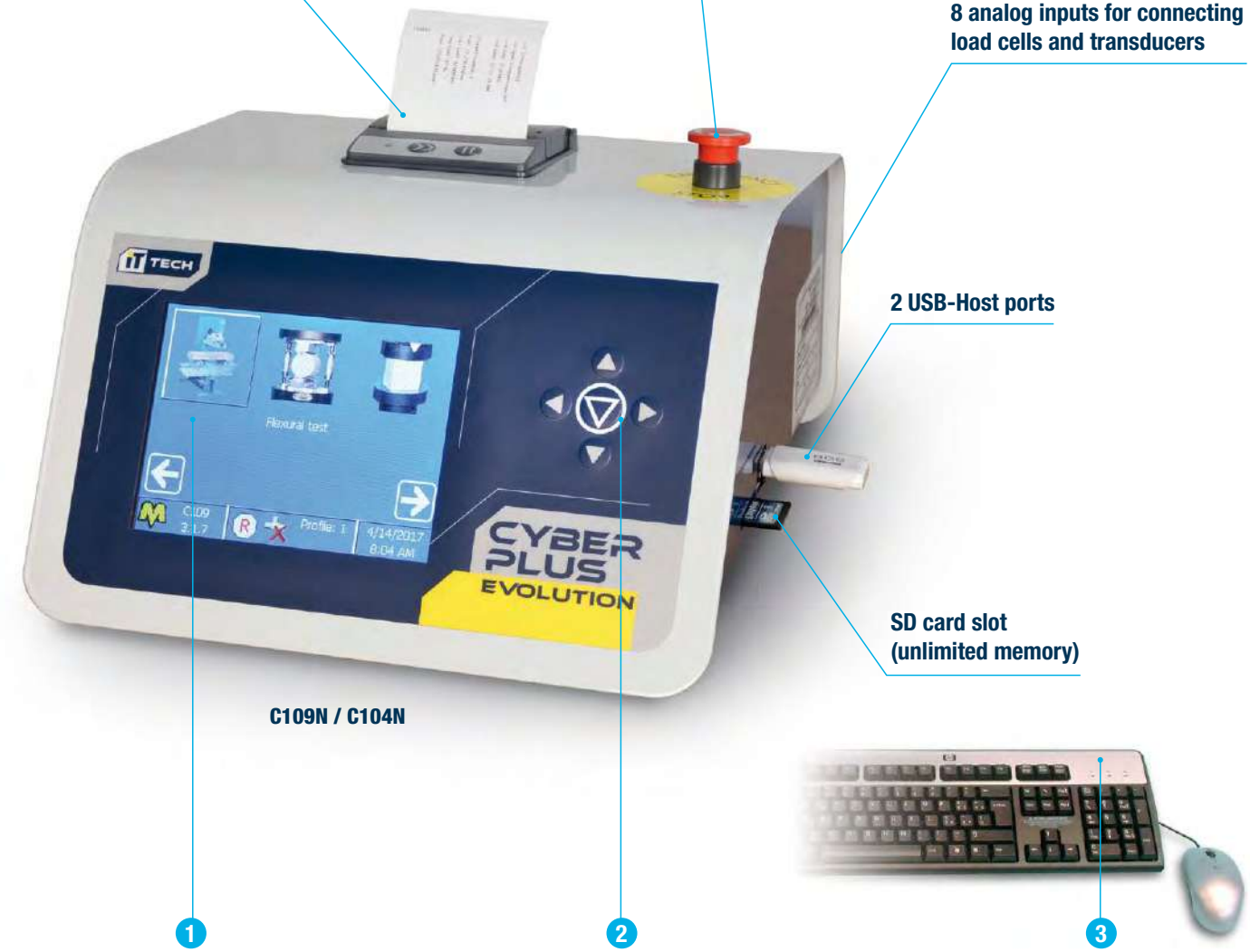
Graphic on board printer

Safety cut out switch

8 analog inputs for connecting load cells and transducers

2 USB-Host ports

SD card slot (unlimited memory)



C109N / C104N

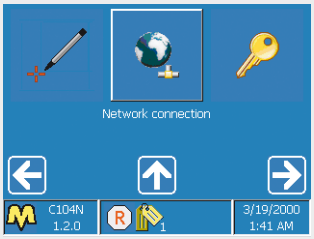
3 OPERATING MODES

1 Control from user friendly Touch-Screen display

2 Large directional arrow-keys for gloved use

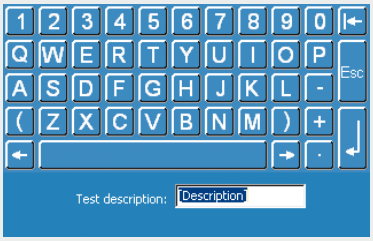
3 Connection of a keyboard or mouse

Direct connection of the Cyber/Servo Plus Evolution to the Intranet (direct connection to a LAN network) and Internet to establish a remote communication and receive diagnostic analysis of potential problems, the ability to execute the test from distance and provide software updates. Matest technicians will check the unit located abroad to guarantee a prompt and professional assistance.

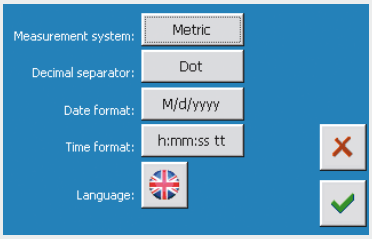


Internet direct connection for remote assistance

Windows operating system like a standard PC. Touch-Screen color display, ¼ VGA

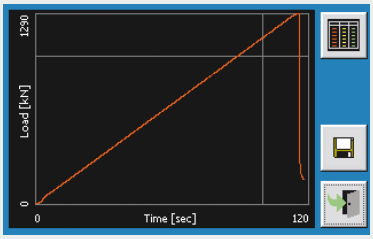


Qwerty Touch-Screen virtual alpha-numerical keyboard, user-friendly



International settings and unlimited language selection

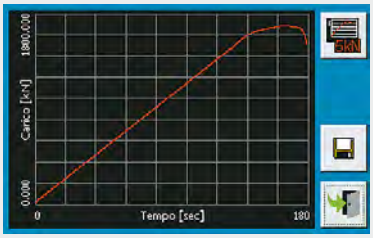
Traditional directional key pad with 5 arrow-keys for standard use or when wearing gloves



Compression Test. Visualization of the load/time graph in real time

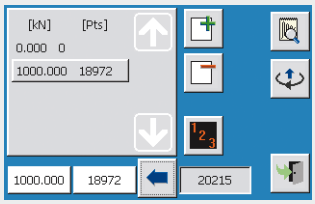
Easy and straightforward selection of the tests (compression)

Selection examples, Elastic Modulus

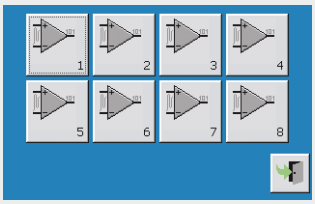


Automatic pace rate up to failure to avoid specimen's crumbling according to ASTM C39 Specification.

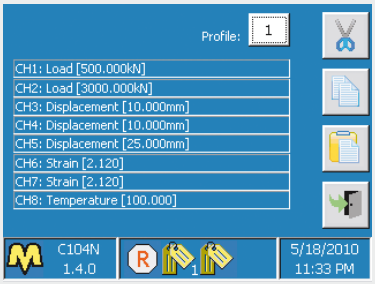
Unlimited memory storage with:
2 USB-Host ports* for PC, 1 SD card slot*
(*memory hardware not included)



Calibration menu of a load channel. Easy set up of the calibration channel



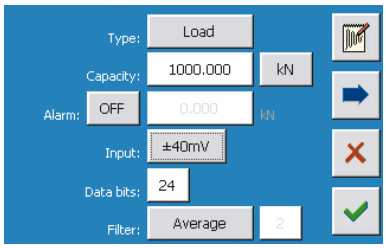
Simple and user-friendly functional channel configuration. 8 analog inputs for connecting up to 8 load cells or transducers



Endless number of test combinations and profile calibrations

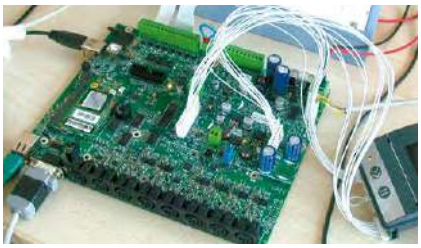
On board graphic printer

Laser printer for graphs and certificates with direct connection via USB.



Configuration menu of a load channel. Rapid channel configuration

RS232 for PC connection only upon customer request LAN connection to internet



High technology and high performance hardware

MAIN FUNCTIONS

- More intuitive interface which simplifies the use of the machine (test begins after a few simple inputs)
- Greater calculation ability and data display (on board charts and graphic print-outs)
- High management capacity for the multilingual framework and international settings (date and time, decimal units, unit of measure).
- Elastic software which allows the installation of new tests when desired.
- Profile configuration manager
- Configuration and calibration supervision of the analog channel
- Alarms manager
- Ethernet parameters configuration
- International settings configuration
- Hardware diagnosis functions
- Functions for the software updates and licenses
- Execution of tests through parameters set up customization
- Several levels of protection (passwords) to prevent the accessibility to the configuration menus by unauthorized staff.

Cyber-Plus Evolution C109N and **Servo-Plus Evolution** C104N are supplied complete with licenses for the execution of the following tests:

- COMPRESSION on Concrete
- FLEXURAL on Concrete
- SPLITTING TEST on cylinders and concrete cubes
- COMPRESSION on mortar
- FLEXURAL on mortar

In accordance to the following standards:
EN, ASTM, BS, NF, DIN etc.

MATEST CUSTOMER SERVICE

C104-05 AFTER SALES TECHNICAL ASSISTANCE
Two hours of remote technical assistance, through a direct connection to the machine via internet. Customers are provided with diagnostics, any software updates or function restoring, all through a remote-access line, via mail, skype or phone, according to their needs.

MODELS

C109N
CYBER-PLUS EVOLUTION
8 channel unit for data acquisition and elaboration.

Power Supply: 230V 1F 50-60Hz 70W
Dimensions: 260x260x155 mm
Weight: 5 kg approx.

C109N

C104-01N
SERVO-PLUS EVOLUTION FOR TWO FRAMES
Servo controlled unit supplied with three way hydraulic valve for the option to connect and use up to TWO TESTING FRAMES.

C104-02N
SERVO-PLUS EVOLUTION FOR THREE FRAMES
Servo-controlled unit supplied with four way hydraulic valve for the option to connect and use up to THREE TESTING FRAMES.

C127N

C104-01N

C104-04

C104N
SERVO-PLUS EVOLUTION
8 channel servo controlled unit for a fully automatic execution of the test. The machine comprises:
- Cyber-Plus Evolution C109N data acquisition system
- Multi-piston electric pump with variable flow (see mod. C114) driven by a microprocessor (reliable and noiseless system, also for intensive and extended use)

Power supply: 230V 1ph 50Hz 750W
Dimensions: 420x290x1120 mm
Weight: 60 kg approx.

C104N + C104-04

ACCESSORIES

C104-04
CONSOLE HOUSING THE SERVO-PLUS EVOLUTION
The pump assembly **lined with sound-proofing material for noise reducion** and the digital system are encased to enhance the design and look of the machine.

C104-09
CONFIGURATION OF ADVANCED PARAMETERS THROUGH TESTS ON REAL SAMPLES
Valid for all MATEST testing machines equipped with SERVOPLUS/ CYBERPLUS controlling unit.
When ordered, the setting of the advanced parameters becomes a phase of the production process. Through tests on real samples, it's possible to define in details the behavior of the tested material and therefore set into the SERVOPLUS/CYBERPLUS controlling units advanced parameters accordingly. For the setting of the advanced parameters, it's necessary to have some real samples available at MATEST's premises.

COMPRESSION TESTING MACHINES, FOUR COLUMNS PRESTRESSED FRAME FOR PRODUCTION ROUTINE TESTS

These models are described at p. 230...259

STANDARDS: ASTM C39 | BS 1610 | NF P18-411 | AASHTO T22 | GOST 10180-2012

MAIN FEATURES

- Compression platens are surface hardened over 55 HRC and rectified.
- Device to check piston's excursion during test.
- The columns are prestressed to provide a very high rigidity.
- Piston having 50 mm stroke and cylinder are coupled with high quality packing set.
- The tank has an oil level and oil discharge.
- Dial speed selector to display, pre-select and control oil flow.
- Multipiston power pump assuring continuity of delivery.
- Fast approach ram device to avoid dead times.
- Ball seating is accurately machined.

Available capacities:

1300 kN | 1500 kN | 2000 kN | 2000 kN BLOCKS | 3000 kN | 3000 kN BLOCKS | 5000 kN

Motorized or hand operated models.
Load measuring system: bourdon type gauges, **DIGITEC** or **CYBER-PLUS** graphic display units, **AUTOTEC** or **SERVO-PLUS EVOLUTION** servo-controlled automatic systems.

COMPRESSION TESTING MACHINE 1300 KN CAPACITY

TO TEST CYLINDERS UP TO Ø 160X320 MM AND CUBES UP TO 150 MM SIDE

STANDARDS: ASTM C39 | AASHTO T22 | NF P18-411 | BS 1610 | GOST 10180-2012

DIAL GAUGES MODELS

- Gauges Ø 250 mm with specific resistance scales for cubes 150 mm and cylinders Ø 150 - 160 mm
- Gauges divisions: 1300 kN div. 4 kN
  600 kN div. 2 kN

MAIN FEATURES FOR ALL MODELS

- Max. vertical daylight: 336 mm
- **Horizontal daylight between columns: 270 mm** NEW
- Compression platens Ø 216 mm
- **High stiffness and heavy weight 4 columns frame (german-style).**
- Calibration accuracy: Class 1
- Max. ram travel 55 mm approx.
- Power supply (motorized models): 230V 1ph 50Hz 750W
- Dimensions: 900x730x280 mm approx.
- **Weight: 580...620 kg**

C022

C025A + C127N + C111 + C121

COMPRESSION 1300 kN capacity			LOAD MEASURIG SYSTEM			
MODEL	Hand Operated	Motorized	1 Gauge	2 Gauge	Digitec mod. C108N (p. 219)	Autotec mod. C098N (p. 219)
C020	▼		▼			
C021	▼			▼		
C022		▼	▼			
C023		▼		▼		
C024D		▼			▼	
C025A *		▼				▼

COMPRESSION TESTING MACHINE HIGH-END MODELS

TO TEST CYLINDERS UP TO Ø 160X320 MM AND CUBES UP TO 150 MM SIDE

STANDARDS: ASTM C39 I AASHTO T22 I NF P18-411 I BS 1610 I GOST 10180-2012

IT TECH

1300 KN CAPACITY

CYBER-PLUS OR **SERVO-PLUS EVOLUTION** DIGITAL TOUCH SCREEN DISPLAY

Cyber and Servo-Plus models have robust and reliable electronic controller, 5.7" touch screen color display. 2 USB ports, 1 SD port, 8 channels for pressure transducers (force measurement) or displacement transducers (Elastic Modulus and Poisson ratio measurement).

INVERTER For a further improvement of energy efficiency and silent operation, (optional device code C099N). Technical details, p. 223 NEW

BARCODE Scanner for specimen file/identification, (optional device code C099-01). Details, p. 223 NEW

C024N | **C025N + C127N + C111-01 + C121**

COMPRESSION 1300 kN capacity		LOAD MEASURIG SYSTEM	
MODEL	Motorized	Cyber-Plus Evolution mod. C109N (p.224)	Servo-Plus Evolution mod. C104N (p.224)
C024N	▼	▼	
C025N *	▼		▼

* Servo-Plus/Autotec models feature fully automatic power pack - electrovalve operated test start (no manual lever).

ACCESSORIES FOR 1300 kN MACHINES FROM MOD. C020 TO C025N

C111-30 DISTANCE PIECE, 20 mm high for cylinders Ø 150x300 mm

C111 DISTANCE PIECE, 176 high for cubes 150 mm side

C111-01 DISTANCE PIECES, 176+50 mm high for cubes 150 and 100 mm side

C111-03 DISTANCE PIECE, 100 high for cylinders Ø 110x220 mm

C111-03 + C111-30 DISTANCE PIECES, 100 + 20 mm high for cylinders Ø 100x200 mm

C111-21 DISTANCE PIECE, 50 mm high

Note: the cylinders Ø 160x320 mm do not require any distance piece.

C127N GRAPHIC PRINTER on thermo-paper on board for digital models

C127-11 THERMO-PAPER roll for printer (pack of 10 rolls)

C121 SAFETY GUARDS, polycarbonate, with hinges and lock, to CE Directive. p. 317

C121-51 STOP SWITCH on safety guard. See p. 317

C041-11 TESTING CHAMBER with vertical clearance of 376 mm, complete with distance piece 40 mm high, that allows to test cylinders Ø 150x300 mm and 160x320 mm with **capping retainers** (ASTM C1231 I AASHTO T22, T851)

C107-10 CAPPING RETAINERS (set of two) for cylinders Ø 150 mm and 6”

C107-12 CAPPING RETAINERS (set of two) for cylinders Ø 160 mm

C107-20 NEOPRENE PADS (set of two) for cylinders Ø 150 mm 60 shore A

C107-21 NEOPRENE PADS (set of two) for cylinders Ø 150 mm 70 shore A

C107-10 + C107-20

C107-25 NEOPRENE PADS (set of two) for cylinders Ø 160mm 60 shore A

C107-26 NEOPRENE PADS (set of two) for cylinders Ø 160 mm 70 shore A

Note: The capping retainers can be used only with the testing chamber having vertical clearance of 376 mm, mod. C041-11
Technical details: see p. 316

C115-01 TWO WAY HYDRAULIC VALVE, connected to the motorized pumping unit of the machine to activate a second frame. Technical details: see p. 318

C115-01

C097-05 CALIBRATION CLASS 1, starting from 1% of the full range. With a special calibration procedure it is possible to grant Class 1 practically on the full range of the compression machine. Applicable only on digital machines.

C097-01 DUAL LOW CAPACITY DIGITAL RANGE, complete with **appropriate pressure transducer**, only for digital machines. Recommended range 0-250kN.
Technical details: see p. 313

C097-01

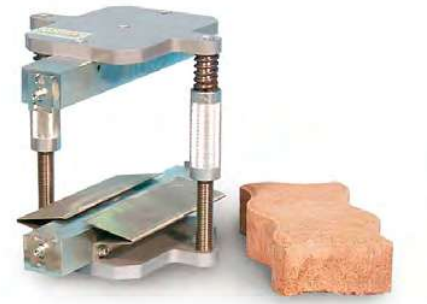
C107 AUTO-CENTERING DEVICE for cubes 100 and 150 mm side, and cylinders Ø 100 and 150 mm.
Technical details: see p. 316

C107

C100 SPLITTING TENSILE test device for cylinders.
EN 12390-6 I ASTM C496
Technical details and other models: see p. 314

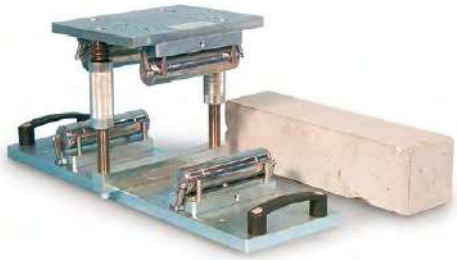
C100

C103 SPLITTING TENSILE test device for self blocking pavers and cubes. EN 1338, 12390-6.
Technical details: see p. 314



C103

C106 FLEXURAL TEST DEVICE for concrete beams.
EN 12390-5 I ASTM C78, C293 I AASHTO T97
Technical details: see p. 315



C106

E170 COMPRESSION DEVICE to test cement specimens 40.1x40 mm EN 196 I ASTM C349
Technical details and other models: see p. 315

E170

C126 BENCH to hold the compression machine. See p. 317

C104-04 CONSOLE HOUSING THE SERVO-PLUS EVOLUTION
The pump assembly "lined" with sound proofing material for noise reduction and the digital system are encased to enhance the design and look of the machine.
Technical details: see p. 312

C025N

C104-04

C099N INVERTER DEVICE
NEW
Applicable only on Cyber-Plus and Servo-Plus Evolution machines.
Technical details: see p. 223

C104-06

C099N

C104-06 CONSOLE HOUSING THE CYBER-PLUS EVOLUTION
NEW
New console internally lined with sound proofing material, to reduce noise and allow for the inverter integration. Detail: see p. 223

SOFTWARE for DIGITEC / AUTOTEC or CYBER / SERVO PLUS models	
C109-10 (N)*	SOFTWARE for compression tests
C123 (N)*	SOFTWARE **Servonet** for remote control through PC
C109-11 (N)*	SOFTWARE for flexural tests
C109-12 (N)*	SOFTWARE for splitting tensile

Technical detail: see p. 18
(N)* for Cyber - Servo Plus models.

COMPRESSION TESTING MACHINE 1500 KN CAPACITY

TO TEST CUBES UP TO 150 MM SIDE AND CYLINDERS UP TO Ø 160X320 MM

STANDARDS: ASTM C39 | AASHTO T22 | NF P18-411 | BS 1610 | GOST 10180-2012

DIAL GAUGES MODELS

- Gauges Ø 250 mm with specific resistance scales for cubes 150 mm and cylinders Ø 150 - 160 mm
- Gauges divisions: 1500 kN div. 5 kN
  600 kN div. 2 kN

MAIN FEATURES FOR ALL MODELS

- Max. vertical daylight: 336 mm
- **Horizontal daylight between columns: 270 mm** NEW
- Compression platens Ø 216 mm
- **High stiffness and heavy weight 4 columns frame (german-style).**
- Calibration accuracy: Class 1
- Max. ram travel 55 mm approx.
- Power supply (motorized models): 230V 1ph 50Hz 750W
- Dimensions: 900x730x280 mm approx.
- **Weight: 580...620 kg**

C038 + C126

C040D + C127N + C111-01

COMPRESSION 1500 kN capacity			LOAD MEASURIG SYSTEM			
MODEL	Hand Operated	Motorized	1 Gauge	2 Gauge	Digitec mod. C108N (p. 219)	Autotec mod. C098N (p. 219)
C036	▼		▼			
C037	▼			▼		
C038		▼	▼			
C039		▼		▼		
C040D		▼			▼	
C041A *		▼				▼

COMPRESSION TESTING MACHINE HIGH-END MODELS

TO TEST CUBES UP TO 150 MM SIDE AND CYLINDERS UP TO Ø 160X320 MM

STANDARDS: ASTM C39 | AASHTO T22 | NF P18-411 | BS 1610 | GOST 10180-2012

IT TECH

1500 KN CAPACITY

CYBER-PLUS OR **SERVO-PLUS EVOLUTION** DIGITAL TOUCH SCREEN DISPLAY

Cyber and Servo-Plus models have robust and reliable electronic controller, 5.7" touch screen color display. 2 USB ports, 1 SD port, 8 channels for pressure transducers (force measurement) or displacement transducers (Elastic Modulus and Poisson ratio measurement).

INVERTER For a further improvement of energy efficiency and silent operation, (optional device code C099N). Technical details, p. 223 NEW

BARCODE Scanner for specimen file/identification, (optional device code C099-01). Details, p. 223 NEW

C040N | **C041N + C127N + C104-04**

COMPRESSION 1500 kN capacity		LOAD MEASURIG SYSTEM	
MODEL	Motorized	Cyber-Plus Evolution mod. C109N (p. 224)	Servo-Plus Evolution mod. C104N (p. 224)
C040N	▼	▼	
C041N *	▼		▼

* Servo-Plus/Autotec models feature fully automatic power pack - electrovalve operated test start (no manual lever).

ACCESSORIES FOR 1500 kN MACHINES FROM MOD. C036 TO C041N

C111-30 DISTANCE PIECE, 20 mm high for cylinders Ø 150x300 mm

C111 DISTANCE PIECE, 176 high for cubes 150 mm side

C111-01 DISTANCE PIECES, 176+50 mm high for cubes 150 and 100 mm side

C111-03 DISTANCE PIECE, 100 high for cylinders Ø 110x220 mm

C111-03 + C111-30 DISTANCE PIECES, 100 + 20 mm high for cylinders Ø 100x200 mm

C111-21 DISTANCE PIECE, 50 mm high

Note: the cylinders Ø 160x320 mm do not require any distance piece.

C127N GRAPHIC PRINTER on thermo-paper on board for digital models

C127-11 THERMO-PAPER roll for printer (pack of 10 rolls)

C121 SAFETY GUARDS, polycarbonate, with hinges and lock, to CE Directive. p. 317

C121-51 STOP SWITCH on safety guard. See p. 317

C041-11 TESTING CHAMBER with vertical clearance of 376 mm, complete with distance piece 40 mm high, that allows to test cylinders Ø 150x300 mm and 160x320 mm with **capping retainers** (ASTM C1231 I AASHTO T22, T851)

C107-10 CAPPING RETAINERS (set of two) for cylinders Ø 150 mm and 6”

C107-12 CAPPING RETAINERS (set of two) for cylinders Ø 160 mm

C107-20 NEOPRENE PADS (set of two) for cylinders Ø 150 mm 60 shore A

C107-21 NEOPRENE PADS (set of two) for cylinders Ø 150 mm 70 shore A

C107-10 + C107-20

C107-25 NEOPRENE PADS (set of two) for cylinders Ø 160mm 60 shore A

C107-26 NEOPRENE PADS (set of two) for cylinders Ø 160 mm 70 shore A

Note: The capping retainers can be used only with the testing chamber having vertical clearance of 376 mm, mod. C041-11
Technical details: see p. 316

C115-01 TWO WAY HYDRAULIC VALVE, connected to the motorized pumping unit of the machine to activate a second frame. Technical details: see p. 318

C115-01

C097-05 CALIBRATION CLASS 1, starting from 1% of the full range. With a special calibration procedure it is possible to grant Class 1 practically on the full range of the compression machine. Applicable only on digital machines.

C097-01 DUAL LOW CAPACITY DIGITAL RANGE, complete with **appropriate pressure transducer**, only for digital machines. Recommended range 0-250kN.
Technical details: see p. 313

C097-01

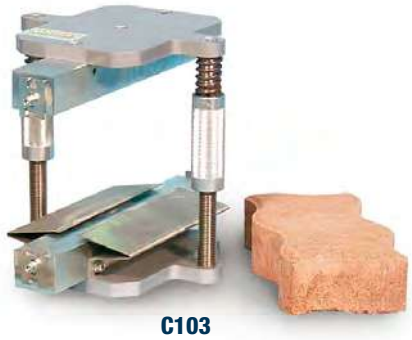
C107 AUTO-CENTERING DEVICE for cubes 100 and 150 mm side, and cylinders Ø 100 and 150 mm.
Technical details: see p. 316

C107

C100 SPLITTING TENSILE test device for cylinders.
EN 12390-6 I ASTM C496
Technical details and other models: see p. 314

C100

C103 SPLITTING TENSILE test device for self blocking pavers and cubes. EN 1338, 12390-6.
Technical details: see p. 314



C103

C106 FLEXURAL TEST DEVICE for concrete beams.
EN 12390-5 I ASTM C78, C293 I AASHTO T97
Technical details: see p. 315

C106

E170 COMPRESSION DEVICE to test cement specimens 40.1x40 mm EN 196 I ASTM C349
Technical details and other models: see p. 315

E170

C126 BENCH to hold the compression machine. See p. 317

C104-04 CONSOLE HOUSING THE SERVO-PLUS EVOLUTION
The pump assembly **lined** with sound proofing material for noise reduction and the digital system are encased to enhance the design and look of the machine.
Technical details: see p. 312

C041N **C104-04**

C099N INVERTER DEVICE
NEW
Applicable only on Cyber-Plus and Servo-Plus Evolution machines.
Technical details: see p. 223

C099N

C104-06

C104-06 CONSOLE HOUSING THE CYBER-PLUS EVOLUTION
NEW
New console internally lined with sound proofing material, to reduce noise and allow for the inverter integration. Detail: see p. 223

SOFTWARE for DIGITEC / AUTOTEC or CYBER / SERVO PLUS models	
C109-10 (N)*	SOFTWARE for compression tests
C123 (N)*	SOFTWARE **Servonet** for remote control through PC
C109-11 (N)*	SOFTWARE for flexural tests
C109-12 (N)*	SOFTWARE for splitting tensile

Technical detail: see p. 18
(N)* for Cyber - Servo Plus models.

COMPRESSION TESTING MACHINE 2000 KN CAPACITY

TO TEST CUBES UP TO 150 MM SIDE AND CYLINDERS UP TO Ø 160X320 MM

STANDARDS: ASTM C39 | AASHTO T22 | NF P18-411 | BS 1610 | GOST 10180-2012

DIAL GAUGES MODELS

- Gauges Ø 250 mm with specific resistance scales for cubes 150 mm and cylinders Ø 150 - 160 mm
- Gauges divisions: 2000 kN div. 5 kN
  600 kN div. 2 kN

MAIN FEATURES FOR ALL MODELS

- Max. vertical daylight: 336 mm
- **Horizontal daylight between columns: 270 mm** NEW
- Compression platens Ø 216 mm
- **High stiffness and heavy weight 4 columns frame (german-style).**
- Calibration accuracy: Class 1
- Max. ram travel 55 mm approx.
- Power supply: 230V 1ph 50Hz 750W
- Dimensions: 1000x780x300 mm approx.
- **Weight: 670...720 kg**

C055D + C111

C056A + C127N

COMPRESSION 2000 kN capacity		LOAD MEASURIG SYSTEM			
MODEL	Motorized	1 Gauge	2 Gauge	Digitec mod. C108N (p. 219)	Autotec mod. C098N (p. 219)
C053	▼	▼			
C054	▼		▼		
C055D	▼			▼	
C056A *	▼				▼

COMPRESSION TESTING MACHINE HIGH-END MODELS

TO TEST CUBES UP TO 150 MM SIDE AND CYLINDERS UP TO Ø 160X320 MM

STANDARDS: ASTM C39 I AASHTO T22 I NF P18-411 I BS 1610 I GOST 10180-2012

IT TECH

2000 KN CAPACITY

CYBER-PLUS OR **SERVO-PLUS EVOLUTION** DIGITAL TOUCH SCREEN DISPLAY

Cyber and Servo-Plus models have robust and reliable electronic controller, 5.7" touch screen color display. 2 USB ports, 1 SD port, 8 channels for pressure transducers (force measurement) or displacement transducers (Elastic Modulus and Poisson ratio measurement).

INVERTER For a further improvement of energy efficiency and silent operation, (optional device code C099N). Technical details, p. 223 NEW

BARCODE Scanner for specimen file/identification, (optional device code C099-01). Details, p. 223 NEW

C055N + C127N + C111 | **C056N + C127N + C111 + C104-04 + C121-05**

COMPRESSION 2000 kN capacity		LOAD MEASURIG SYSTEM	
MODEL	Motorized	Cyber-Plus Evolution mod. C109N (p. 224)	Servo-Plus Evolution mod. C104N (p. 224)
C055N	▼	▼	
C056N *	▼		▼

* Servo-Plus/Autotec models feature fully automatic power pack - electrovalve operated test start (no manual lever).

ACCESSORIES FOR 2000 kN MACHINES FROM MOD. C053 TO C056N

C111-30 DISTANCE PIECE, 20 mm high for cylinders Ø 150x300 mm

C111 DISTANCE PIECE, 176 high for cubes 150 mm side

C111-01 DISTANCE PIECES, 176+50 mm high for cubes 150 and 100 mm side

C111-03 DISTANCE PIECE, 100 high for cylinders Ø 110x220 mm

C111-03 + C111-30 DISTANCE PIECES, 100 + 20 mm high for cylinders Ø 100x200 mm

C111-21 DISTANCE PIECE, 50 mm high

Note: the cylinders Ø 160x320 mm do not require any distance piece.

C127N GRAPHIC PRINTER on thermo-paper on board for digital models

C127-11 THERMO-PAPER roll for printer (pack of 10 rolls)

C121-05 SAFETY GUARDS, polycarbonate, with hinges and lock, to CE Directive. p. 317

C121-51 STOP SWITCH on safety guard. See p. 317

C056-11 TESTING CHAMBER with vertical clearance of 376 mm, complete with distance piece 40 mm high, that allows to test cylinders Ø 150x300 mm and 160x320 mm with **capping retainers** (ASTM C1231 I AASHTO T22, T851)

C107-10 CAPPING RETAINERS (set of two) for cylinders Ø 150 mm and 6"

C107-12 CAPPING RETAINERS (set of two) for cylinders Ø 160 mm

C107-20 NEOPRENE PADS (set of two) for cylinders Ø 150 mm 60 shore A

C107-25 NEOPRENE PADS (set of two) for cylinders Ø 160mm 60 shore A

Note: The capping retainers can be used only with the testing chamber having vertical clearance of 376 mm, mod. C041-11
Technical details: see p. 316

C107-10 + C107-20

C115-01 TWO WAY HYDRAULIC VALVE, connected to the motorized pumping unit of the machine to activate a second frame. Technical details: see p. 318

C115-01

C097-05 CALIBRATION CLASS 1, starting from 1% of the full range. With a special calibration procedure it is possible to grant Class 1 practically on the full range of the compression machine. Applicable only on digital machines.

C097-01 DUAL LOW CAPACITY DIGITAL RANGE, complete with **appropriate pressure transducer**, only for digital machines. Recommended range 0-250kN.
Technical details: see p. 313

C097-01

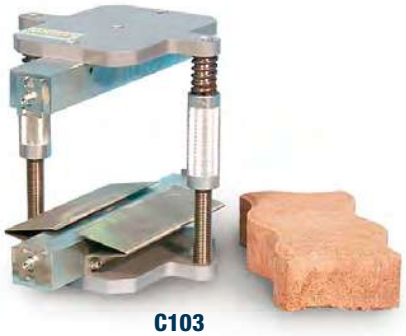
C107 AUTO-CENTERING DEVICE for cubes 100 and 150 mm side, and cylinders Ø 100 and 150 mm.
Technical details: see p. 316

C107

C100 SPLITTING TENSILE test device for cylinders.
EN 12390-6 I ASTM C496
Technical details and other models: see p. 314

C100

C103 SPLITTING TENSILE test device for self blocking pavers and cubes. EN 1338, 12390-6.
Technical details: see p. 314



C103

C106 FLEXURAL TEST DEVICE for concrete beams.
EN 12390-5 I ASTM C78, C293 I AASHTO T97
Technical details: see p. 315

C106

E170 COMPRESSION DEVICE to test cement specimens 40.1x40 mm EN 196 I ASTM C349
Technical details and other models: see p. 315

E170

C126 BENCH to hold the compression machine. See p. 317

C104-04 CONSOLE HOUSING THE SERVO-PLUS EVOLUTION
The pump assembly **lined** with sound proofing material for noise reduction and the digital system are encased to enhance the design and look of the machine.
Technical details: see p. 312

C056N C104-04

C099N INVERTER DEVICE
NEW
Applicable only on Cyber-Plus and Servo-Plus Evolution machines.
Technical details: see p. 223

C099N

C104-06

C104-06 CONSOLE HOUSING THE CYBER-PLUS EVOLUTION
NEW
New console internally lined with sound proofing material, to reduce noise and allow for the inverter integration. Detail: see p. 223

SOFTWARE for DIGITEC / AUTOTEC or CYBER / SERVO PLUS models	
C109-10 (N)*	SOFTWARE for compression tests
C123 (N)*	SOFTWARE **Servonet** for remote control through PC
C109-11 (N)*	SOFTWARE for flexural tests
C109-12 (N)*	SOFTWARE for splitting tensile

Technical detail: see p. 18
(N)* for Cyber - Servo Plus models.

COMPRESSION TESTING MACHINE 2000 KN CAPACITY

TO TEST CUBES UP TO 200 MM SIDE AND CYLINDERS UP TO 280 MM HEIGHT

STANDARDS: ASTM C39 | AASHTO T22 | BS 1610 | GOST 10180-2012

DIAL GAUGES MODELS

- Gauges Ø 250 mm with specific resistance scales for cubes 150 mm and cylinders Ø 150 - 160 mm
- Gauges divisions: 2000 kN div. 5 kN
  600 kN div. 2 kN

MAIN FEATURES FOR ALL MODELS

- Max. vertical daylight: 282 mm
- **Horizontal daylight between columns: 270 mm** NEW
- Compression platens Ø 287 mm
- **High stiffness and heavy weight 4 columns frame (german-style).**
- Calibration accuracy: Class 1
- Max. ram travel 55 mm approx.
- Power supply: 230V 1ph 50Hz 750W
- Dimensions: 690x400x1320 mm approx.
- **Weight: 670...720 kg**

C058-04D + C127N + C111-22

C058-05A + C127N + C121-05 + C111-26 + C111-22

COMPRESSION 2000 kN capacity		LOAD MEASURIG SYSTEM			
MODEL	Motorized	1 Gauge	2 Gauge	Digitec mod. C108N (p. 219)	Autotec mod. C098N (p. 219)
C058-02	▼	▼			
C058-03	▼		▼		
C058-04D	▼			▼	
C058-05A *	▼				▼

COMPRESSION TESTING MACHINE HIGH-END MODELS

TO TEST CUBES UP TO 200 MM SIDE AND CYLINDERS UP TO 280 MM HEIGHT

STANDARDS: ASTM C39 I AASHTO T22 I BS 1610 I GOST 10180-2012

IT TECH

2000 KN CAPACITY

CYBER-PLUS OR **SERVO-PLUS EVOLUTION** DIGITAL TOUCH SCREEN DISPLAY

Cyber and Servo-Plus models have robust and reliable electronic controller, 5.7" touch screen color display. 2 USB ports, 1 SD port, 8 channels for pressure transducers (force measurement) or displacement transducers (Elastic Modulus and Poisson ratio measurement).

INVERTER For a further improvement of energy efficiency and silent operation, (optional device code C099N). NEW
Technical details, p. 223

BARCODE Scanner for specimen file/identification, (optional device code C099-01). NEW
Details, p. 223

C058-04N + C127N + C111-26 + C111-22

C058-05N + C104-04 + C127N + C111-26 + C111-22 + C121-05

COMPRESSION 2000 kN capacity		LOAD MEASURIG SYSTEM	
MODEL	Motorized	Cyber-Plus Evolution mod. C109N (p. 224)	Servo-Plus Evolution mod. C104N (p. 224)
C058-04N	▼	▼	
C058-05N *	▼		▼

* Servo-Plus/Autotec models feature fully automatic power pack - electrovalve operated test start (no manual lever).

ACCESSORIES FOR 2000 kN MACHINES FROM MOD C058-02 TO C058-05N

C111-26 DISTANCE PIECE, 76 mm high for cubes 200 mm side

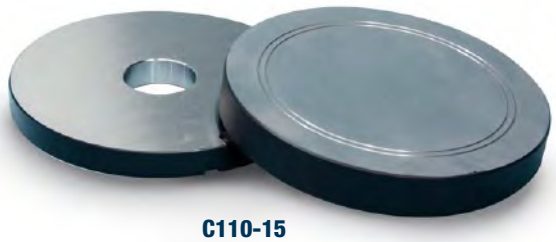
C111-26 + C111-22
DISTANCE PIECES, 76+50 mm high for cubes 200 and 150 mm side

C111-26 + C111-22 + C111-22
DISTANCE PIECES 76+50+50 mm high for cubes 200, 150 and 100 mm side

C111-22 DISTANCE PIECE 50 mm high

C111-31 DISTANCE PIECE 20 mm high

C110-15 LOWER COMPRESSION PLATEN, Ø 216x40 mm, hardened and rectified to test cubes 100 and 150 mm, as an alternative to the standard platen Ø 278 mm
Technical details: see p. 319



C110-15

C112-10 UPPER+LOWER LARGE COMPRESSION PLATENS 245x510x55 mm WITH SEAT BALL to test **also** blocks.

C112-10

C127N GRAPHIC PRINTER on thermo-paper on board for digital models

C127-11 THERMO-PAPER roll for printer (pack of 10 rolls)

C121-05 SAFETY GUARDS, polycarbonate, with hinges and lock, to CE Directive. See p. 317

C121-51 STOP SWITCH on safety guard.
See p. 317

C115-01 TWO WAY HYDRAULIC VALVE, connected to the motorized pumping unit of the machine to activate a second frame. Technical details: see p. 318

C115-01

C097-05 CALIBRATION CLASS 1, starting from 1% of the full range. With a special calibration procedure it is possible to grant Class 1 practically on the full range of the compression machine. Applicable only on digital machines.

C097-01 DUAL LOW CAPACITY DIGITAL RANGE, complete with **appropriate pressure transducer**, only for digital machines. Recommended range 0-250kN.
Technical details: see p. 313

C097-01

C107-01 AUTO-CENTERING DEVICE for cubes 100 and 150 mm side, and cylinders Ø 100 mm
Technical details: see p. 316

C107-01

C100 SPLITTING TENSILE test device for cylinders.
EN 12390-6 | ASTM C496
Technical details and other models: see p. 314

C100

C103 SPLITTING TENSILE test device for self blocking pavers and cubes. EN 1338, 12390-6.
Technical details: see p. 314

C103

C106 FLEXURAL TEST DEVICE for concrete beams.
EN 12390-5 | ASTM C78, C293 | AASHTO T97
Technical details: see p. 315

C106

E170 COMPRESSION DEVICE to test cement specimens 40.1x40 mm EN 196 | ASTM C349
Technical details and other models: see p. 315

E170

C126 BENCH to hold the compression machine. See p. 317

C104-04 CONSOLE HOUSING THE SERVO-PLUS EVOLUTION
The pump assembly **lined** with sound proofing material for noise reduction and the digital system are encased to enhance the design and look of the machine.
Technical details: see p. 312

C058-05N C104-04

C099N INVERTER DEVICE
NEW
Applicable only on Cyber-Plus and Servo-Plus Evolution machines.
Technical details: see p. 223

C099N

C104-06

C104-06 CONSOLE HOUSING THE CYBER-PLUS EVOLUTION
NEW
New console internally lined with sound proofing material, to reduce noise and allow for the inverter integration. Detail: see p. 223

SOFTWARE for DIGITEC / AUTOTEC or CYBER / SERVO PLUS models	
C109-10 (N)*	SOFTWARE for compression tests
C123 (N)*	SOFTWARE **Servonet** for remote control through PC
C109-11 (N)*	SOFTWARE for flexural tests
C109-12 (N)*	SOFTWARE for splitting tensile

Technical detail: see p. 18
(N)* for Cyber - Servo Plus models.

COMPRESSION TESTING MACHINE 2000 KN CAPACITY

TO TEST BLOCKS MAX. 500X300 MM, CUBES UP TO 300 MM SIDE AND CYLINDERS UP TO Ø 160X320 MM

STANDARDS: EN 772-1 I ASTM C39, C140, C1314 I AASHTO T22 I NF P18-411 I BS 1610, 6073 I GOST 10180-2012

DIAL GAUGES MODELS

- Gauges Ø 250 mm with specific resistance scales for cubes 150 mm and cylinders Ø 150 - 160 mm
- Gauges divisions: 2000 kN div. 5 kN
  600 kN div. 2 kN

MAIN FEATURES FOR ALL MODELS

- Max. vertical daylight: 336 mm
- Horizontal daylight beetween columns: 324 mm
- Compression platens 510x320x55 mm
- **High stiffness and heavy weight 4 columns frame (german-style).**
- Calibration accuracy: Class 1
- Max. ram travel 55 mm approx.
- Power supply: 230V 1ph 50Hz 750W
- Dimensions: 870x600x1400 mm approx.
- **Weight: 850...900**

C077D + C127N + C105 + C111-08

C078A + C105 + C111-08

COMPRESSION 2000 kN capacity		LOAD MEASURIG SYSTEM			
MODEL	Motorized	1 Gauge	2 Gauge	Digitec mod. C108N (p. 219)	Autotec mod. C098N (p. 219)
C075	▼	▼			
C076	▼		▼		
C077D	▼			▼	
C078A *	▼				▼

COMPRESSION TESTING MACHINE HIGH-END MODELS

TO TEST BLOCKS MAX. 500X300 MM, CUBES UP TO 300 MM SIDE AND CYLINDERS UP TO Ø 160X320 MM

STANDARDS: EN 772-1 | ASTM C39, C140, C1314 | AASHTO T22 | NF P18-411 | BS 1610, 6073 | GOST 10180-2012

2000 KN CAPACITY

CYBER-PLUS OR **SERVO-PLUS EVOLUTION** DIGITAL TOUCH SCREEN DISPLAY

IT TECH

Cyber and Servo-Plus models have robust and reliable electronic controller, 5.7" touch screen color display. 2 USB ports, 1 SD port, 8 channels for pressure transducers (force measurement) or displacement transducers (Elastic Modulus and Poisson ratio measurement).

INVERTER For a further improvement of energy efficiency and silent operation, (optional device code C099N). Technical details, p. 223 NEW

BARCODE Scanner for specimen file/identification, (optional device code C099-01). Details, p. 223 NEW

C077N + C127N + C111-22 | **C078N + C104-04 + C127N + C105 + C111-08**

COMPRESSION 2000 kN capacity		LOAD MEASURIG SYSTEM	
MODEL	Motorized	Cyber-Plus Evolution mod. C109N (p. 224)	Servo-Plus Evolution mod. C104N (p. 224)
C077N	▼	▼	
C078N *	▼		▼

* Servo-Plus/Autotec models feature fully automatic power pack - electrovalve operated test start (no manual lever).

ACCESSORIES FOR 2000 kN BLOCKS MACHINES FROM MOD. C075 TO C078N

C111-31 DISTANCE PIECE, 20 mm high for cylinders Ø 150x300 mm

C111-04 DISTANCE PIECE, 126 mm high for cubes 200 mm side

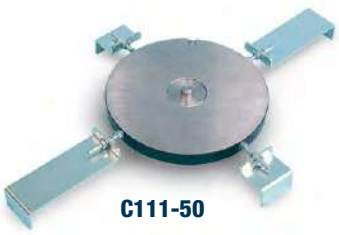
C111-05 DISTANCE PIECES, 126+50 mm high for cubes 200 and 150 mm side

C111-06 DISTANCE PIECES 126+50+50 mm high for cubes 200, 150 and 100 mm side

C111-22 DISTANCE PIECE 50 mm high

Note: The cylinders Ø 160x320 mm do not require any distance piece.

C111-50 DISTANCE PIECE, it eliminates the heavy procedure to lift the lower rectangular platen and to add distance pieces.
Technical details: see p. 320



C111-50

AS AN ALTERNATIVE:

C112-05 KIT of 4 HANDLES to lift the lower platen, making the positioning of distance pieces easier. Technical details: see p. 320

C112-05

AS AN ALTERNATIVE:

C105 CENTRAL SCREW, to get easier the adjustment between the big sized compression platens.
Technical details: see p. 313

C111-27 SLOTTED DISTANCE PIECE, 20 mm high, for central screw

C111-23 SLOTTED DISTANCE PIECE, 50 mm high for central screw

C111-28 SLOTTED DISTANCE PIECE, 76 mm high for central screw

C111-08 SLOTTED DISTANCE PIECE, 126 mm high for central screw

C127N GRAPHIC PRINTER on thermo-paper on board for digital models

C127-11 THERMO-PAPER roll for printer (pack of 10 rolls)

C121-01 SAFETY GUARDS, polycarbonate, with hinges and lock, to CE Directive. See p. 317

C121-51 STOP SWITCH on safety guard. See p. 317

C107-10 CAPPING RETAINERS (set of two) for cylinders 150 mm and 6". Other models: see p. 316

C107-20 NEOPRENE PADS (set of two) for cylinders Ø 150 mm 60 shore A. Other models: see p. 316

C107-10 + C107-20

C110-30

C110-30 UPPER COMPRESSION PLATEN+SPHERICAL SEAT, to fix on the testing machine, in replacement of the standard platen + seat to obtain an increased vertical clearance of the testing chamber and to meet
ASTM C39, C1231 and AASHTO T22, T851
Platen dimensions: Ø 165x30 mm
Weight: 10 kg approx.
Technical details: see p. 316

C115-01 TWO WAY HYDRAULIC VALVE, connected to the motorized pumping unit of the machine to activate a second frame.
Technical details: see p. 318

C115-01

C097-05 CALIBRATION CLASS 1, starting from 1% of the full range. With a special calibration procedure it is possible to grant Class 1 practically on the full range of the compression machine. Applicable only on digital machines.

C097-01 DUAL LOW CAPACITY DIGITAL RANGE, complete with **appropriate pressure transducer**, only for digital machines. Recommended range 0-250kN.
Technical details: see p. 313

C097-01

C100 SPLITTING TENSILE test device for cylinders.
EN 12390-6 I ASTM C496
Technical details and other models: see p. 314

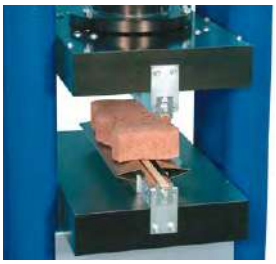
C100

C103 SPLITTING TENSILE test device for self blocking pavers and cubes. EN 1338, 12390-6.
Technical details: see p. 314

C103

AS AN ALTERNATIVE:

C103-01 SPLITTING TENSILE test device for self blocking pavers and cubes having max. dimensions 300x500 mm, directly fixed on the large compression platens.
EN 1338, 12390-6. Technical details: see p. 314



C103-01

C106 FLEXURAL TEST DEVICE for concrete beams.
EN 12390-5 I ASTM C78, C293 I AASHTO T97
Technical details: see p. 315

C106

E170 COMPRESSION DEVICE to test cement specimens 40.1x40 mm EN 196 I ASTM C349
Technical details and other models: see p. 315

E170

C126 BENCH to hold the compression machine. See p. 317

C104-04 CONSOLE HOUSING THE SERVO-PLUS EVOLUTION
The pump assembly **lined** with sound proofing material for noise reduction and the digital system are encased to enhance the design and look of the machine.
Technical details: see p. 312

C078N **C104-04**

C099N INVERTER DEVICE
NEW
Applicable only on Cyber-Plus and Servo-Plus Evolution machines.
Technical details: see p. 223

C099N

C104-06

C104-06 CONSOLE HOUSING THE CYBER-PLUS EVOLUTION
NEW
New console internally lined with sound proofing material, to reduce noise and allow for the inverter integration. Detail: see p. 223

SOFTWARE for DIGITEC / AUTOTEC or CYBER / SERVO PLUS models	
C109-10 (N)*	SOFTWARE for compression tests
C123 (N)*	SOFTWARE **Servonet** for remote control through PC
C109-11 (N)*	SOFTWARE for flexural tests
C109-12 (N)*	SOFTWARE for splitting tensile

Technical detail: see p. 18
(N)* for Cyber - Servo Plus models.

COMPRESSION TESTING MACHINE 3000 KN CAPACITY

TO TEST CUBES UP TO 200 MM SIDE AND CYLINDERS UP TO Ø 160X320 MM

STANDARDS: ASTM C39 | AASHTO T22 | NF P18-411 | BS 1610 | GOST 10180-2012

DIAL GAUGES MODELS

- Gauges Ø 250 mm with specific resistance scales for cubes 150 mm and cylinders Ø 150 - 160 mm
- Gauges divisions: 3000 kN div. 10 kN
  600 kN div. 2 kN

MAIN FEATURES FOR ALL MODELS

- Max. vertical daylight: 336 mm
- Horizontal daylight between columns: 272 mm
- Compression platens Ø 287 mm
- **High stiffness and heavy weight 4 columns frame (german-style).**
- Calibration accuracy: Class 1
- Max. ram travel 55 mm approx.
- Power supply: 230V 1ph 50Hz 750W
- Dimensions: 860x470x1450 mm approx.
- **Weight: 1050...1120 kg**

C070D + C111-05

C071A + C127N + C111-05 + C121-07

COMPRESSION 3000 kN capacity		LOAD MEASURIG SYSTEM			
MODEL	Motorized	1 Gauge	2 Gauge	Digitec mod. C108N (p. 219)	Autotec mod. C098N (p. 219)
C068	▼	▼			
C069	▼		▼		
C070D	▼			▼	
C071A *	▼				▼

COMPRESSION TESTING MACHINE HIGH-END MODELS

TO TEST CUBES UP TO 200 MM SIDE AND CYLINDERS UP TO Ø 160X320 MM

STANDARDS: ASTM C39 I AASHTO T22 I NF P18-411 I BS 1610 I GOST 10180-2012

IT TECH

3000 KN CAPACITY

CYBER-PLUS OR **SERVO-PLUS EVOLUTION** DIGITAL TOUCH SCREEN DISPLAY

Cyber and Servo-Plus models have robust and reliable electronic controller, 5.7" touch screen color display. 2 USB ports, 1 SD port, 8 channels for pressure transducers (force measurement) or displacement transducers (Elastic Modulus and Poisson ratio measurement).

INVERTER For a further improvement of energy efficiency and silent operation, (optional device code C099N). Technical details, p. 223 NEW

BARCODE Scanner for specimen file/identification, (optional device code C099-01). Details, p. 223 NEW

C070N + C127N + C111-05 | **C071N + C104-04 + C127N + C111-05 + C121-07**

COMPRESSION 3000 kN capacity		LOAD MEASURIG SYSTEM	
MODEL	Motorized	Cyber-Plus Evolution mod. C109N (p. 224)	Servo-Plus Evolution mod. C104N (p. 224)
C070N	▼	▼	
C071N *	▼		▼

* Servo-Plus/Autotec models feature fully automatic power pack - electrovalve operated test start (no manual lever).

ACCESSORIES FOR 3000 kN MACHINES FROM MOD. C068 TO C071N

C111-31 DISTANCE PIECE, 20 mm high for cylinders Ø 150x300 mm

C111-04 DISTANCE PIECE, 126 mm high for cubes 200 mm side

C111-05 DISTANCE PIECES, 126+50 mm high for cubes 200 and 150 mm side

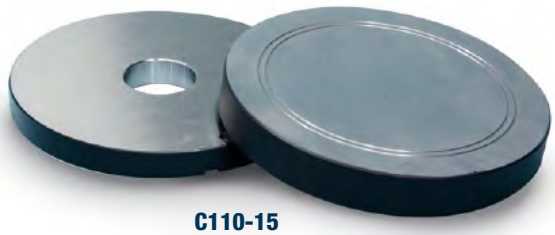
C111-06 DISTANCE PIECES 126+50+50 mm high for cubes 200, 150 and 100 mm side

C111-07 + C111-31 DISTANCE PIECES, high 50+50+20 mm for cylinders Ø 100x200 mm

C111-22 DISTANCE PIECE, 50 mm high

C110-15 LOWER COMPRESSION PLATEN, Ø 216x40 mm, hardened and rectified to test cubes 100 and 150 mm, as an alternative to the standard platen Ø 278 mm
Technical details: see p. 319

Note: the cylinders Ø 160x320 mm do not require any distance piece.



C110-15

C112-10 UPPER+LOWER LARGE COMPRESSION PLATENS 245x510x55 mm complete with SEAT BALL to test **also** blocks.

C127N GRAPHIC PRINTER on thermo-paper on board for digital models

C127-11 THERMO-PAPER roll for printer (pack of 10 rolls)

C121-07 SAFETY GUARDS, polycarbonate, with hinges and lock, to CE Directive. p. 317

C121-51 STOP SWITCH on safety guard. See p. 319

C107-10 CAPPING RETAINERS (set of two) for cylinders Ø 150 mm and 6". Other models: see p. 316

C107-12 CAPPING RETAINERS (set of two) for cylinders Ø 160 mm

C107-20 NEOPRENE PADS (set of two) for cylinders Ø 150mm 60 shore A

C107-25 NEOPRENE PADS (set of two) for cylinders Ø 160 mm 60 shore A. Other models: see p. 316

C112-10

C107-10 + C107-20

C110-30 UPPER COMPRESSION PLATEN+SPHERICAL SEAT, to fix on the testing machine, in replacement of the standard platen + seat to obtain an increased vertical clearance of the testing chamber and to meet the
ASTM C39, C1231 and AASHTO T22, T851
Platen dimensions: Ø 165x30 mm
Weight: 10 kg approx.
Technical details: see p. 316

C110-30

C115-01 TWO WAY HYDRAULIC VALVE, connected to the motorized pumping unit of the machine to activate a second frame. Technical details: see p. 318

C115-01

C097-01 DUAL LOW CAPACITY DIGITAL RANGE, complete with **appropriate pressure transducer**, only for digital machines. Recommended range 0-250kN.
Technical details: see p. 313

C097-01

C097-05 CALIBRATION CLASS 1, starting from 1% of the full range. With a special calibration procedure it is possible to grant Class 1 practically on the full range of the compression machine. Applicable only on digital machines.

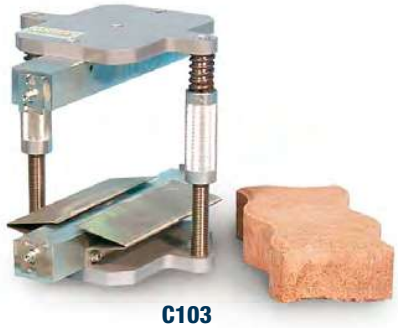
C107-01 AUTO-CENTERING DEVICE for cubes 100 and 150 mm side, and cylinders Ø 100 and 150 mm.
Technical details: see p. 316

C107-01

C100 SPLITTING TENSILE test device for cylinders.
EN 12390-6 I ASTM C496
Technical details and other models: see p. 314

C100

C103 SPLITTING TENSILE test device for self blocking pavers and cubes. EN 1338, 12390-6.
Technical details: see p. 314



C103

C106 FLEXURAL TEST DEVICE for concrete beams.
EN 12390-5 I ASTM C78, C293 I AASHTO T97
Technical details: see p. 315

C106

E170 COMPRESSION DEVICE to test cement specimens 40.1x40 mm EN 196 I ASTM C349
Technical details and other models: see p. 315

E170

C126 BENCH to hold the compression machine. See p. 317

C104-04 CONSOLE HOUSING THE SERVO-PLUS EVOLUTION
The pump assembly **lined** with sound proofing material for noise reduction and the digital system are encased to enhance the design and look of the machine.
Technical details: see p. 314

C071N C104-04

C099N INVERTER DEVICE
NEW
Applicable only on Cyber-Plus and Servo-Plus Evolution machines.
Technical details: see p. 223

C099N

C104-06

C104-06 CONSOLE HOUSING THE CYBER-PLUS EVOLUTION
NEW
New console internally lined with sound proofing material, to reduce noise and allow for the inverter integration. Detail: see p. 223

SOFTWARE for DIGITEC / AUTOTEC or CYBER / SERVO PLUS models	
C109-10 (N)*	SOFTWARE for compression tests
C123 (N)*	SOFTWARE **Servonet** for remote control through PC
C109-11 (N)*	SOFTWARE for flexural tests
C109-12 (N)*	SOFTWARE for splitting tensile

Technical detail: see p. 18
(N)* for Cyber - Servo Plus models.

COMPRESSION TESTING MACHINE 3000 KN CAPACITY

TO TEST BLOCKS MAX. 500X300 MM, CUBES UP TO 300 MM SIDE AND CYLINDERS UP TO Ø 160X320 MM

STANDARDS: EN 772-1 | ASTM C39, C140, C1314 | AASHTO T22 | NF P18-411 | BS 1610, 6073 | GOST 10180-2012

DIAL GAUGES MODELS

- Gauges Ø 250 mm with specific resistance scales for cubes 150 mm and cylinders Ø 150 - 160 mm
- Gauges divisions: 3000 kN div. 10 kN
  600 kN div. 2 kN

MAIN FEATURES FOR ALL MODELS

- Max. vertical daylight between platens: 336 mm
- Horizontal daylight between columns: 340 mm
- Compression platens 510x320xh55 mm
- **High stiffness and heavy weight 4 columns frame (german-style).**
- Calibration accuracy: Class 1
- Max. ram travel 55 mm approx.
- Power supply: 230V 1ph 50Hz 750W
- Dimensions: 900x600x1500 mm approx.
- **Weight: 1150...1220 kg**

C079-05D + C105 + C127N + C111-28

C079-06A + C105 + C111-28

COMPRESSION 3000 kN capacity		LOAD MEASURIG SYSTEM			
MODEL	Motorized	1 Gauge	2 Gauge	Digitec mod. C108N (p. 219)	Autotec mod. C098N (p. 219)
C079-03	▼	▼			
C079-04	▼		▼		
C079-05D	▼			▼	
C079-06A *	▼				▼

COMPRESSION TESTING MACHINE HIGH-END MODELS

TO TEST BLOCKS MAX. 500X300 MM, CUBES UP TO 300 MM SIDE AND CYLINDERS UP TO Ø 160X320 MM

STANDARDS: EN 772-1 | ASTM C39, C140, C1314 | AASHTO T22 | NF P18-411 | BS 1610, 6073 | GOST 10180-2012

3000 KN CAPACITY

CYBER-PLUS OR **SERVO-PLUS EVOLUTION** DIGITAL TOUCH SCREEN DISPLAY

IT TECH

Cyber and Servo-Plus models have robust and reliable electronic controller, 5.7" touch screen color display. 2 USB ports, 1 SD port, 8 channels for pressure transducers (force measurement) or displacement transducers (Elastic Modulus and Poisson ratio measurement).

INVERTER For a further improvement of energy efficiency and silent operation, (optional device code C099N). Technical details, p. 223 NEW

BARCODE Scanner for specimen file/identification, (optional device code C099-01). Details, p. 223 NEW

C079-05N + C127N + C111-22

C079-06N + C105 + C127N + C104-04 + C111-28

COMPRESSION 3000 kN capacity		LOAD MEASURIG SYSTEM	
MODEL	Motorized	Cyber-Plus Evolution mod. C109N (p. 224)	Servo-Plus Evolution mod. C104N (p. 224)
C079-05N	▼	▼	
C079-06N *	▼		▼

* Servo-Plus/Autotec models feature fully automatic power pack - electrovalve operated test start (no manual lever).

ACCESSORIES FOR 3000 kN BLOCKS MACHINES FROM MOD. C079-03 TO C079-06N

C111-31 DISTANCE PIECE, 20 mm high for cylinders Ø 150x300 mm

C111-04 DISTANCE PIECE, 126 mm high for cubes 200 mm side

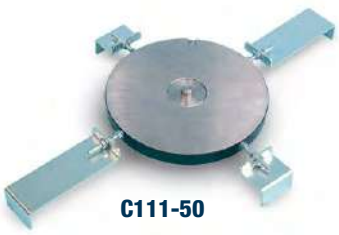
C111-05 DISTANCE PIECES, 126+50 mm high for cubes 200 and 150 mm side

C111-06 DISTANCE PIECES 126+50+50 mm high for cubes 200, 150 and 100 mm side

C111-22 DISTANCE PIECE 50 mm high

Note: The cylinders Ø 160x320 mm do not require any distance piece.

C111-50 DISTANCE PIECE, it eliminates the heavy procedure to lift the lower rectangular platen and to add distance pieces.
Technical details: see p. 320



C111-50

AS AN ALTERNATIVE:

C112-05 KIT of 4 HANDLES to lift the lower platen, making the positioning of distance pieces easier. Technical details: see p. 320

C112-05

AS AN ALTERNATIVE:

C105 CENTRAL SCREW, to get easier the adjustment between the big sized compression platens.
Technical details: see p. 313

C111-27 SLOTTED DISTANCE PIECE, 20 mm high, for central screw

C111-23 SLOTTED DISTANCE PIECE, 50 mm high for central screw

C111-28 SLOTTED DISTANCE PIECE, 76 mm high for central screw

C111-08 SLOTTED DISTANCE PIECE, 126 mm high for central screw

C127N GRAPHIC PRINTER on thermo-paper on board for digital models

C127-11 THERMO-PAPER roll for printer (pack of 10 rolls)

C121-08 SAFETY GUARDS, polycarbonate, with hinges and lock, to CE Directive. See p. 317

C121-51 STOP SWITCH on safety guard. See p. 317

C107-10 CAPPING RETAINERS (set of two) for cylinders 150 mm and 6". Other models: see p. 316

C107-20 NEOPRENE PADS (set of two) for cylinders Ø 150 mm 60 shore A. Other models: see p. 316

C107-10 + C107-20

C110-30

C110-30 UPPER COMPRESSION PLATEN+SPHERICAL SEAT, to fix on the testing machine, in replacement of the standard platen + seat to obtain an increased vertical clearance of the testing chamber and to meet the
ASTM C39, C1231 and AASHTO T22, T851
Platen dimensions: Ø 165x30 mm
Weight: 10 kg approx.
Technical details: see p. 316

C115-01 TWO WAY HYDRAULIC VALVE, connected to the motorized pumping unit of the machine to activate a second frame.
Technical details: see p. 318

C115-01

C097-05 CALIBRATION CLASS 1, starting from 1% of the full range. With a special calibration procedure it is possible to grant Class 1 practically on the full range of the compression machine. Applicable only on digital machines.

C097-01 DUAL LOW CAPACITY DIGITAL RANGE, complete with **appropriate pressure transducer**, only for digital machines. Recommended range 0-250kN.
Technical details: see p. 313

C097-01

C100 SPLITTING TENSILE test device for cylinders.
EN 12390-6 I ASTM C496
Technical details and other models: see p. 314

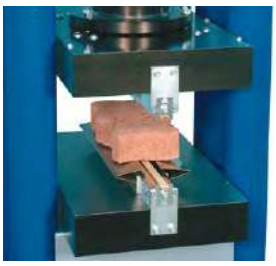
C100

C103 SPLITTING TENSILE test device for self blocking pavers and cubes. EN 1338, 12390-6.
Technical details: see p. 314

C103

AS AN ALTERNATIVE:

C103-01 SPLITTING TENSILE test device for self blocking pavers and cubes having max. dimensions 300x500mm, directly fixed on the large compression platens.
EN 1338, 12390-6. Technical details: see pag. 314



C103-01

C106 FLEXURAL TEST DEVICE for concrete beams.
EN 12390-5 | ASTM C78, C293 | AASHTO T97
Technical details: see p. 315

C106

E170 COMPRESSION DEVICE to test cement specimens 40.1x40 mm EN 196 | ASTM C349
Technical details and other models: see p. 315

E170

C126 BENCH to hold the compression machine. See p. 317

C104-04 CONSOLE HOUSING THE SERVO-PLUS EVOLUTION
The pump assembly **lined** with sound proofing material for noise reduction and the digital system are encased to enhance the design and look of the machine.
Technical details: see p. 312

C079-06N **C104-04**

C099N INVERTER DEVICE
NEW
Applicable only on Cyber-Plus and Servo-Plus Evolution machines.
Technical details: see p. 223

C104-06

C099N

C104-06 CONSOLE HOUSING THE CYBER-PLUS EVOLUTION
NEW
New console internally lined with sound proofing material, to reduce noise and allow for the inverter integration. Detail: see p. 223

SOFTWARE for DIGITEC / AUTOTEC or CYBER / SERVO PLUS models	
C109-10 (N)*	SOFTWARE for compression tests
C123 (N)*	SOFTWARE **Servonet** for remote control through PC
C109-11 (N)*	SOFTWARE for flexural tests
C109-12 (N)*	SOFTWARE for splitting tensile

Technical detail: see p. 18
(N)* for Cyber - Servo Plus models.

COMPRESSION TESTING MACHINE 5000 KN CAPACITY HIGH-END MODELS

TO TEST CUBES UP TO 300 MM SIDE AND CYLINDERS UP TO Ø 250X500 MM

STANDARDS: BS 1610 | NF P18-411 | ASTM C39 | AASHTO T22 | GOST 10180-2012

IT TECH

5000 KN CAPACITY

MAIN FEATURES FOR ALL MODELS

- Max. vertical daylight: 530 mm
- Horizontal daylight between columns: 340 mm
- Compression platens 310x310 mm
- Calibration accuracy: Class 1
- Max. ram travel 60 mm approx.
- **High stiffness and heavy weight 4 columns frame (german-style).**
- Power supply: 230V 1ph 50Hz 750W
- Dimensions: 1200x900x1900 mm approx.
- Weight: 2800...2900 kg approx.

CYBER-PLUS OR **SERVO-PLUS EVOLUTION**
DIGITAL TOUCH SCREEN DISPLAY

Cyber and Servo-Plus models have robust and reliable electronic controller, 5.7" touch screen color display. 2 USB ports, 1 SD port, 8 channels for pressure transducers (force measurement) or displacement transducers (Elastic Modulus and Poisson ratio measurement).

INVERTER

NEW

For a further improvement of energy efficiency and silent operation, (optional device code C099N). Technical details, p. 223

BARCODE

Scanner for specimen file/identification, (optional device code C099-01). Details, p. 223

NEW

C086-02N + C127N

C086-03N + C086-10

COMPRESSION 5000 kN capacity		LOAD MEASURIG SYSTEM	
MODEL	Motorized	Cyber-Plus Evolution mod. C109N (p. 224)	Servo-Plus Evolution mod. C104N (p. 224)
C086-02N	▼	▼	
C086-03N *	▼		▼

* Servo-Plus model feature fully automatic power pack - electrovalve operated test start (no manual lever).

ACCESSORIES FOR 5000 kN MACHINES

C086-10 DISTANCE PIECE, 50 mm high

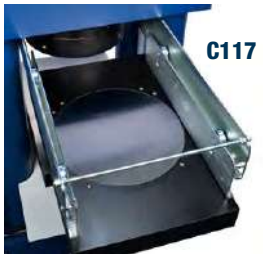
C086-11 DISTANCE PIECE, 25 mm high

Note: Vertical daylight of the compression platens is 530 mm. The operator will have to buy the needed distance pieces to reduce the daylight between the compression platens to get the correct daylight of the specimen under test plus approx. 10 to 15 mm

C112-11

C112-11 UPPER+LOWER LARGE COMPRESSION PLATENS+SEAT BALL 310x510x55 mm to test **also** blocks. It is necessary to have also the sliding rail carriage mod. C117

C117 SLIDING RAIL CARRIAGE, for an easy removal of the large block upper platen



C117

C127N GRAPHIC PRINTER on thermo-paper on board

C127-11 THERMO-PAPER roll for printer (pack of 10 rolls)

C121-04 SAFETY GUARDS, polycarbonate, with hinges and lock, to CE Directive. See p. 317

C121-51 STOP SWITCH on safety guard. See p. 317

C115-01 TWO WAY HYDRAULIC VALVE, connected to the motorized pumping unit of the machine to activate a second frame.
Technical details: see p. 318

C097-01

C097-01 DUAL LOW CAPACITY DIGITAL RANGE, complete with **appropriate pressure transducer**. Recommended range 0-250kN. Technical details: see p. 313

C097-01

C097-05 CLASS 1, starting from 1% of the full range. With a special calibration procedure it is possible to grant Class 1 practically on the full range of the compression machine.

C100
SPLITTING TENSILE test device for cylinders.EN 12390-6 | ASTM C496
Technical details and other models: see p. 314

C100

C103
SPLITTING TENSILE test device for self blocking pavers and cubes.
EN 1338, 12390-6.
Technical details: see p. 314

C103

C106
FLEXURAL TEST DEVICE for concrete beams.
EN 12390-5 | ASTM C78, C293 | AASHTO T97
Technical details: see p. 315

C106

E170
COMPRESSION DEVICE to test cement specimens 40.1x40 mm EN 196 | ASTM C349
Technical details and other models: see p. 317

E170

C099N NEW
INVERTER DEVICE
Applicable only on Cyber-Plus and Servo-Plus Evolution machines.
Technical details: see p. 223

C099N

SOFTWARE for CYBER / SERVO PLUS models	
C109-10N	SOFTWARE for compression tests
C123N	SOFTWARE **Servonet** for remote control through PC
C109-11N	SOFTWARE for flexural tests
C109-12N	SOFTWARE for splitting tensile

Technical detail: see p. 18

COMPRESSION AND FLEXURAL FRAMES ONLY

The compression frame is supplied complete with upper compression platen + spherical seat and lower compression platen, pressure transducer and and flexible connection pipe to separate control console.
The two-way hydraulic valve mod. C115-01 (see p. 318), the distance pieces and the safety guards are not included and must be ordered separately.

Code	Capacity	Technical details at pages	Cube/Cylinder	Blocks	ASTM Spec.	EN High Stability Spec.
C036F	1300/1500 kN	230, 234	▼		▼	
C051F	2000 kN	238	▼		▼	
C058F	2000 kN	242	▼		▼	
C073F	2000 kN	246	▼	▼	▼	
C066F	3000 kN	250	▼		▼	
C079-01F	3000 kN	254	▼	▼	▼	
C089F	2000 kN	262	▼			▼
C089-22F	2000 kN	266	▼	▼		▼
C089-06F	3000 kN	270	▼			▼
C089-15F	3000 kN	274	▼	▼		▼
C090F	150 kN	290	beams		▼	▼
C091-01F*	150 kN	292	multipurpose		▼	▼
C090-06F*	200 kN	294	multipurpose		▼	▼
C095F*	320 kN	296	multipurpose		▼	▼
C096F*	360 kN	300	multipurpose		▼	▼

*Note: rollers are not included


C051F


C089F


C095F


C090F


C090-06F


C091-01F

COMPRESSION TESTING MACHINES TESTED FOR HIGH STABILITY

FOUR COLUMNS PRESTRESSED FRAME

The compression machines **tested for high stability** meet the stringent requirements of the:
EN 12390-4 | BS 1881:115 | DIN 51220 | UNI 6686, part 3 | NF P18-411 | UNE 83304 | ASTM C39 | AASHTO T22

The machines are manufactured with specific quality features (processing, tolerances) of frame, piston/cylinder group, spherical seat, compression platens, distance pieces etc., conforming and meeting the high stability verification. (force distribution).
The conformity of the stability is certified with the verification of the self-alignment (foot-meter test) of the machines components and the restraint on movement of the upper spherical seat/platen, by using a special electric strain load column at 5 measuring points which is connected to its suitable datalogger (technical details: see p. 325)

An incorrect and not uniform load application to the specimen causes irregular, unsatisfactory and premature failure. The obtained compression resistance can be substantially lower than the effective resistance.

The most important feature of the high stability frames is their uniform distribution of the applied load on all the specimen surface under test. The sample breakage is satisfactory and the strength results are correct, high and true.

- The four columns frame is prestressed on 8 ring nuts and the clamping is obtained and checked by a dynamometric spanner, allowing to get a very high stiffness and stability on all load range and to keep these features in the time.
- The spherical seat, in oil bath with null end float, is studied and manufactured to grant, during the starting phase of the test, an accurate self-alignment without frictions of the upper compression platen to the specimen. By applying the load, the ball seating assembly locks and keeps the position until the specimen's failure.
- Piston and cylinder are coupled with high quality packing set.
- Compression platens are hardened over 55 HRC and rectified.

Available in the capacities: 2000 kN | 2000 kN blocks | 3000 kN | 3000 kN blocks | 4000 kN | 5000 kN
Load measuring system: Bourdon type gauge
Digitec or **Cyber-Plus Evolution** graphic display unit
Servo-controlled automatic system **Autotec** or **Servo-Plus Evolution** with optional **Servo-Strain** and **Elastic Modulus** determination.

Described and pictured in the next p. 262...281

COMPRESSION TESTING MACHINE 2000 KN CAPACITY TESTED FOR HIGH STABILITY

TO TEST CUBES UP TO 200 MM SIDE AND CYLINDERS UP TO Ø 160X320 MM

STANDARDS: EN 12390-4 | BS 1881:115 | DIN 51220 | ASTM C39 | NF P18-411 | AASHTO T22 | GOST 10180-2012

DIAL GAUGES MODELS

- Gauges Ø 250 mm with specific resistance scales for cubes 150 mm and cylinders Ø 150 - 160 mm
- Gauges divisions: 2000 kN div. 5 kN
  600 kN div. 2 kN

MAIN FEATURES FOR ALL MODELS

- Max. vertical daylight: 334.5 mm
- Horizontal daylight between columns: 260 mm
- Compression platens Ø 287X60 mm
- Calibration accuracy: Class 1
- Max. ram travel 60 mm approx.
- **High stiffness and heavy weight 4 columns frame (german-style).**
- Power supply: 230V 1ph 50Hz 750W
- Dimensions: 690x400x1400 mm approx.
- **Weight: 850...920 kg**

C089-02D+C127N+C121-06+C111-13

C089-04A+C127N+C111-13

COMPRESSION 2000 kN High Stability		LOAD MEASURIG SYSTEM			
MODEL	Motorized	1 Gauge	2 Gauge	Digitec mod. C108N (p. 219)	Autotec mod. C098N (p. 219)
C089	▼	▼			
C089-01	▼		▼		
C089-02D	▼			▼	
C089-04A *	▼				▼

COMPRESSION TESTING MACHINE TESTED FOR HIGH STABILITY HIGH-END MODELS

TO TEST CUBES UP TO 200 MM SIDE AND CYLINDERS UP TO Ø 160X320 MM

STANDARDS: EN 12390-4 | BS 1881:115 | DIN 51220 | ASTM C39 | NF P18-411 | AASHTO T22 | GOST 10180-2012

2000 KN CAPACITY

CYBER-PLUS OR **SERVO-PLUS EVOLUTION** DIGITAL TOUCH SCREEN DISPLAY

IT TECH

Cyber and Servo-Plus models have robust and reliable electronic controller, 5.7" touch screen color display. 2 USB ports, 1 SD port, 8 channels for pressure transducers (force measurement) or displacement transducers (Elastic Modulus and Poisson ratio measurement).

INVERTER For a further improvement of energy efficiency and silent operation, (optional device code C099N). Technical details, p. 223 NEW

BARCODE Scanner for specimen file/identification, (optional device code C099-01). Details, p. 223 NEW

C089-02N+C111-13 | **C089-04N+C104-04+C127N+C121-06+C111-13**

COMPRESSION 2000 kN High Stability		LOAD MEASURIG SYSTEM	
MODEL	Motorized	Cyber-Plus Evolution mod. C109N (p. 224)	Servo-Plus Evolution mod. C104N (p. 224)
C089-02N	▼	▼	
C089-04N *	▼		▼

* Servo-Plus/Autotec models feature fully automatic power pack - electrovalve operated test start (no manual lever).

ACCESSORIES FOR 2000 kN MACHINES FROM MOD. C089 TO C089-04N

C111-32 DISTANCE PIECE, 20 mm high for cylinders Ø 150x300 mm

C111-12 DISTANCE PIECE, 73+50 mm high for cubes 200 mm side

C111-13 DISTANCE PIECES, 73+50+50 mm high for cubes 200 and 150 mm side

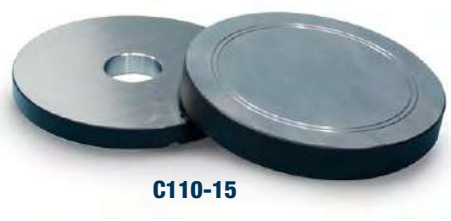
C111-14 DISTANCE PIECES, 73+50+50+50 mm high for cubes 200, 150 and 100 mm side

C111-15 DISTANCE PIECES, 50+50 mm high for cylinders Ø 110x220 mm

C111-24 DISTANCE PIECE 50 mm high

C111-25 DISTANCE PIECE 73 mm high

C110-15 LOWER COMPRESSION PLATEN, Ø 216x40 mm, hardened and rectified to test cubes 100 and 150 mm, as an alternative to the standard platen Ø 278 mm
Technical details: see p. 319



C110-15

Note: the cylinders Ø 160x320 mm do not require any distance piece.

C127N GRAPHIC PRINTER on thermo-paper on board for digital models

C127-11 THERMO-PAPER roll for printer (pack of 10 rolls)

C121-06 SAFETY GUARDS, polycarbonate, with hinges and lock, to CE Directive. See p. 317

C121-51 STOP SWITCH on safety guard. See p. 317

C107-10 CAPPING RETAINERS (set of two) for cylinders Ø 150 mm and 6". Other models: see p. 316

C107-20 NEOPRENE PADS (set of two) for cylinders Ø 150 mm 60 shore A. Other models: see p. 316

C107-10 + C107-20

C110-30 UPPER COMPRESSION PLATEN+SPHERICAL SEAT, to fix on the testing machine, in replacement of the standard platen + seat to obtain an increased vertical clearance of the testing chamber and to meet the ASTM C39, C1231 and AASHTO T22, T851
Platen dimensions: Ø 165x30 mm
Weight: 10 kg approx.
Technical details: see p. 316

C110-30

C115-01 TWO WAY HYDRAULIC VALVE, connected to the motorized pumping unit of the machine to activate a second frame. Technical details: see p. 318

C115-01

C097-01 DUAL LOW CAPACITY DIGITAL RANGE, complete with **appropriate pressure transducer**, only for digital machines. Recommended range 0-250kN.
Technical details: see p. 313

C097-01

C097-05 CALIBRATION CLASS 1, starting from 1% of the full range. With a special calibration procedure it is possible to grant Class 1 practically on the full range of the compression machine. Applicable only on digital machines.

C097-08 OFFICIAL ACCREDIA (Equivalent UKAS, ENAC, DAKKS, SAS, COFRAC etc.) HARDNESS CERTIFICATE of upper and lower compression platens. Minimum hardness: 55 HRC. See p. 313

C107-01 AUTO-CENTERING DEVICE for cubes 100 and 150 mm side, and cylinders Ø 100 and 150 mm.
Technical details: see p. 316

C107-01

C100 SPLITTING TENSILE test device for cylinders.
EN 12390-6 | ASTM C496
Technical details and other models: see p. 314

C100

C106 FLEXURAL TEST DEVICE for concrete beams.
EN 12390-5 | ASTM C78, C293 | AASHTO T97
Technical details: see p. 315

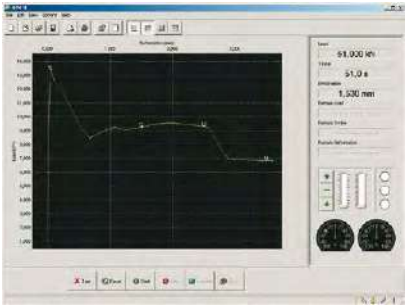
C106

E170 COMPRESSION DEVICE to test cement specimens 40.1x40 mm EN 196 | ASTM C349
Technical details and other models: see p. 315

E170

C104-10N SERVO-STRAIN
Servocontrolled Software, system of:
- Load or Strength
- Displacement
- Strain

This system can be used only with Servo-Plus Evolution machine mod. C089-04N. Technical details see p. 282



C104-10N

C125N ELASTIC MODULUS determination of the secant compression on concrete. Automatic system with pace rate control also when releasing the load, applicable only to high stability frames with Servo-Plus Evolution.
EN 12390-13, 13412, 13286-43, UNI 6556, ASTM C469, ISO 6784, DIN 1048, BS 1888:121
Technical details: see p. 284

C126 BENCH to hold the compression machine. See p. 317

C104-04 CONSOLE HOUSING THE SERVO-PLUS EVOLUTION
The pump assembly **lined** with sound proofing material for noise reduction and the digital system are encased to enhance the design and look of the machine.
Technical details: see p. 314

C089-04N **C104-04**

C099N INVERTER DEVICE
NEW
Applicable only on Cyber-Plus and Servo-Plus Evolution machines.
Technical details: see p. 223

C104-06

C099N

C104-06 CONSOLE HOUSING THE CYBER-PLUS EVOLUTION
NEW
New console internally lined with sound proofing material, to reduce noise and allow for the inverter integration. Detail: see p. 223

SOFTWARE for DIGITEC / AUTOTEC or CYBER / SERVO PLUS models	
C109-10 (N)*	SOFTWARE for compression tests
C123 (N)*	SOFTWARE **Servonet** for remote control through PC
C109-11 (N)*	SOFTWARE for flexural tests
C109-12 (N)*	SOFTWARE for splitting tensile

Technical detail: see p. 18
(N)* for Cyber - Servo Plus models.

COMPRESSION TESTING MACHINE 2000 KN CAPACITY TESTED FOR HIGH STABILITY

TO TEST BLOCKS MAX 500X300 MM, CUBES UP TO 200 MM SIDE AND CYLINDERS UP TO Ø 160X320 MM

STANDARDS: EN 12390-4, EN 772-1 | BS 1881:115, 6073 | DIN 51220 | NF P18-411 | ASTM C39, C140, C1314 | AASHTO T22 | GOST 10180-2012

DIAL GAUGES MODELS

- Gauges Ø 250 mm with specific resistance scales for cubes 150 mm and cylinders Ø 150 - 160 mm
- Gauges divisions: 2000 kN div. 10 kN
  600 kN div. 2 kN

MAIN FEATURES FOR ALL MODELS

- Max. vertical daylight to test blocks: 283 mm
- Horizontal daylight between columns: 340 mm
- Compression platens for blocks: 510x320x55 mm
- Max. vertical daylight to test cubes and cylinders: 334.5 mm
- Compression platens to test cubes, cylinders: Ø 287x60 mm
- Calibration accuracy: Class 1
- Max. ram travel 60 mm approx.
- **High stiffness and heavy weight 4 columns frame (german-style).**
- Power supply: 230V 1ph 50Hz 750W
- Dimensions: 750x520x1500 mm approx.
- **Weight: 1000...1070 kg**

C089-21D + C127N

C089-22A + C127N

COMPRESSION 2000 kN High Stability Blocks		LOAD MEASURIG SYSTEM			
MODEL	Motorized	1 Gauge	2 Gauge	Digitec mod. C108N (p. 219)	Autotec mod. C098N (p. 219)
C089 B	▼	▼			
C089-01B	▼		▼		
C089-21D	▼			▼	
C089-22A *	▼				▼

COMPRESSION TESTING MACHINE TESTED FOR HIGH STABILITY HIGH-END MODELS

TO TEST BLOCKS MAX 500X300 MM, CUBES UP TO 200 MM SIDE AND CYLINDERS UP TO Ø 160X320 MM

STANDARDS: EN 12390-4, EN 772-1 | BS 1881:115, 6073 | DIN 51220 | NF P18-411 | ASTM C39, C140, C1314 | AASHTO T22 | GOST 10180-2012

2000 KN CAPACITY

CYBER-PLUS OR **SERVO-PLUS EVOLUTION** DIGITAL TOUCH SCREEN DISPLAY

IT TECH

Cyber and Servo-Plus models have robust and reliable electronic controller, 5.7" touch screen color display. 2 USB ports, 1 SD port, 8 channels for pressure transducers (force measurement) or displacement transducers (Elastic Modulus and Poisson ratio measurement).

INVERTER For a further improvement of energy efficiency and silent operation, (optional device code C099N). Technical details, p. 223 NEW

BARCODE Scanner for specimen file/identification, (optional device code C099-01). Details, p. 223 NEW

C089-21N **C089-22N + C127N + C104-04**

COMPRESSION 2000 kN High Stability Blocks		LOAD MEASURIG SYSTEM	
MODEL	Motorized	Cyber-Plus Evolution mod. C109N (p. 224)	Servo-Plus Evolution mod. C104N (p. 224)
C089-21N	▼	▼	
C089-22N *	▼		▼

* Servo-Plus/Autotec models feature fully automatic power pack - electrovalve operated test start (no manual lever).

ACCESSORIES FOR 2000 kN BLOCKS MACHINES FROM MOD. C089B TO C089-22N

C111-32 DISTANCE PIECE, 20 mm high for cylinders Ø 150x300 mm

C111-12 DISTANCE PIECE, 73+50 mm high for cubes 200 mm side

C111-13 DISTANCE PIECES, 73+50+50 mm high for cubes 200 and 150 mm side

C111-14 DISTANCE PIECES 73+50+50+50 mm high for cubes 200, 150 and 100 mm side

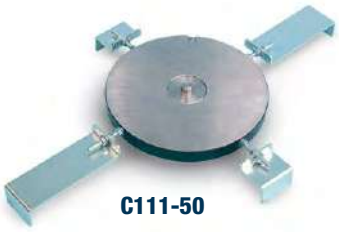
C111-15 DISTANCE PIECES 50+50 mm high for cylinders Ø 110x220 mm

C111-24 DISTANCE PIECE 50 mm high

C111-25 DISTANCE PIECE 73 mm high

Note: The cylinders Ø 160x320 mm do not require any distance piece.

C111-50 DISTANCE PIECE, it eliminates the heavy procedure to lift the lower rectangular platen and to add distance pieces. Technical details: see p. 320



C111-50

AS AN ALTERNATIVE:

C112-05 KIT of 4 HANDLES to lift the lower platen, making the positioning of distance pieces easier. Technical details: see p. 320

C112-05

C117 SLIDING RAIL CARRIAGE, for an easy removal of the upper block platen, to perform tests on blocks or on standard cubes and cylinders.

C117

C127N GRAPHIC PRINTER on thermo-paper on board for digital models

C127-11 THERMO-PAPER roll for printer (pack of 10 rolls)

C121-10 SAFETY GUARDS, polycarbonate, with hinges and lock, to CE Directive. See p. 317

C121-51 STOP SWITCH on safety guard. See p. 317

C115-01 TWO WAY HYDRAULIC VALVE, connected to the motorized pumping unit of the machine to activate a second frame. Technical details: see p. 318

C115-01

C097-05 CALIBRATION CLASS 1, starting from 1% of the full range. With a special calibration procedure it is possible to grant Class 1 practically on the full range of the compression machine. Applicable only on digital machines.

C097-08 OFFICIAL ACCREDIA (Equivalent UKAS, ENAC, DAKKS, SAS, COFRAC etc.) HARDNESS CERTIFICATE of upper and lower compression platens. Minimum hardness: 55 HRC. See p. 313

C097-01 DUAL LOW CAPACITY DIGITAL RANGE, complete with **appropriate pressure transducer**, only for digital machines. Recommended range 0-250kN. Technical details: see p. 313

C097-01

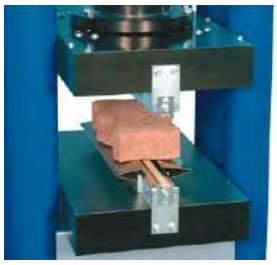
C100 SPLITTING TENSILE test device for cylinders. EN 12390-6 | ASTM C496 Technical details and other models: see p. 314

C100

C103 SPLITTING TENSILE test device for self blocking pavers and cubes. EN 1338, 12390-6.
Technical details: see p. 314

AS AN ALTERNATIVE:

C103-01 SPLITTING TENSILE test device for self blocking pavers and cubes having max. dimensions 300x500mm, directly fixed on the large compression platens.
EN 1338, 12390-6.
Technical details: see p. 314



C103-01

C106 FLEXURAL TEST DEVICE for concrete beams.
EN 12390-5 | ASTM C78, C293 | AASHTO T97
Technical details: see p. 315

C106

E170 COMPRESSION DEVICE to test cement specimens 40.1x40 mm EN 196 | ASTM C349
Technical details and other models: see p. 315

E170

C104-10N SERVO-STRAIN
Servocontrolled Software, system of:
- Load or Strength
- Displacement
- Strain

This system can be used only with Servo-Plus Evolution machine mod. C089-22N. Technical details see p. 282

C125N ELASTIC MODULUS determination of the secant compression on concrete. Automatic system with pace rate control also when releasing the load, applicable only to high stability frames with Servo-Plus Evolution.
EN 12390-13, 13412, 13286-43, UNI 6556, ASTM C469, ISO 6784, DIN 1048, BS 1888:121
Technical details: see p. 284

C126 BENCH to hold the compression machine. See p. 317

C104-04 CONSOLE HOUSING THE SERVO-PLUS EVOLUTION
The pump assembly **lined** with sound proofing material for noise reduction and the digital system are encased to enhance the design and look of the machine.
Technical details: see p. 314

C089-22N **C104-04**

C099N INVERTER DEVICE
NEW
Applicable only on Cyber-Plus and Servo-Plus Evolution machines.
Technical details: see p. 223

C104-06

C099N

C104-06 CONSOLE HOUSING THE CYBER-PLUS EVOLUTION
NEW
New console internally lined with sound proofing material, to reduce noise and allow for the inverter integration. Detail: see p. 223

SOFTWARE for DIGITEC / AUTOTEC or CYBER / SERVO PLUS models	
C109-10 (N)*	SOFTWARE for compression tests
C123 (N)*	SOFTWARE **Servonet** for remote control through PC
C109-11 (N)*	SOFTWARE for flexural tests
C109-12 (N)*	SOFTWARE for splitting tensile

Technical detail: see p. 18
(N)* for Cyber - Servo Plus models.

COMPRESSION TESTING MACHINE 3000 KN CAPACITY TESTED FOR HIGH STABILITY

TO TEST CUBES UP TO 200 MM SIDE AND CYLINDERS UP TO Ø 160X320 MM

STANDARDS: EN 12390-4 | BS 1881:115 | DIN 51220 | ASTM C39 | NF P18-411 | AASHTO T22 | GOST 10180-2012

DIAL GAUGES MODELS

- Gauges Ø 250 mm with specific resistance scales for cubes 150 mm and cylinders Ø 150 - 160 mm
- Gauges divisions: 3000 kN div. 10 kN
  600 kN div. 2 kN

MAIN FEATURES FOR ALL MODELS

- Max. vertical daylight: 334.5 mm
- Horizontal daylight between columns: 272 mm
- Compression platens Ø 287X60 mm
- Calibration accuracy: Class 1
- Max. ram travel 60 mm approx.
- **High stiffness and heavy weight 4 columns frame (german-style).**
- Power supply: 230V 1ph 50Hz 750W
- Dimensions: 750x450x1500 mm approx.
- **Weight: 1200...1250 kg**

C089-08D + C127N + C111-13

C089-10A + C127N + C111-13

COMPRESSION 3000 kN High Stability		LOAD MEASURIG SYSTEM			
MODEL	Motorized	1 Gauge	2 Gauge	Digitec mod. C108N (p. 219)	Autotec mod. C098N (p. 219)
C089-06	▼	▼			
C089-07	▼		▼		
C089-08D	▼			▼	
C089-10A *	▼				▼

COMPRESSION TESTING MACHINE TESTED FOR HIGH STABILITY HIGH-END MODELS

TO TEST CUBES UP TO 200 MM SIDE AND CYLINDERS UP TO Ø 160X320 MM

STANDARDS: EN 12390-4 | BS 1881:115 | DIN 51220 | ASTM C39 | NF P18-411 | AASHTO T22 | GOST 10180-2012

3000 KN CAPACITY

CYBER-PLUS OR **SERVO-PLUS EVOLUTION** DIGITAL TOUCH SCREEN DISPLAY

IT TECH

Cyber and Servo-Plus models have robust and reliable electronic controller, 5.7" touch screen color display. 2 USB ports, 1 SD port, 8 channels for pressure transducers (force measurement) or displacement transducers (Elastic Modulus and Poisson ratio measurement).

INVERTER For a further improvement of energy efficiency and silent operation, (optional device code C099N). Technical details, p. 223 NEW

BARCODE Scanner for specimen file/identification, (optional device code C099-01). Details, p. 223 NEW

C089-08N + C127N + C111-13 | **C089-10N + C104-04 + C121-07 + C111-13**

COMPRESSION 3000 kN High Stability		LOAD MEASURIG SYSTEM	
MODEL	Motorized	Cyber-Plus Evolution mod. C109N (p. 224)	Servo-Plus Evolution mod. C104N (p. 224)
C089-08N	▼	▼	
C089-10N *	▼		▼

* Servo-Plus/Autotec models feature fully automatic power pack - electrovalve operated test start (no manual lever).

ACCESSORIES FOR 3000 kN MACHINES FROM MOD. C089-06 TO C089-10N

C111-32 DISTANCE PIECE, 20 mm high for cylinders Ø 150x300 mm

C111-12 DISTANCE PIECE, 73+50 mm high for cubes 200 mm side

C111-13 DISTANCE PIECES, 73+50+50 mm high for cubes 200 and 150 mm side

C111-14 DISTANCE PIECES, 73+50+50+50 mm high for cubes 200, 150 and 100 mm side

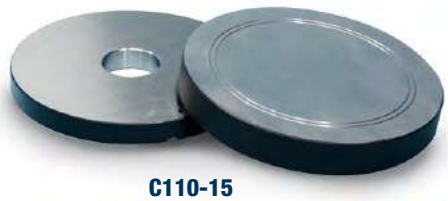
C111-15 DISTANCE PIECES, 50+50 mm high for cylinders Ø 110x220 mm

C111-24 DISTANCE PIECE 50 mm high

C111-25 DISTANCE PIECE 73 mm high

C110-15 LOWER COMPRESSION PLATEN, Ø 216x40 mm, hardened and rectified to test cubes 100 and 150 mm, as an alternative to the standard platen Ø 278 mm
Technical details: see p. 319

Note: the cylinders Ø 160x320 mm do not require any distance piece.



C110-15

C127N GRAPHIC PRINTER on thermo-paper on board for digital models

C127-11 THERMO-PAPER roll for printer (pack of 10 rolls)

C121-07 SAFETY GUARDS, polycarbonate, with hinges and lock, to CE Directive. See p. 317

C121-51 STOP SWITCH on safety guard. See p. 317

C107-10 CAPPING RETAINERS (set of two) for cylinders Ø 150 mm and 6". Other models: see p. 316

C107-20 NEOPRENE PADS (set of two) for cylinders Ø 150 mm 60 shore A. Other models: see p. 316

C107-10 + C107-20

C110-30 UPPER COMPRESSION PLATEN+SPHERICAL SEAT, to fix on the testing machine, in replacement of the standard platen + seat to obtain an increased vertical clearance of the testing chamber and to meet the ASTM C39, C1231 and AASHTO T22, T851
Platen dimensions: Ø 165x30 mm
Weight: 10 kg approx.
Technical details: see p. 316

C110-30

C115-01 TWO WAY HYDRAULIC VALVE, connected to the motorized pumping unit of the machine to activate a second frame. Technical details: see p. 318

C115-01

C097-01 DUAL LOW CAPACITY DIGITAL RANGE, complete with **appropriate pressure transducer**, only for digital machines. Recommended range 0-250kN.
Technical details: see p. 313

C097-01

C097-05 CALIBRATION CLASS 1, starting from 1% of the full range. With a special calibration procedure it is possible to grant Class 1 practically on the full range of the compression machine. Applicable only on digital machines.

C097-08 OFFICIAL ACCREDIA (Equivalent UKAS, ENAC, DAKKS, SAS, COFRAC etc.) HARDNESS CERTIFICATE of upper and lower compression platens. Minimum hardness: 55 HRC. See p. 313

C107-01 AUTO-CENTERING DEVICE for cubes 100 and 150 mm side, and cylinders Ø 100 and 150 mm.
Technical details: see p. 316

C107-01

C100 SPLITTING TENSILE test device for cylinders.
EN 12390-6 I ASTM C496
Technical details and other models: see p. 314

C100

C103 SPLITTING TENSILE test device for self blocking pavers and cubes. EN 1338, 12390-6.
Technical details: see p. 314

C106 FLEXURAL TEST DEVICE for concrete beams.
EN 12390-5 I ASTM C78, C293 I AASHTO T97
Technical details: see p. 315

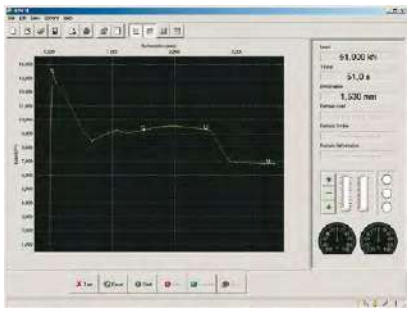
C106

E170 COMPRESSION DEVICE to test cement specimens 40.1x40 mm EN 196 I ASTM C349
Technical details and other models: see p. 315

E170

C104-10N SERVO-STRAIN
Servocontrolled Software, system of:
- Load or Strength
- Displacement
- Strain

This system can be used only with Servo-Plus Evolution machine mod. C089-10N. Technical details see p. 282



C104-10N

C125N ELASTIC MODULUS determination of the secant compression on concrete. Automatic system with pace rate control also when releasing the load, applicable only to high stability frames with Servo-Plus Evolution.
EN 12390-13, 13412, 13286-43, UNI 6556, ASTM C469, ISO 6784, DIN 1048, BS 1888:121
Technical details: see p. 284

C126 BENCH to hold the compression machine. See p. 317

C104-04 CONSOLE HOUSING THE SERVO-PLUS EVOLUTION
The pump assembly **lined** with sound proofing material for noise reduction and the digital system are encased to enhance the design and look of the machine.
Technical details: see p. 314

C089-10N **C104-04**

C099N INVERTER DEVICE
NEW
Applicable only on Cyber-Plus and Servo-Plus Evolution machines.
Technical details: see p. 223

C104-06

C099N

C104-06 CONSOLE HOUSING THE CYBER-PLUS EVOLUTION
NEW
New console internally lined with sound proofing material, to reduce noise and allow for the inverter integration. Detail: see p. 223

SOFTWARE for DIGITEC / AUTOTEC or CYBER / SERVO PLUS models	
C109-10 (N)*	SOFTWARE for compression tests
C123 (N)*	SOFTWARE **Servonet** for remote control through PC
C109-11 (N)*	SOFTWARE for flexural tests
C109-12 (N)*	SOFTWARE for splitting tensile

Technical detail: see p. 18
(N)* for Cyber - Servo Plus models.

COMPRESSION TESTING MACHINE 3000 KN CAPACITY TESTED FOR HIGH STABILITY

TO TEST BLOCKS MAX 500X300 MM, CUBES UP TO 200 MM SIDE AND CYLINDERS UP TO Ø 160X320 MM

STANDARDS: EN 12390-4, EN 772-1 | BS 1881:115, 6073 | DIN 51220 | NF P18-411 | ASTM C39, C140, C1314 | AASHTO T22 | GOST 10180-2012

DIAL GAUGES MODELS

- Gauges Ø 250 mm with specific resistance scales for cubes 150 mm and cylinders Ø 150 - 160 mm
- Gauges divisions: 3000 kN div. 10 kN
  600 kN div. 2 kN

MAIN FEATURES FOR ALL MODELS

- Max. vertical daylight to test blocks: 283 mm
- Horizontal daylight between columns: 340 mm
- Compression platens for blocks: 510x320x55 mm
- Max. vertical daylight to test cubes and cylinders: 334.5 mm
- Compression platens to test cubes, cylinders: Ø 287x60 mm
- Calibration accuracy: Class 1
- Max. ram travel 60 mm approx.
- **High stiffness and heavy weight 4 columns frame (german-style).**
- Power supply: 230V 1ph 50Hz 750W
- Dimensions: 750x520x1500 mm approx.
- **Weight: 1350...1400 kg**

C089-17D + C127N

C089-19A + C127N

COMPRESSION 3000 kN High Stability Blocks		LOAD MEASURIG SYSTEM			
MODEL	Motorized	1 Gauge	2 Gauge	Digitec mod. C108N (p. 219)	Autotec mod. C098N (p. 219)
C089-15	▼	▼			
C089-16	▼		▼		
C089-17D	▼			▼	
C089-19A *	▼				▼

COMPRESSION TESTING MACHINE TESTED FOR HIGH STABILITY HIGH-END MODELS

TO TEST BLOCKS MAX 500X300 MM, CUBES UP TO 200 MM SIDE AND CYLINDERS UP TO Ø 160X320 MM

STANDARDS: EN 12390-4, EN 772-1 | BS 1881:115, 6073 | DIN 51220 | NF P18-411 | ASTM C39, C140, C1314 | AASHTO T22 | GOST 10180-2012

3000 KN CAPACITY

CYBER-PLUS OR **SERVO-PLUS EVOLUTION** DIGITAL TOUCH SCREEN DISPLAY

IT TECH

Cyber and Servo-Plus models have robust and reliable electronic controller, 5.7" touch screen color display. 2 USB ports, 1 SD port, 8 channels for pressure transducers (force measurement) or displacement transducers (Elastic Modulus and Poisson ratio measurement).

INVERTER For a further improvement of energy efficiency and silent operation, (optional device code C099N). Technical details, p. 223 NEW

BARCODE Scanner for specimen file/identification, (optional device code C099-01). Details, p. 223 NEW

C089-17N | **C089-19N + C104-04 + C127N**

COMPRESSION 3000 kN High Stability Blocks		LOAD MEASURIG SYSTEM	
MODEL	Motorized	Cyber-Plus Evolution mod. C109N (p. 224)	Servo-Plus Evolution mod. C104N (p. 224)
C089-17N	▼	▼	
C089-19N *	▼		▼

* Servo-Plus/Autotec models feature fully automatic power pack - electrovalve operated test start (no manual lever).

ACCESSORIES FOR 3000 kN BLOCKS MACHINES FROM MOD. C089-15 TO C089-19N

C111-32 DISTANCE PIECE, 20 mm high for cylinders Ø 150x300 mm

C111-12 DISTANCE PIECE, 73+50 mm high for cubes 200 mm side

C111-13 DISTANCE PIECES, 73+50+50 mm high for cubes 200 and 150 mm side

C111-14 DISTANCE PIECES 73+50+50+50 mm high for cubes 200, 150 and 100 mm side

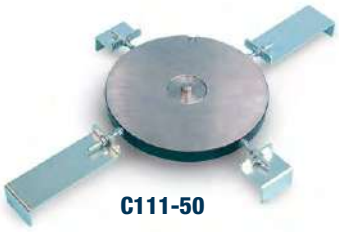
C111-15 DISTANCE PIECES 50+50 mm high for cylinders Ø 110x220 mm

C111-24 DISTANCE PIECE 50 mm high

C111-25 DISTANCE PIECE 73 mm high

Note: The cylinders Ø 160x320 mm do not require any distance piece.

C111-50 DISTANCE PIECE, it eliminates the heavy procedure to lift the lower rectangular platen and to add distance pieces. Technical details: see p. 320



C111-50

AS AN ALTERNATIVE:

C112-05 KIT of 4 HANDLES to lift the lower platen, making the positioning of distance pieces easier. Technical details: see p. 320

C112-05

C117 SLIDING RAIL CARRIAGE, for an easy removal of the upper block platen, to perform tests on blocks or on standard cubes and cylinders.

C117

C127N GRAPHIC PRINTER on thermo-paper on board for digital models

C127-11 THERMO-PAPER roll for printer (pack of 10 rolls)

C121-08 SAFETY GUARDS, polycarbonate, with hinges and lock, to CE Directive. See p. 317

C121-51 STOP SWITCH on safety guard. See p. 317

C115-01 TWO WAY HYDRAULIC VALVE, connected to the motorized pumping unit of the machine to activate a second frame. Technical details: see p. 318

C115-01

C097-05 CALIBRATION CLASS 1, starting from 1% of the full range. With a special calibration procedure it is possible to grant Class 1 practically on the full range of the compression machine. Applicable only on digital machines.

C097-08 OFFICIAL ACCREDIA (Equivalent UKAS, ENAC, DAKKS, SAS, COFRAC etc.) HARDNESS CERTIFICATE of upper and lower compression platens. Minimum hardness: 55 HRC. See p. 313

C097-01 DUAL LOW CAPACITY DIGITAL RANGE, complete with **appropriate pressure transducer**, only for digital machines. Recommended range 0-250kN. Technical details: see p. 313

C097-01

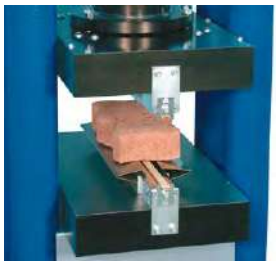
C100 SPLITTING TENSILE test device for cylinders. EN 12390-6 I ASTM C496 Technical details and other models: see p. 314

C100

C103 SPLITTING TENSILE test device for self blocking pavers and cubes. EN 1338, 12390-6.
Technical details: see p. 314

AS AN ALTERNATIVE:

C103-01 SPLITTING TENSILE test device for self blocking pavers and cubes having max. dimensions 300x500mm, directly fixed on the large compression platens.
EN 1338, 12390-6.
Technical details: see p. 314



C103-01

C106 FLEXURAL TEST DEVICE for concrete beams.
EN 12390-5 I ASTM C78, C293 I AASHTO T97
Technical details: see p. 315

C106

E170 COMPRESSION DEVICE to test cement specimens 40.1x40 mm EN 196 I ASTM C349
Technical details and other models: see p. 315

E170

C104-10N SERVO-STRAIN
Servocontrolled Software, system of:
- Load or Strength
- Displacement
- Strain

This system can be used only with Servo-Plus Evolution machine mod. C089-19N. Technical details see p. 282

C125N ELASTIC MODULUS determination of the secant compression on concrete. Automatic system with pace rate control also when releasing the load, applicable only to high stability frames with Servo-Plus Evolution.
EN 12390-13, 13412, 13286-43, UNI 6556, ASTM C469, ISO 6784, DIN 1048, BS 1888:121
Technical details: see p. 284

C126 BENCH to hold the compression machine. See p. 317

C104-04 CONSOLE HOUSING THE SERVO-PLUS EVOLUTION
The pump assembly **lined** with sound proofing material for noise reduction and the digital system are encased to enhance the design and look of the machine.
Technical details: see p. 314

C089-19N **C104-04**

C099N INVERTER DEVICE
NEW
Applicable only on Cyber-Plus and Servo-Plus Evolution machines.
Technical details: see p. 223

C099N

C104-06

C104-06 CONSOLE HOUSING THE CYBER-PLUS EVOLUTION
NEW
New console internally lined with sound proofing material, to reduce noise and allow for the inverter integration. Detail: see p. 223

SOFTWARE for DIGITEC / AUTOTEC or CYBER / SERVO PLUS models	
C109-10 (N)*	SOFTWARE for compression tests
C123 (N)*	SOFTWARE **Servonet** for remote control through PC
C109-11 (N)*	SOFTWARE for flexural tests
C109-12 (N)*	SOFTWARE for splitting tensile

Technical detail: see p. 18
(N)* for Cyber - Servo Plus models.

COMPRESSION TESTING MACHINE 4000 KN CAPACITY TESTED FOR HIGH STABILITY HIGH-END MODELS

TO TEST CUBES UP TO 200 MM SIDE AND CYLINDERS UP TO Ø 250X500 MM

STANDARDS: EN 12390-4, EN 13503-2 | BS 1881:115, BS 812-110, 812-111 | DIN 51220 | NF P18-411 | ASTM C39 | AASHTO T22 GOST 10180-2012 | API RP 19C

4000 KN CAPACITY

MAIN FEATURES FOR ALL MODELS

- Max. vertical daylight: 530 mm
- Horizontal daylight between columns: 340 mm
- Compression platens Ø 287x60 mm
- Calibration accuracy: Class 1
- Max. ram travel 60 mm approx.
- **High stiffness and heavy weight 4 columns frame (german-style).**
- Power supply (motorized models): 230V 1ph 50Hz 750W
- Dimensions: 850x600x1500 mm approx.
- **Weight: 1800...1900 kg**

CYBER-PLUS OR **SERVO-PLUS EVOLUTION**
DIGITAL TOUCH SCREEN DISPLAY

IT TECH

Cyber and Servo-Plus models have robust and reliable electronic controller, 5.7" touch screen color display. 2 USB ports, 1 SD port, 8 channels for pressure transducers (force measurement) or displacement transducers (Elastic Modulus and Poisson ratio measurement).

INVERTER NEW

For a further improvement of energy efficiency and silent operation, (optional device code C099N). Technical details, p. 223

BARCODE

Scanner for specimen file/identification, (optional device code C099-01). Details, p. 223 NEW

C088-11N + C121-04 + C121-51 + C086-10 | **C088-10N + C127N + C121-04 - C181-51 + C086-10**

COMPRESSION 4000 kN capacity		LOAD MEASURIG SYSTEM	
MODEL	Motorized	Cyber-Plus Evolution mod. C109N (p. 224)	Servo-Plus Evolution mod. C104N (p. 224)
C088-10N	▼	▼	
C088-11N *	▼		▼

* Servo-Plus model feature fully automatic power pack - electrovalve operated test start (no manual lever).

ACCESSORIES FOR 4000 kN MACHINES

C111-32 DISTANCE PIECE, 20 mm high for cylinders Ø 250x500 mm

C111-12 DISTANCE PIECES, 73+50 mm high, vertical daylight 407 mm

C111-13 DISTANCE PIECES, 73+50+50 mm, vertical daylight 357 mm

C111-14 DISTANCE PIECES, 73+50+50+50 mm high for cylinders Ø 150x300 mm

C111-15 DISTANCE PIECES, 50+50 mm high, vertical daylight 430 mm

C111-24 DISTANCE PIECE 50 mm high

C111-25 DISTANCE PIECE 73 mm high

C110-15 LOWER COMPRESSION PLATEN, Ø 216x40 mm, hardened and rectified to test cubes 100 and 150 mm, as an alternative to the standard platen Ø 278 mm
Technical details: see p. 319

Note: Vertical daylight of the compression platens is 530 mm. The operator will have to buy the needed distance pieces to reduce the daylight between the compression platens to get the correct daylight of the specimen under test plus approx. 10 to 15 mm

C112-11 UPPER+LOWER LARGE COMPRESSION PLATENS 320x510x55 mm to test **also** blocks. It is necessary to have also the sliding rail carriage mod. C117

C117 SLIDING RAIL CARRIAGE, for an easy removal of the large block upper platen

C127N GRAPHIC PRINTER on thermo-paper on board

C127-11 THERMO-PAPER roll for printer (pack of 10 rolls)

C104-10N SERVO-STRAIN
Servocontrolled Software, system of:
- Load or Strength
- Displacement
- Strain

This system can be used only with Servo-Plus Evolution machine mod. C088-11N. Technical details see p. 282

C125N ELASTIC MODULUS determination of the secant compression on concrete. Automatic system with pace rate control also when releasing the load, applicable only to high stability frames with Servo-Plus Evolution.
EN 12390-13, 13412, 13286-43, UNI 6556, ASTM C469, ISO 6784, DIN 1048, BS 1888:121
Technical details: see p. 284

C121-02 SAFETY GUARDS, polycarbonate, with hinges and lock, to CE Directive.

C121-51 STOP SWITCH on safety guard. See p. 317

C115-01 TWO WAY HYDRAULIC VALVE, connected to the motorized pumping unit of the machine to activate a second frame.
Technical details: see p. 318

C115-01

C097-05 CLASS 1, starting from 1% of the full range. With a special calibration procedure it is possible to grant Class 1 practically on the full range of the compression machine.

C097-01 DUAL LOW CAPACITY DIGITAL RANGE, complete with **appropriate pressure transducer**. Recommended range 0-250kN. Technical details: see p. 313

C097-01

C097-08 OFFICIAL ACCREDIA (Equivalent UKAS, ENAC, DAKKS, SAS, COFRAC etc.) HARDNESS CERTIFICATE of upper and lower compression platens. Minimum hardness: 55 HRC. See p. 313

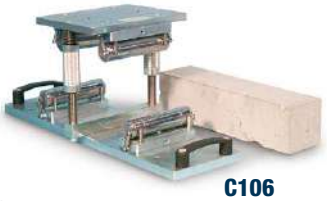
C107-01 AUTO-CENTERING DEVICE for cubes 100 and 150 mm side, and cylinders Ø 100 and 150 mm.
Technical details: see p. 316

C103
SPLITTING TENSILE test device for self blocking pavers and cubes.
EN 1338, 12390-6.
Technical details: see p. 314

C103

C106
FLEXURAL TEST DEVICE for concrete beams.
EN 12390-5 | ASTM C78, C293 | AASHTO T97
Technical details: see p. 315

E170
COMPRESSION DEVICE to test cement specimens 40.1x40 mm
EN 196 | ASTM C349
Technical details and other models: see p. 315



C106

C099N NEW
INVERTER DEVICE
Applicable only on Cyber-Plus and Servo-Plus Evolution machines.
Technical details: see p. 223

C099N

SOFTWARE for DIGITEC / AUTOTEC or CYBER / SERVO PLUS models	
C109-10 (N)*	SOFTWARE for compression tests
C123 (N)*	SOFTWARE **Servonet** for remote control through PC
C109-11 (N)*	SOFTWARE for flexural tests
C109-12 (N)*	SOFTWARE for splitting tensile

Technical detail: see p. 18
(N)* for Cyber - Servo Plus models.

COMPRESSION TESTING MACHINES 3000 KN AND 5000 KN CAPACITY TESTED FOR HIGH STABILITY

THIS OVERSIZED ISOSTATIC HIGH STABILITY STIFFNESS FRAME FOR CENTRAL AND RESEARCH LABORATORIES TO TEST HIGH STRENGTH SPECIMENS, EXPLOSIVE SAMPLES, ROCK AND CERAMIC

STANDARDS: EN 12390-4 | BS 1881:115 | DIN 51220 | NF P18-411 | GOST 10180-2012

HIGH-END MODELS

3000/5000 KN CAPACITY

MAIN FEATURES FOR ALL MODELS

- Compression platens Ø 316x60 mm
- Hydraulic pressure: 360 bar max.
- Max. vertical daylight: 411 mm
- Horizontal daylight between columns: 321 - 345 mm
- Max. ram travel: 100 mm
- **High stiffness and heavy weight 4 columns frame: 0.3 mm at max. load (german-style).**
- Safety guards to CE Directive ▌Class "1"
- Frame size 3000 kN: 725x710x1570 mm
- Frame size 5000 kN: 750x750x1700 mm
- Power supply: 230V 1ph 50Hz 750W
- **Weight frame 3000 kN: 2500 kg / 5000 kN: 4000 kg**

CYBER-PLUS OR **SERVO-PLUS EVOLUTION**
DIGITAL TOUCH SCREEN DISPLAY

IT TECH

Cyber and Servo-Plus models have robust and reliable electronic controller, 5.7" touch screen color display. 2 USB ports, 1 SD port, 8 channels for pressure transducers (force measurement) or displacement transducers (Elastic Modulus and Poisson ratio measurement).

INVERTER NEW

For a further improvement of energy efficiency and silent operation, (optional device code C099N). Technical details, p. 223

BARCODE

Scanner for specimen file/identification, (optional device code C099-01). Details, p. 223 NEW

C088-01N

C087N

COMPRESSION 3000/5000 kN High Stability		LOAD MEASURIG SYSTEM		
MODEL	Code	Motorized	Cyber-Plus Evolution mod. C109N (p. 224)	Servo-Plus Evolution mod. C104N (p. 224)
3000 kN	**C087N**	▼	▼	
3000 kN	**C087-01N**	▼		▼
5000 kN	**C088N**	▼	▼	
5000 kN	**C088-01N**	▼		▼

✱ Servo-Plus model feature fully automatic power pack - electrovalve operated test start (no manual lever).

ACCESSORIES FOR 3000 kN and 5000 kN MACHINES

C087-11 DISTANCE PIECE, 50 mm high

C087-12 DISTANCE PIECE, 25 mm high

C087-15 DISTANCE PIECE, 100 mm high

Note:
Vertical daylight of the compression platens is 411 mm.
The operator will have to buy the needed distance pieces to reduce the daylight between the compression platens to get the correct daylight of the specimen under test plus approx.
10 to 15 mm

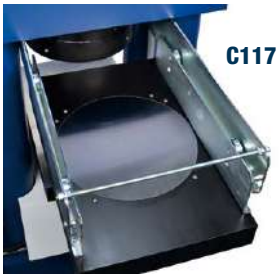
C112-11

NEW

C087-16 CLAMPING DEVICE for distance pieces.
Strongly recommended for tests on high strength samples.

C112-11 UPPER+LOWER LARGE COMPRESSION PLATENS 320x510x55 mm to test **also** blocks. It is necessary to have also the sliding rail carriage mod. C117

C117 SLIDING RAIL CARRIAGE, for an easy removal of the large block upper platen



C117

C127N GRAPHIC PRINTER on thermo-paper on board

C127-11 THERMO-PAPER roll for printer (pack of 10 rolls)

C104-10N SERVO-STRAIN
Servocontrolled Software, system of:
- Load or Strength
- Displacement
- Strain

This system can be used only with Servo-Plus machines.
Technical details p. 282

C125N ELASTIC MODULUS determination of the secant compression on concrete. Automatic system with pace rate control also when releasing the load, applicable only to high stability frames with Servo-Plus Evolution.
EN 12390-13, 13412, 13286-43, UNI 6556, ASTM C469, ISO 6784, DIN 1048, BS 1881:121
Technical details: see p. 284

C115-01 TWO WAY HYDRAULIC VALVE, connected to the motorized pumping unit of the machine to activate a second frame.
Technical details: see p. 318

C115-01

C097-01 DUAL LOW CAPACITY DIGITAL RANGE, complete with **appropriate pressure transducer**.
Recommended range 0-250kN. Technical details: see p. 313

C097-01

C097-05 CLASS 1, starting from 1% of the full range. With a special calibration procedure it is possible to grant Class 1 practically on the full range of the compression machine.

C097-08 OFFICIAL ACCREDIA (Equivalent UKAS, ENAC, DAKKS, SAS, COFRAC etc.) HARDNESS CERTIFICATE of upper and lower compression platens. Minimum hardness: 55 HRC. See p. 313

C100
SPLITTING TENSILE test device for cylinders.EN 12390-6 | ASTM C496
Technical details and other models: see p. 314

C100

C106
FLEXURAL TEST DEVICE for concrete beams.
EN 12390-5 | ASTM C78, C293
AASHTO T97
Technical details: see p. 315

C106

E170
COMPRESSION DEVICE to test portion of cement specimens 40.1x40 mm EN 196 | ASTM C349
Technical details and other models: see p. 315

C099N NEW
INVERTER DEVICE
Applicable only on Cyber-Plus and Servo-Plus Evolution machines.
Technical details: see p. 223

C099N

SOFTWARE for DIGITEC / AUTOTEC or CYBER / SERVO PLUS models	
C109-10N	SOFTWARE for compression tests
C123N	SOFTWARE **Servonet** for remote control through PC
C109-11N	SOFTWARE for flexural tests
C109-12N	SOFTWARE for splitting tensile

Technical detail: see p. 18

SERVO-STRAIN

SOFTWARE-FIRMWARE for the automatic servo-controlled management of the testing machine to measure:

- LOAD OR STRENGTH
- DISPLACEMENT
- STRAIN

The **servo-strain** software/firmware can be applied **ONLY** to Matest **servo-plus evolution** testing machines.

The system is connected to displacement or strain transducers allowing to automatically perform the following tests:

- Deflection on fiber reinforced concrete beams (ASTM C1018, C1609 | EN 11039-03, 14487-1, 14488-3, 14651-05) see p. 305
- Punching of sprayed concrete plate with measurement of the absorbed energy (EN 10834, 14488-3, 14488-05) see p. 306
- Deformation and ductility on building materials, **with C104-10N**
- Lightweight Aggregates for concrete, mortar and grout (EN 13055-1 method 1) by using the suitable device mod. A081-01 described at p. 45
- Deflection on fiber reinforced concrete beams (ASTM C1018, C1609 | EN 11039-03, 14487-1, 14488-3, 14651-05) see p. 305
- Punching of sprayed concrete plate with measurement of the absorbed energy (EN 10834, 14488-3, 14488-05) see p. 306
- Research tests

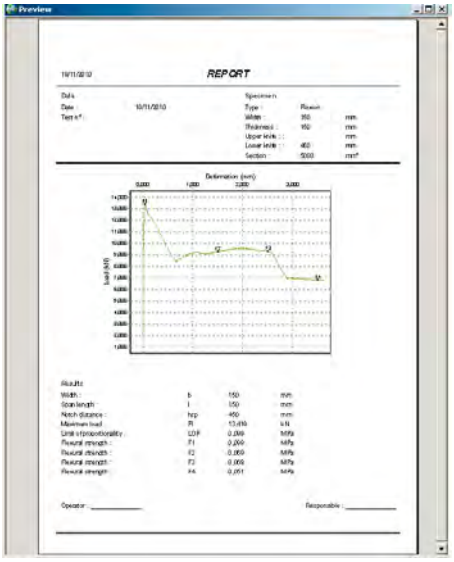
The applied load is automatically controlled by the **servo-plus evolution** machine.

The displacement of the piston or the strain/deformation of the sample are controlled by the **servo-strain** software, through a linear strain gage transducer (accessory), calculating values such as deflection, energy absorption, ductility.

TECHNICAL FEATURES

Same to **servo-plus evolution** model C104N (p. 224), and in addition:

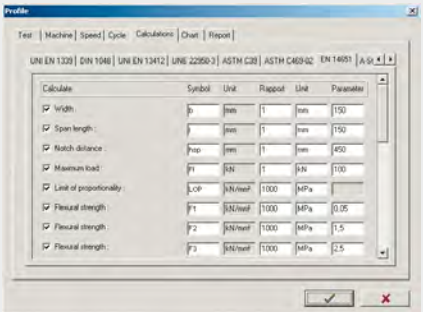
- Real time Graphical/Numerical display of all test data (load, strain, displacement, energy absorption, deflection, ductility etc.)
- Printing of test results and certificate on the onboard printer, or on a laser printer (accessories) directly connected to the machine via USB port.
- Personalized management of the archive exportable through pendrive.
- Possibility to connect up to 3 test frames
- Eight analog channels to connect load cells or pressure transducers with strain gage technology, linear displacement/deformation transducers and with strain gage technology.



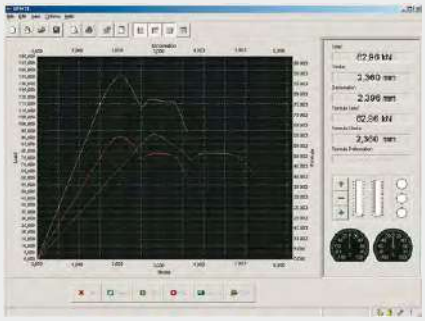
C104-10N Test report

C104-10N
Set up of customized compression test

C104-10N
Exemple of test result



C109-15N Calculation set up



C104-10N Test graph

SERVO-STRAIN APPLICATIONS

C104-10N
STRAIN, DUCTILITY, POST-BREAKING BEHAVIOUR
LIGHTWEIGHT AGGREGATES FOR CONCRETE I EN 13055-1

Compression tests on concrete specimens, steel fiber reinforced concrete (FRC), building material, and for research and experimental tests in order to evaluate the behavior of a specimen subjected to compression stress.

NEEDED ACCESSORIES for High stability Servo-Plus Evolution compression machines

C104-31SP
SUPPORTING DEVICE for displacement transducer, able to grant an high precision and an high stability control of the test in mm/min.

S336-14
LINEAR DISPLACEMENT TRANSDUCER, strain gage technology, 50 mm travel to permit a control between 0.2 mm/min and 2 mm/min
Other models of linear displacement transducers at p. 549

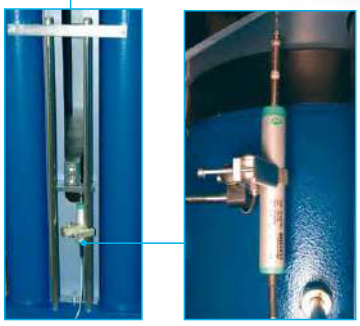
Note: To permit a control lower than 0.2 mm/min. other transducers available on request.

NEEDED ACCESSORY for all the other Servo-Plus Evolution machines

C104-31 HOLDER for displacement transducer.

S336-14 LINEAR DISPLACEMENT TRANSDUCER
Strain gage technology, 50 mm travel.
Other models of linear displacement transducers listed at p. 549

C089-10N + C104-10N



S336-14 + C104-31SP
Detail

S336-14 + C104-31SP

C109-15N
DEFLECTION MEASUREMENT ON STEEL FIBER REINFORCED CONCRETE BEAMS
100x100x400(500) mm AND 150x150x500(600) mm

STANDARDS: EN 11039-03, 14487-1, 14488-3, 14651-05 I ASTM C1018, C1609

Used on a flexural frame machine complete with Servo-Plus Evolution (to be selected among the models C090-07N, C091-03N) and by adding the specific equipment required to perform the test, that is described and illustrated in detail at p. 295

PUNCHING TEST ON SPRAYED CONCRETE SPECIMENS WITH MEASUREMENTS OF THE ENERGY ABSORPTION

STANDARDS: EN 10834, 14488-3, 14488-05 I UNI 10834

Used on a flexural frame machine and a Servotronic model C090-07N, with the addition of the specific equipment required to perform the test, that is described and illustrated in detail at p. 295

C090-14 + S336-14 + C109-15N
fixed on the flexural machine **C090-07N**

C090-15 + C109-15N fixed on the flexural machine **C090-07N**

C109-15N
Test result

C109-15N
Set up of deflection

C125N
DETERMINATION OF THE SECANT COMPRESSION ELASTIC MODULUS ON CONCRETE
AUTOMATIC WITH PACE RATE CONTROL ALSO WHEN RELEASING THE LOAD

STANDARDS: EN 12390-13, EN 13412, EN 13286-43 | ASTM C469 | ISO 6784 | UNI 6556 | DIN 1048 | BS 1888:121

C089-04N + C125N


C125-13


C134

It can be used with a MATEST high stability frame 2000 or 3000 or 5000 kN capacity, coupled to the automatic servo-controlled system “Servo-Plus Evolution” (mod. C104N) housed in a separate pyramidal frame.

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 than controls the pace rate decreasing the load.
The setting of the pace rate is made by a very sensitive valve controlled by a stepper motor thus allowing 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 at 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 8 high resolution channels for the control of load cells or transducers with strain gages bridge.
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 further processing following the most updated International Standards for this application.

DATA ACQUISITION AND PROCESSING UTM2 SOFTWARE LICENSE FOR ELASTIC MODULUS ON CONCRETE
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 personalize the test profile that will be carried out in a completely automatic way by the testing machine.

The software allows to determine both the initial and stabilized **secant modulus of elasticity** as requested by **EN 12390-13** Standard.
The software gives the possibility to print on a standard printer a test certificate reporting all the data concerning the test and the specimen and the graph of the test. The software includes the license "Servonet" mod. C123N, while the extensometers (two models are proposed: **A** and **B**) are not included in the standard supply and must be ordered separately (see accessories).

ACCESSORY

C125-01N
SOFTWARE FOR ELASTIC MODULUS TESTS ON ROCKS
STANDARDS: ASTM D3148, D5407, D2664,
EN 14580, EN 1926 | ISRM

Note: The Elastic Modulus on Concrete mod. C125N can be used together with:

A) EXTENSOMETERS (STRAIN GAGES), SINGLE USE, ELECTRIC, available in different sizes, mod. C125-10 to C125-13 (see accessories).

or:

B) EXTENSOMETERS /COMPRESSOMETERS, electronic, universal, mechanical frame, mod. C134 (see accessories)

ACCESSORIES

A) EXTENSOMETERS (STRAIN GAGES), SINGLE USE, ELECTRIC
Pack of 10 pieces

Available models:

C125-10 Electric extensometer, base length 10 mm
C125-11 Electric extensometer, base length 20 mm
C125-12 Electric extensometer, base length 30 mm
C125-13 Electric extensometer, base length 60 mm
C125-14 Electric extensometer, base length 120 mm

C125-15
KIT for the application of single use extensometers composed by: glue, welder, solder, cleaning liquid, accessories, the whole in carrying case.

C125-09
INTERFACE MODULE, a **needed accessory** to connect up to 4 electric single use extensometers. This module allows also the automatic calibration of the zero and of the measuring range after a special thermal compensation. This grants a five times better accuracy than the one requested by the Standards.

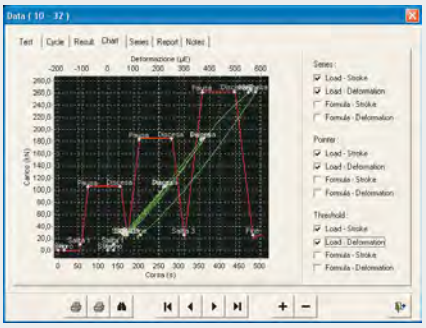
C125-09

AS AN ALTERNATIVE:

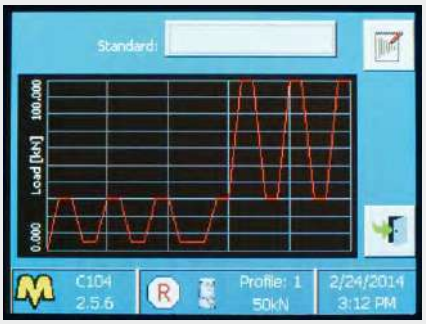
B) **C134**
EXTENSOMETER / COMPRESSOMETER, ELECTRONIC, UNIVERSAL, MECHANICAL FRAME.
It can be used only with samples having minimum height of 130 mm.
Technical details: see p. 286

C134-10
TEMPLATE, to regulate and calibrate the base length of the C134 extensometer.

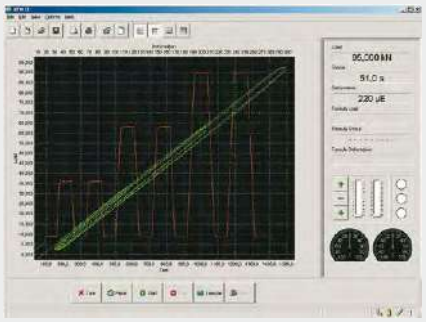
C134



Screen during a test and marker indicating any change.



Test graph to EN 12390-13



Test with longitudinal and transversal deformations

Test data

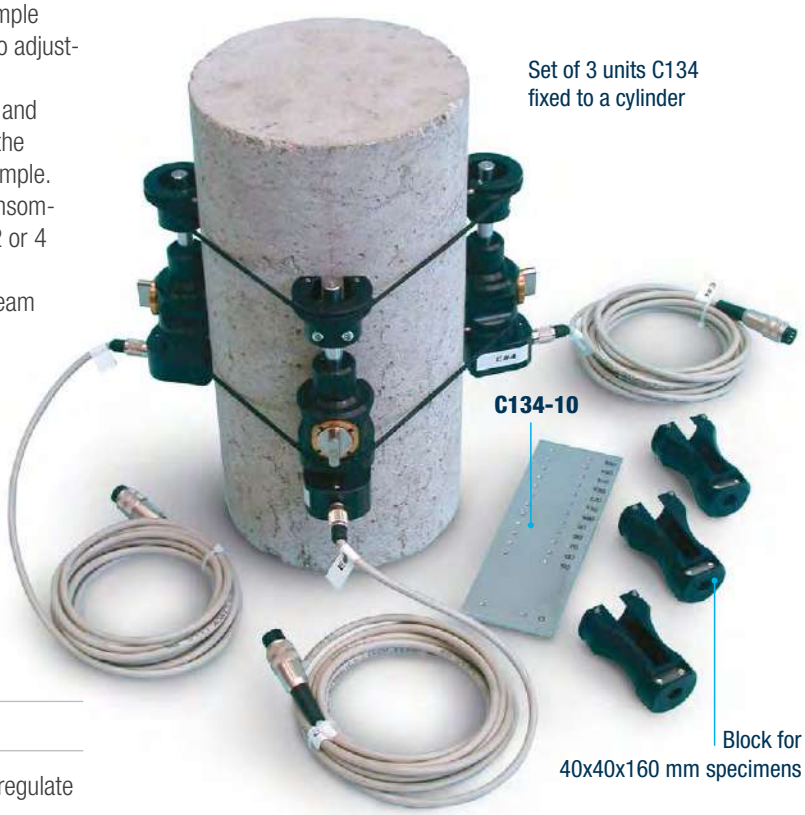
DETERMINATION OF THE SECANT COMPRESSION ELASTIC MODULUS TEST
ON CONCRETE AND MORTAR SPECIMENS

C134
ELECTRONIC UNIVERSAL EXTENSOMETER/COMPRESSOMETER

STANDARDS: EN 12390-14, EN 13412, EN 13286-43 | ASTM C469 | ISO 6784 | BS 1881:121 | DIN 1048 | UNI 6556

Made of two anodized aluminium pieces, one fixed and the other sliding and housing a displacement transducer that measures with high accuracy the movement of two conical points made of hardened steel and attached at the two ends of the electronic sensor.
An aluminium template (optional mod C134-10) is used to regulate and to calibrate the base length.
The two conical points are coupled to the surface of the sample with a rapid and simple attachment system by means of two adjustable elastic straps.
The instrument is equipped with a mechanical knob to lock and unlock the displacement transducer, allowing to safeguard the selected base length while attaching of the device to the sample.
Normally the test is performed on cylinders by using 3 extensometers/compressometers, and on cubes or beams by using 2 or 4 instruments.
The extensometer is suitable to test cubes, cylinders and beam specimens, having minimum height of 130 mm
It is also possible to test mortar prisms 40x40x160 mm by using a block for reducing length.
Gauge length adjustable from 50 to 160 mm
Feeding up to 10 V
Travel: ± 1.5 mm
Sensitivity less than 0.01 micron
Supplied complete with reducing block for mortar prisms, elastic straps, carrying case.

Weight: 1000 g approx.



ACCESSORIES

C134-10 TEMPLATE, anodized aluminium made, used to regulate and calibrate the base length.

S337-51 CALIBRATION PROCESS for one Extensometer/Compressometer combined with digital unit.

Note:
The Compressometers and the Compressometer/Extensometer connected to electronic linear transducers (accessory mod. S336-11) can be used with:
- Matest Servo-Plus Evolution compression machines equipped with Automatic Elastic Modulus system (mod. C125N) in complete accordance with EN, ASTM, ISO, DIN, BS, UNI Specifications (see p. 284)
- Matest Cyber-Plus and Servo-Plus compression machines. The electric cable of the displacement transducer is "directly" connected to one of the eight channels available on the digital unit.
  Through the suitable Software (accessory mod. C130-05), the digital unit will automatically elaborate the data, supplying the load/deformation graph with certificate printing.

C134 with case

C130-05
FIRMWARE for Elastic Modulus test on Concrete, Mortar, Rock specimens and tests according to API 19C and ISO 13503-2 Automatic data and processing acquisition, load/deformation graph and certificate printing with direct management of the testing machine. The software can be installed only on Cyber and Servo-Plus Evolution systems.

C130-05 Test execution

Note:
The Elastic Modulus test, to fully comply EN, ASTM, ISO, DIN, UNI, BS Standards, must be carried out with a Servo-Plus Matest machine equipped with C125N automatic system with pace rate load and "unload" control.

STATIC ELASTIC MODULUS OF CONCRETE

COMPRESSOMETER

Used to determine the strain and deformation characteristics of concrete specimens. It comprises two steel rings for clamping to the specimen, two gauge length bars, and spherically-seated lever unit. Supplied **without** dial gauge or strain transducer to be ordered separately (see accessories).

C132N + S375 **C131N1 + S375** **C130N + S375**

AVAILABLE MODELS

C130N COMPRESSOMETER for cylinders Ø 150x300 mm; Ø 160x320 mm; Ø 6"x12"

C131N1 COMPRESSOMETER for cylinders Ø 100x200 mm; Ø 112.8x220 mm; Ø 4"x8"

C132N COMPRESSOMETER for cubes 150 mm side.

C132-01N COMPRESSOMETER for cubes 200 mm side.

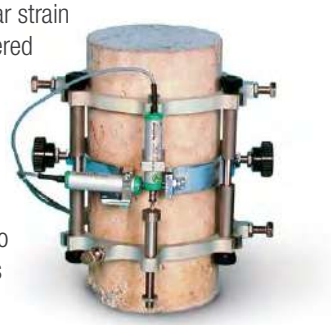
C130N + C133 + S375 (2)

C130N + S336-11

C133
COMPRESSOMETER-EXTENSOMETER Ø 150-160 mm

STANDARD: ASTM C469

To measure both axial deformation and diametrical extension of cylinder specimens Ø 150x300 mm, 160x320 mm, 6"x 12" under compression stress, by determining the elastic modulus.
It consists of a central ring for the diametrical extension measure, **to be fixed on the C130N compressometer**.
Supplied **without** dial gauges or linear strain transducers (**two required**) to be ordered separately (see accessories).



C130N + C133 + S336-11(2)

C133-01
COMPRESSOMETER EXTENSOMETER Ø 100-112.8 mm

Same as mod. C133 but, connected to C131N1. It is suitable to test cylinders from Ø 100x200 to 112.8x220 mm.

NEEDED ACCESSORY

S375 DIAL GAUGE, 5 mm travel by 0.001 mm subd.

AS AN ALTERNATIVE:

S336-11 ELECTRONIC LINEAR DISPLACEMENT TRANSDUCER, 10 mm travel, complete with cable.
Technical details: see p. 549

Note:
The Compressometers and the Compressometer/Extensometer connected to electronic linear transducers (accessory mod. S336-11) can be used with:
- Matest Servo-Plus Evolution compression machines equipped with Automatic Elastic Modulus system (mod. C125N) in complete accordance with ASTM C469, ISO 6784, UNI 6556 Specifications (see p. 284)
- Matest Cyber-Plus and Servo-Plus compression machines. The electric cable of the displacement transducer is "directly" connected to one of the eight channels available on the digital unit. Through the suitable Software (accessory mod. C130-05), the digital unit will automatically elaborate the data, supplying the load/deformation graphic with certificate printing.

C130-05 SOFTWARE for Elastic Modulus test on Concrete Mortar specimens and tests according to API 19C and ISO 13503-2
Automatic data and processing acquisition, load/deformation graphic and certificate printing with direct management of the testing machine. The software can be used only with Cyber and Servo-Plus Evolution systems.

S337-51 CALIBRATION PROCESS of one displacement transducer S336-11 combined with Cyber or Servo-Plus Matest compression machine.

Note:
The Elastic Modulus test, to fully comply EN, ASTM, ISO, DIN, UNI, BS Standards, must be carried out with a Servo-Plus Matest machine equipped with C125N automatic system with pace rate load and "unload" control.

FLEXURE TESTING MACHINES

MAIN FEATURES

- Motorized or hand operated models.
- Gauge load measuring system.
- **Digitec** or **Cyber-Plus Evolution** graphic display unit.
- **Autotec** or **Servo-Plus Evolution** servo-controlled automatic system.
- Stand-alone frame, or combined to another frame.
- Possibility of two-point loading or centre-point loading by simply removing one upper roller and placing the other in the centre.
- Graduated scales to get easy rollers adjustment.
- Rollers are hardened, case hardened and rectified.

WE PROPOSE VARIOUS FLEXURAL FRAMES:

- **C090** Series with frame 150 kN capacity frame to perform flexural tests on concrete beam specimens having max. dimensions of 150x150x750 mm. See p. 290

C090 SERIE

- **C091** Series with **open sided frame** 150 kN capacity to perform flexural tests on concrete beam specimens having max. dimensions of 200x200x800 mm;
  - Flat blocks (max. width 600 mm);
  - Flagstones and Kerbs;
  - Any type of beam having max. size 600xh250 mm (lower rollers max. length 1325 mm). See p. 292

C091 SERIE

- **C090-06** Series with 200 kN capacity, high stiffness flexure frame to perform tests on concrete beams max. dimensions 150x150x750 mm;
  - Flat blocks, max. width 600 mm
  - Flagstones and Kerbs
  - Any type of beam having max. width 600 mm and max. height 150 mm
  - Energy absorption on sprayed concrete samples

  See p. 294

C090-06 SERIE

C095N
FLEXURAL AND TRANSVERSE MULTIPURPOSE TESTING MACHINE
320 KN CAPACITY, **C-SHAPED OPEN FRAME**

NEW

To perform a wide range of flexural/compression tests on concrete specimens, paving slabs, kerbs, mortar specimens, flexural toughness of steel FRC concrete, energy absorption of sprayed concrete, beam deflection and toughness of steel FRC/Shotcrete, measurement of crack opening (CTOD-CMOD) etc. See p. 296

C095N

C096N
HIGH STIFFNESS FLEXURAL MACHINE
360 KN CAPACITY.

NEW

See p. 300

C096N

C093 Series to perform flexural tests on concrete beam specimens having max. dimensions 200x200x800 mm and to perform tests on any kind of other product with max. dimensions 550x550 mm (adjustable distance between lower rollers up to max. 1325 mm). See p. 308

C093 SERIE

C109-09N + C093-05N
CONCRETE PIPE TESTING MACHINE, 1000 kN capacity to test pipes Ø 450 to 2600 mm. See p. 307

C093-05N

FLEXURAL TESTING MACHINE 150 KN CAPACITY

FOR FLEXURAL TESTS ON CONCRETE BEAM SPECIMENS MAX. DIMENSIONS 150X150X600 (750) MM

STANDARDS: EN 12390-5 | ASTM C78, C293 | AASHTO T97 | BS 1881:118

150 KN CAPACITY

MAIN FEATURES

- Max. vertical daylight between upper/lower rollers: 160 mm
- Rollers dimensions: Ø 40x160 mm
- Complete with 4 adjustable and articulated rollers.
- Distance of lower rollers adjustable from 100 to 455 mm
- Distance of upper rollers adjustable from 40 to 155 mm
- Gauge diameter 250 mm with 0.5 kN divisions.
- Max. ram travel 50 mm approx.
- Calibration accuracy: class 1.0
- Hydraulic device to stop the piston stroke at its max excursion, to avoid pumping the piston out of the cylinder.
- Power supply (motorized models): 230V 1ph 50Hz 750W
- Dimensions: 540x460x960 mm
- Weight: 180...240 kg approx.

INVERTER Details, p. 223

C090-03N + C104-04 + C127N | C090-02D | C090-01 + C111-16

FLEXURAL 150 kN capacity			LOAD MEASURING SYSTEM				
MODEL	Hand Operated	Motorized	1 Gauge	Cyber-Plus Evolution mod. C109N (p.224)	Servo-Plus Evolution mod. C104N (p.224)	Digitec mod. C108N (p.219)	Autotec mod. C098N (p.219)
C090	▼		▼				
C090-01		▼	▼				
C090-02N		▼		▼			
C090-03N		▼			▼		
C090-02D		▼				▼	
C090-03A		▼					▼

ACCESSORIES FOR 150 kN FLEXURAL MACHINES

C111-16 DISTANCE PIECE, 50 mm high to test beams 100x100x400/500 mm

C127N GRAPHIC PRINTER on thermo-paper on board for digital models

C115-01 TWO WAY HYDRAULIC VALVE, connected to the motorized pumping unit of the machine to activate a second frame. Technical details: see p. 318

C115-01

C104-04 CONSOLE HOUSING THE SERVO-PLUS EVOLUTION, the pump assembly is lined with sound-proofing material for noise reduction and encased to enhance the design of the machine. See p. 314

C104-04

C097-01 DUAL LOW CAPACITY DIGITAL RANGE, complete with **appropriate pressure transducer**, only for digital machines. Range selectable from 10 kN to 100 kN. Technical details: see p. 313

C097-01

C097-05 CALIBRATION CLASS 1, starting from 1% of the full range. With a special calibration procedure it is possible to grant Class 1 practically on the full range of the flexural machine. Applicable only on digital machines.

C100 SPLITTING TENSILE test device for cylinders.
EN 12390-6 | ASTM C496
Technical details and other models: see p. 314

C100

E170 COMPRESSION DEVICE to test mortar specimens 40.1x40 mm
EN 196 | ASTM C349
Technical details and other models: see p. 315

E170

E172-01 FLEXURE DEVICE for mortar prisms 40.1x40x160 mm.
EN 196 / EN ISO 679 (it can be used only with the dual low capacity digital range 0-15kN).
Technical details and other models: see p. 428

C126 BENCH to hold the compression machine. See p. 317

E172-01

C126

C099N NEW
INVERTER DEVICE
Applicable only on Cyber-Plus and Servo-Plus Evolution machines.
Technical details: see p. 223

C099N

SOFTWARE for DIGITEC / AUTOTEC or CYBER / SERVO PLUS models	
C109-16 (N)*	SOFTWARE for flexural tests on clay blocks
C109-11 (N)*	SOFTWARE for flexural tests
C109-12 (N)*	SOFTWARE for splitting tensile

Technical detail: see p. 18
(N)* for Cyber - Servo Plus models.

FLEXURAL TESTING MACHINE 150KN CAPACITY OPEN-SIDED FRAME

FOR FLEXURAL TESTS ON CONCRETE BEAM SPECIMENS MAX. DIMENSIONS 200X200X800 MM, FLAT BLOCKS, FLAGSTONES, KERBS, TILES, SLABS, MASONRY UNITS, AND ANY TYPE OF MATERIAL HAVING MAX. SIZE 600X250 MM (LOWER ROLLERS MAX. DISTANCE 1325 MM)

STANDARDS: EN 12390-5 | EN 1340:4 | ASTM C78, C293 | AASHTO T97 | BS1881 :118, BS 6073-1, BS 7263

150 KN CAPACITY

MAIN FEATURES

- **Open-sided frame** for an easy and fast positioning of the specimen between the rollers
- Max. vertical daylight between upper/lower rollers: 260 mm, intermediate daylight positions: 210, 160, 110 and 60 mm
- Roller dimensions: Ø 40x613 mm
- Ram travel 110mm approx.
- Calibration accuracy: class 1.0
- Simple action piston with counterweights to minimize frictions
- Power supply: 230V 1ph 50Hz 750W
- Dimensions: 1400x1200x1430 mm
- Weight: 350 kg approx.

INVERTER Details, p. 223

BARCODE Details, p. 223

C091-03N + C091-11 + PC

FLEXURAL 150 kN capacity		LOAD MEASURING SYSTEM			
MODEL	Motorized	Cyber-Plus Evolution mod. C109N (p. 224)	Servo-Plus Evolution mod. C104N (p. 224)	Digitec mod. C108N (p. 219)	Autotec mod. C098N (p. 219)
C091-02N	▼	▼			
C091-03N	▼		▼		
C091-02D	▼			▼	
C091-03A	▼				▼

ACCESSORIES FOR FLEXURAL 150 kN "OPEN SIDED FRAME"

C091-10 ROLLERS GROUP: lower adjustable from 75 to 525 mm, and **only one** upper central roller for single point method.

C091-11 ROLLERS GROUP: lower adjustable from 75 to 525 mm, and upper adjustable from 75 to 180 mm for two points method.

C091-12 ROLLERS GROUP: lower adjustable from 75 to 1325 mm, and upper adjustable from 75 to 575 mm for two points method.

C091-14 ROLLERS GROUP: lower adjustable from 75 to 1325 mm, and **only one** upper central roller for single point method.


C091-13

C091-13 UPPER TAMPER (steel made), for concrete KERBS tests.
The tamper is mounted on a rotating coupling and fixed to the upper part of the machine to apply a flexural strength on three points on the kerb, without any torsional stress. STANDARD: EN 1340

C090-15 DEFLECTION MEASUREMENT TEST on fiber reinforced concrete beams 100x100x400(500) mm and 150x150x500(600) mm
STANDARDS: EN 14488-3 | ASTM C1609, C1018
The test is performed with the specific equipment (deflection measurement device, displacement transducers) described at pag. 305 and the automatic servocontrolled system of load and displacement Servo-Strain (see p. 282)


C090-15


C093-11

C093-11 DEVICE for flexural tests on clay blocks for flooring.
STANDARDS: EN 15037-2, 15037-3 | UNI 9730-3

C127N GRAPHIC PRINTER on thermo-paper on board for digital models

C127-11 THERMO-PAPER roll for printer (pack of 10 rolls)

C115-01 TWO WAY HYDRAULIC VALVE, connected to the motorized pumping unit of the machine to activate a second frame.
Technical details: see p. 318


C115-01

C097-01 DUAL LOW CAPACITY DIGITAL RANGE, complete with **appropriate pressure transducer**, only for digital machines. Range selectable from 10 kN to 100 kN.
Technical details: see p. 313


C097-01

C097-05 CALIBRATION CLASS 1, starting from 1% of the full range. With a special calibration procedure it is possible to grant Class 1 practically on the full range of the flexural machine. Applicable only on digital machines.

C100 SPLITTING TENSILE test device for cylinders.
EN 12390-6 | ASTM C496
Technical details and other models: see p. 314


C100

C103 SPLITTING TENSILE test device for self blocking pavers and cubes.
EN 1338, 12390-6.
Technical details: see p. 314


C103

AS AN ALTERNATIVE:

C103-02 SPLITTING TENSILE test device for self blocking pavers and cubes, max dimensions 300x500 mm.
EN 1338, 12390-6. Technical details: see p. 314

E170 COMPRESSION DEVICE to test mortar specimens 40.1x40 mm EN 196 | ASTM C349
Technical details and other models: see p. 315

E172-01 FLEXURE DEVICE for mortar prisms 40.1x40x160 mm EN 196 / EN 1015 (it can be used only with the dual low capacity digital range 0-15kN). Technical details and other models: see p. 428

C099N NEW
INVERTER DEVICE
Applicable only on Cyber-Plus and Servo-Plus Evolution machines.
Technical details: see p. 223


C099N

SOFTWARE for DIGITEC / AUTOTEC or CYBER / SERVO PLUS models	
C109-15 (N)*	SOFTWARE for deflection measurement test
C109-16 (N)*	SOFTWARE for flexural tests on clay blocks
C123 (N)*	SOFTWARE **Servonet** for remote control through PC
C109-11 (N)*	SOFTWARE for flexural tests
C109-12 (N)*	SOFTWARE for splitting tensile

Technical detail: see p. 18
(N)* for Cyber - Servo Plus models.

FLEXURAL FRAME, 200 KN CAPACITY HIGH STIFFNESS AND STABILITY

FOR FLEXURAL TESTS ON CONCRETE BEAMS MAX. DIMENSIONS 150X150X600/750 MM, FLAT BLOCKS, FLAGSTONES, KERBS, TILES, SLABS, MASONRY UNITS, AND ANY TYPE OF MATERIAL HAVING MAX. WIDTH 600 MM AND MAX. HEIGHT 150 MM

STANDARDS: EN 12390-5 | EN 1340:4 | BS 1881:118, 6073-1, 7263 | ASTM C78, C293 | AASHTO T97

200 KN CAPACITY

MAIN FEATURES

- High stiffness frame with minimum deflection at maximum load (0.9 mm)
- Max. vertical daylight between upper/lower rollers: 160 mm
- Ram travel: 110 mm, to get minimun daylight of 50 mm
- Horizontal daylight of the testing chamber: 720 mm
- Simple action piston with counterweights to maximize frictions
- Power supply: 230V 1ph 50Hz 750W
- Dimensions: 990x970x1105 mm
- Weight: 190...250 kg approx.

INVERTER For a further improvement of energy efficiency and silent operation, (optional device code C099N). Technical details, p. 223 NEW

BARCODE Scanner for specimen file/identification, (optional device code C099-01). Details, p. 223 NEW

THE FRAME IS SUPPLIED **WITHOUT** UPPER/LOWER ROLLERS GROUP, TAMPER, BASE SUPPORT ETC. TO BE ORDERED SEPARATELY (see accessories).

C090-07N + C090-13 | **C090-07N + C127N + C104-04 + C090-13**

FLEXURAL 200 kN capacity High Stiffness		LOAD MEASURING SYSTEM			
MODEL	Capacity kN	Cyber-Plus Evolution mod. C109N (p. 224)	Servo-Plus Evolution mod. C104N (p. 224)	Digitec mod. C108N (p. 219)	Autotec mod. C098N (p. 219)
C090-06N	200	▼			
C090-07N	200		▼		
C090-06D	200			▼	
C090-07A	200				▼

ACCESSORIES FOR FLEXURAL 200 kN HIGH STIFFNESS

Rollers, Ø 40 mm, hardened and rectified, cadmium plated against corrosion.
Lower rollers have adjustable distance from 75 to 900 mm, and upper rollers have adjustable distance from 75 to 180 mm for two points loading tests.
Possibility to easily place in the centre one upper roller for centre point loading tests.

Models:

C090-12 ROLLERS GROUP upper and lower, 160 mm long.
C090-13 ROLLERS GROUP upper and lower, 613 mm long.

ACCESSORY FOR C090-13

C090-21 ROLLERS-HOLDERS (lowers only) 613 mm long, to be installed on the C090-13 group in order to modify the max. vertical daylight at 60 mm and min. at -50 mm to test tiles, slabs etc. with max. thickness of 50 mm and flexibility up to -45 mm

C090-14 ENERGY ABSORPTION TEST on sprayed concrete specimens. STANDARDS: EN 14488-5 | UNI 10834
The test is performed with the specific equipment (square base with useful size of 500x500 mm, loading element, displacement transducer) described at p. 283 and the Software/Firmware automatic system of load and displacement Servo Strain (p. 282)


C090-14

C090-15 DEFLECTION MEASUREMENT TEST on fiber reinforced concrete beams 100x100x400(500) mm and 150x150x500(600) mm
STANDARDS: EN 14488-3
ASTM C1609, C1018
The test is performed with the specific equipment (deflection measurement device, displacement transducers) described at p. 305 and the Software/Firmware automatic system of load and displacement Servo Strain (p. 282)


C090-15

C111-17 DISTANCE PIECE 40 mm high, needed to perform the deflection test to EN 14488-3

C091-13 UPPER TAMPER (steel made), for concrete KERBS tests. The tamper is mounted on a rotating coupling and fixed to the upper part of the machine to apply a flexural strength on three points on the kerb, without any torsional stress.
STANDARD: EN 1340


C091-13

C093-11 DEVICE for flexural tests on clay blocks for flooring.
STANDARDS: EN 15037 | UNI 9730-3


C093-11

C127N GRAPHIC PRINTER on thermo-paper on board for digital models

C097-01 DUAL LOW CAPACITY DIGITAL RANGE, complete with **appropriate pressure transducer**.
Range selectable from 10 kN to 100 kN.
Technical details: see p. 313


C097-01

C097-05 CALIBRATION CLASS 1, starting from 1% of the full range. With a special calibration procedure it is possible to grant Class 1 practically on the full range of the flexural machine.

C100 SPLITTING TENSILE test device for cylinders.
EN 12390-6 | ASTM C496
Technical details and other models: see p. 314


C100

C103 SPLITTING TENSILE test device for self blocking pavers and cubes.
EN 1338, 12390-6.
Technical details: see p. 314


C103

As alternative:

C103-02 SPLITTING TENSILE TEST DEVICE for self blocking pavers and cubes, max. dimensions 300x500 mm
EN 1338, 12390-6
Technical details: see p. 314

E170 COMPRESSION DEVICE to test mortar specimens 40.1x40 mm
EN 196 | ASTM C349
Technical details and other models: see p. 315


C103-02

SOFTWARE for DIGITEC / AUTOTEC or CYBER / SERVO PLUS models	
C109-15 (N)*	SOFTWARE for deflection measurement test
C109-16 (N)*	SOFTWARE for flexural tests on clay blocks
C123 (N)*	SOFTWARE **Servonet** for remote control through PC
C109-11 (N)*	SOFTWARE for flexural tests
C109-12 (N)*	SOFTWARE for splitting tensile

Technical detail: see p. 18
(N)* for Cyber - Servo Plus models.

C095N
FLEXURAL AND TRANSVERSE MULTIPURPOSE TESTING MACHINE, 320 KN CAPACITY
C-SHAPED OPEN FRAME

STANDARDS: EN 12390-5, 12390-6, 14488-5, 1338, 1339, 1340, 196
ASTM C78, C293, C1550, C496, C349 | UNI 9730-3

NEW

iT TECH

320 KN CAPACITY

MAIN FEATURES

- Servo-Plus evolution 8-channel servo controlled system for a fully automatic execution of the test (mod. C104N).
- Load is measured by a high accuracy electric strain cell, eliminating the piston's weight and friction.
- C-shaped open frame for an easy and fast positioning of the specimen between the rollers.
- Frame is closed by a hydraulic vertical rod, granting high rigidity.
- Ram travel: 110 mm
- Maximum vertical daylight between upper/lower rollers: 263 mm
- Horizontal clearance (between uprights): 1040 mm
- Possibility to easily place one upper roller in the centre for centre-point loading.
- Graduated scales are foreseen for easy roller adjustment.
- Simple action piston with counterweights to minimize frictions.
- Calibration accuracy: class 1
- Power supply: 230V 1ph 50Hz 750W
- Frame dimensions: 1700x1470x1557 mm
- Frame weight: 800 kg + 100 kg approx. of control console.

INVERTER NEW

For a further improvement of energy efficiency and silent operation, (optional device code C099N). Technical details, p. 223

BARCODE

Scanner for specimen file/identification, (optional device code C099-01). Details, p. 223 NEW

C095N with accessories

C095N SPECIFIC APPLICATIONS

NEW

C095N-11
FLEXURAL TESTS ON CONCRETE BEAMS

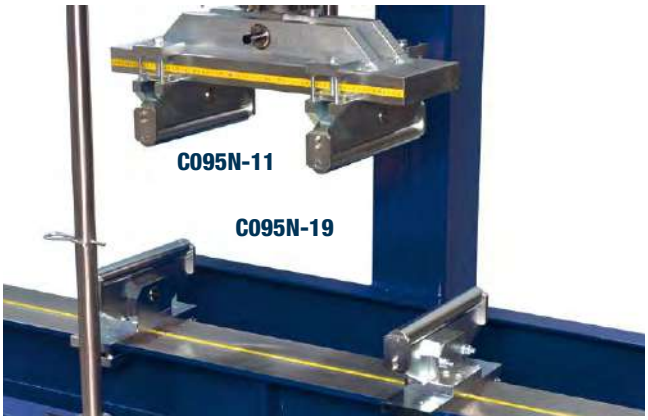
STANDARDS: EN 12390-5 I ASTM C78, C293

Upper and lower roller group for third point and centre tests on concrete beams up to 200x200x800 mm
Rollers size: 30 mm Ø by 312 mm long, cadmium plated against corrosion.
Span between upper rollers adjustable from 75 to 570 mm
Span between lower rollers adjustable from 75 to 1560 mm

Weight: 65 kg approx.

NEEDED ACCESSORY

C095N-18 FOUR DISTANCE PIECES height 43 mm each, to adjust the vertical useful light of the frame from 263 to 177 mm (67 mm with piston excursion)



C095N-12
FLEXURAL TESTS ON PAVING SLABS AND ANY TYPE OF MATERIAL HAVING MAX. WIDTH 600 MM

STANDARD: EN 1339

One upper centre loading roller and two lower roller assembly for tests on paving slabs.
Rollers size: 40 mm Ø by 620 mm long, cadmium plated against corrosion.
Span between lower rollers adjustable from 75 to 1560 mm

Weight: 76 kg approx.

NEEDED ACCESSORY

C095N-18 FOUR DISTANCE PIECES height 43 mm each, to adjust the vertical useful light of the frame from 263 to 177 mm (67 mm with piston excursion)

C095N-19
FLEXURAL TESTS ON CONCRETE BEAMS

STANDARDS: EN 12390-5

Two upper loading rollers for third point and centre tests on concrete beams up to 200x200x800 mm
Rollers size: 40 mm Ø by 312 mm long, cadmium plated against corrosion, to be used with the rollers assembly C095N-12.
Span between upper rollers adjustable from 75 to 570 mm

Weight: 65 kg approx.

NEEDED ACCESSORY

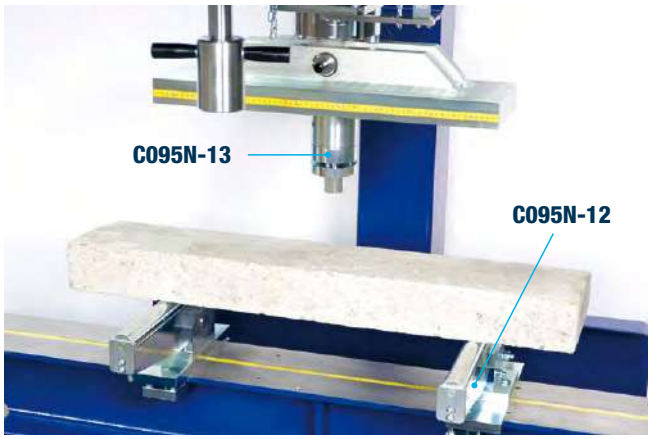
C095N-18 FOUR DISTANCE PIECES height 43 mm each, to adjust the vertical useful light of the frame from 263 to 177 mm (67 mm with piston excursion)

C095N-13
UPPER TAMPER FOR TESTING KERBS

STANDARDS: EN 1340

The Tamper, steel made, is mounted on a rotating coupling and fixed to the upper part of the machine to apply a flexural load on the kerb, without any torsional stress.
To be used with the rollers assembly C095N-12.
The vertical useful light is 221 mm (111 mm with piston excursion).

Weight: 6 kg approx.



ACCESSORY

C095N-18 FOUR DISTANCE PIECES height 43 mm each, to adjust the vertical useful light from 221 to 135 mm (25 mm with piston excursion)

C095N SPECIFIC APPLICATIONS

C095N-14
COMPRESSION TESTS UP TO 320KN CAPACITY

The multipurpose (flexural) frame can be equipped with Lower platen and Upper spherically seated platen, having Ø 165 mm by 30 mm thick, to perform compression tests on low strength and small size specimens.
To be used with the four distance pieces C095N-18
The vertical useful light is from 350 to 178 mm (68mm with piston excursion).
The device can be used also for compression tests on mortar specimens (by using suitable devices E170 etc. listed on page 315, splitting tensile tests (by using suitable C100, C103 etc. devices listed on page 314).

Weight:
20 kg approx.

C095N-14 / C095N-18

C095N-15

DISPLACEMENT TRANSDUCER, to measure the piston travel.
Supplied complete with holder to the test frame.
Travel: 100 mm
Full bridge at 350 Ohm
Indipendent linearity: < 0.1%
Standard sensitivity: 2 mV/V

C095N-16
ENERGY ABSORPTION TEST ON SPRAYED CONCRETE SLABS

STANDARD: EN 14488-5
SQUARE BASE SUPPORT FRAME useful inside dimensions 500x500 mm, holding the sprayed concrete slab, complete with spherically upper loading element.

Weight:
125 kg approx.

C095N-16 + S336-14 with sample

NEEDED ACCESSORY

S336-14 DISPLACEMENT TRANSDUCER, to measure the central deformation of the slab under concentrated load.
Travel: 50 mm
Full bridge at 350 Ohm
Independent linearity: < 0.1%
Standard sensitivity: 2 mV/V

C109-15N

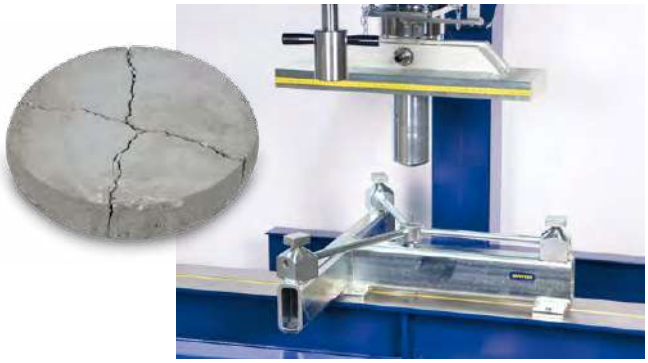
FIRMWARE / SOFTWARE for:
- Measurement of deflection on fibre reinforced concrete beams
- Determination of toughness, first crack strength and ductility
- Energy absorption test on sprayed specimens.

STANDARD: EN 14488-5
(see p. 283)

C095N-16 / S336-14 without sample

C095N-17
FLEXURAL TOUGHNESS OF FIBRE REINFORCED CONCRETE (FCR) SLABS

STANDARD: ASTM C1550
BASE SUPPORT FRAME, holding the concrete slabs having 800 mm diameter by 75 mm thick, complete with upper loading element.
Weight: 60 kg approx.



C095N-17

NEEDED ACCESSORY

S336-14 DISPLACEMENT TRANSDUCER, to measure the central deformation of the slab under concentrated load.
Travel: 50 mm
Full bridge at 350 Ohm
Independent linearity: < 0.1%
Standard sensitivity: 2 mV/V

C109-15N

FIRMWARE / SOFTWARE for:
- Measurement of deflection on fibre reinforced concrete beams
- Determination of toughness, first crack strength and ductility
- Energy absorption test on sprayed specimens.

STANDARD: EN 14488-5 I ASTM C1550
(see p. 283)

C095N SPECIFIC APPLICATIONS

C090-15 DEFLECTION MEASUREMENT TEST on fiber reinforced concrete beams 100x100x400(500) mm and 150x150x500(600) mm
STANDARDS: EN 14488-3 ASTM C1609, C1018
The test is performed with the specific equipment (deflection measurement device, displacement transducers) described at p. 305 and the Software/Firmware automatic system of load and displacement Servo Strain (p. 282)

C090-15

C127N GRAPHIC PRINTER on thermo-paper on board

C115-01 TWO-WAY HYDRAULIC VALVE, connected to the motorized pumping unit of the machine to activate a second frame. Technical details: see p. 318

C115-01

C097-05 CALIBRATION CLASS 1, starting from 1% of the full range. With a special calibration procedure it is possible to grant Class 1 practically on the full range of the flexural machine.

C100 SPLITTING TENSILE test device for cylinders.
EN 12390-6 | ASTM C496
Technical details and other models: see p. 314

C100

C103 SPLITTING TENSILE test device for self blocking pavers and cubes. EN 1338, 12390-6
Technical details: see p. 314

C103

AS AN ALTERNATIVE:

C103-02 SPLITTING TENSILE test device for self blocking pavers and cubes, max dimensions 300x500 mm.
EN 1338, 12390-6. Technical details: see p. 314

C103-02

C093-11 DEVICE for flexural tests on clay blocks for flooring.
STANDARD: UNI 9730-3

C093-11

E170 COMPRESSION DEVICE to test mortar specimens 40.1 x 40 mm EN 196 | ASTM C349
Technical details and other models: see p. 315

E170

SOFTWARE for CYBER models	
C109-16N	SOFTWARE for flexural tests on clay blocks
C123N	SOFTWARE **Servonet** for remote control through PC
C109-11N	SOFTWARE for flexural tests

Technical detail: see p. 18

Note:
Accessories for specific applications listed above are common for different tests. We recommend to check them when ordering, to avoid duplications.

C096N
HIGH STIFFNESS FLEXURAL MACHINE, 360 KN CAPACITY

NEW

STANDARDS: EN 12390-5, 1339, 1340, 14488-5 I ASTM C78, C293, C1550

IT TECH

360 KN CAPACITY

The frame has been designed to perform different kind of tests, from the simple third/centre point flexural test on beams to the advanced FRC displacement controlled tests and energy absorption tests on sprayed concrete. Accurate results are granted by the high stiffness of the frame according to the international Standards requirement (more than 200 kN/mm) and by a high precision load cell measurement system fitted into the frame. The high horizontal daylight of the testing chamber allows to test big dimension specimens. **Rollers are optional and must be ordered separately** according to user needs.

MAIN FEATURES

- 1 mm deformation every 200 kN.
- Easy positioning of the specimen.
- High precision load cell.
- Possibility to test any type of specimen: beams, flagstones, blocks, kerbs, FRC, slabs.
- Graduated scales for an easy rollers adjustment.
- Piston travel limit device.
- Simple action piston with counterweights.
- Power supply: 230V 1ph 50Hz 750W.

INVERTER

NEW

For a further improvement of energy efficiency and silent operation, (optional device code C099N). Technical details, p. 223

C096N + C095N-12

C096N SPECIFIC APPLICATIONS NEW

TECHNICAL SPECIFICATIONS

Model		C096N
Load capacity		360 kN
Load reading		Load cell
Horizontal daylight of the testing chamber		980 mm
Max. vertical daylight between upper/lower rollers	With C095N-11	263 mm
	With C095N-12	253 mm
	With C095N-13	221 mm
	With C095N-19	253 mm
	With C095N-14	350 mm
Upper rollers adjustable distance		From 75 to 210 mm
Lower rollers adjustable distance		From 75 to 850 mm
Ram travel		140 mm
Dimensions		600x1240x1400 mm
Weight (approx.)		900 kg

C095N-11
FLEXURAL TESTS ON CONCRETE BEAMS
STANDARDS: EN 12390-5 | ASTM C78, C293

Upper and lower roller group for third point and centre tests on concrete beams up to 200x200x800 mm
Rollers size:
30 mm Ø by 312 mm long, cadmium plated against corrosion.

Weight: 65 kg approx.

NEEDED ACCESSORY

C095N-18 FOUR DISTANCE PIECES height 43 mm each, to adjust the vertical useful light of the frame.

C095N-12
FLEXURAL TESTS ON PAVING SLABS AND ANY TYPE OF MATERIAL HAVING MAX. WIDTH 600 MM
STANDARD: EN 1339

One upper centre loading roller and two lower roller assembly for tests on paving slabs.
Rollers size:
40 mm Ø by 620 mm long, cadmium plated against corrosion.

Weight: 76 kg approx.

NEEDED ACCESSORY

C095N-18 FOUR DISTANCE PIECES height 43 mm each, to adjust the vertical useful light of the frame.

C095N-19
FLEXURAL TESTS ON CONCRETE BEAMS
STANDARDS: EN 12390-5

Two upper loading rollers for third point and centre tests on concrete beams up to 200x200x800 mm
Rollers size: 40 mm Ø by 312 mm long, cadmium plated against corrosion, to be used with the rollers assembly C095N-12.

Weight: 65 kg approx.

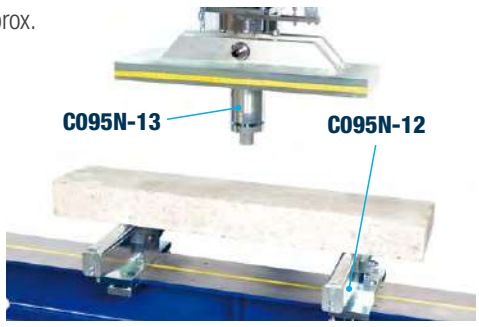
NEEDED ACCESSORY

C095N-18 FOUR DISTANCE PIECES height 43 mm each, to adjust the vertical useful light of the frame.

C095N-13
UPPER TAMPER FOR TESTING KERBS
STANDARDS: EN 1340

The Tamper, steel made, is mounted on a rotating coupling and fixed to the upper part of the machine to apply a flexural load on the kerb, without any torsional stress.
To be used with the rollers assembly C095N-12.

Weight: 6 kg approx.



ACCESSORY

C095N-18 FOUR DISTANCE PIECES height 43 mm each, to adjust the vertical useful light from 221 to 135 mm (25 mm with piston excursion)

C096N SPECIFIC APPLICATIONS

C095N-14
COMPRESSION TESTS UP TO 320KN CAPACITY

The multipurpose (flexural) frame can be equipped with Lower platen and Upper spherically seated platen, having Ø 165 mm by 30 mm thick, to perform compression tests on low strength and small size specimens.
To be used with the four distance pieces C095N-18.
The device can be used also for compression tests on mortar specimens (by using suitable devices E170 etc. listed on page 315, splitting tensile tests (by using suitable C100, C103 etc. devices listed on page 314).

Weight: 20 kg approx.

C095N-14 / C095N-18

C096N + C095N-17

C095N-15

DISPLACEMENT TRANSDUCER, to measure the piston travel.
Supplied complete with holder to the test frame.
Travel: 100 mm
Full bridge at 350 Ohm
Indipendent linearity: < 0.1%
Standard sensitivity: 2 mV/V

C095N-17
FLEXURAL TOUGHNESS OF FIBRE REINFORCED CONCRETE (FCR) SLABS

STANDARD: ASTM C1550
BASE SUPPORT FRAME, holding the concrete slabs having 800 mm diameter by 75 mm thick, complete with upper loading element.
Weight: 60 kg approx.

C095N-17

C090-14SP
ENERGY ABSORPTION TEST ON SPRAYED CONCRETE SLABS

STANDARD: EN 14488-5
SQUARE BASE SUPPORT FRAME, holding the sprayed concrete slab with useful inside dimensions 500x500 mm, complete with spherically upper loading element.

Weight: 125 kg approx.

C090-14SP + S336-14 with sample

NEEDED ACCESSORY

S336-14 DISPLACEMENT TRANSDUCER, to measure the central deformation of the slab under concentrated load.
Travel: 50 mm
Full bridge at 350 Ohm
Independent linearity: < 0.1%
Standard sensitivity: 2 mV/V

NEEDED ACCESSORY

S336-14 DISPLACEMENT TRANSDUCER, to measure the central deformation of the slab under concentrated load.
Travel: 50 mm
Full bridge at 350 Ohm
Independent linearity: < 0.1%
Standard sensitivity: 2 mV/V

C096N SPECIFIC APPLICATIONS

C090-15
DEFLECTION MEASUREMENT DEVICE

STANDARDS: EN 14488-3 | ASTM C1609, C1018

This device is fixed directly on the fiber reinforced concrete beam under test.
The device is placed between the loading bearers of a flexure frame or of a flexure device in a compression frame.
The test is performed by applying a flexural load to the concrete beam with load and displacement control and with automatic deflection measurement of the loaded specimen.
It is possible to test fibre reinforced concrete beams 100x100x400 or 500 mm and 150x150x500 or 600 mm dimensions.
The deflection device is steel made with chromed finishing; it is supplied complete with transducer holders, vertically positioned on the two opposite sides of the beam, but without the two transducers, for the measurement of deflection (mod. S336-11), and without the fork form transducer (mod. C090-16) to be ordered separately.

Dimensions: 300x450x300 mm
Weight: 8 kg approx.

C090-15
Bending device for testing to ASTM C1609

S336-11
DISPLACEMENT TRANSDUCER, HIGH PRECISION

STANDARDS: EN 14488-3 | ASTM C1609, C1018

To be attached to the device C090-15 for the measurement of deflection and determination of toughness on fibre reinforced concrete beams. Travel: 10 mm
Complete with cable and connector.
Two transducers are required.

C109-15N
FIRMWARE/SOFTWARE for:

- Measurement of deflection on fibre reinforced concrete beams.
- Determination of toughness, first crack strength and ductility.
- Energy absorption test on sprayed specimens. (see p. 283)

STANDARD: EN 14488-5

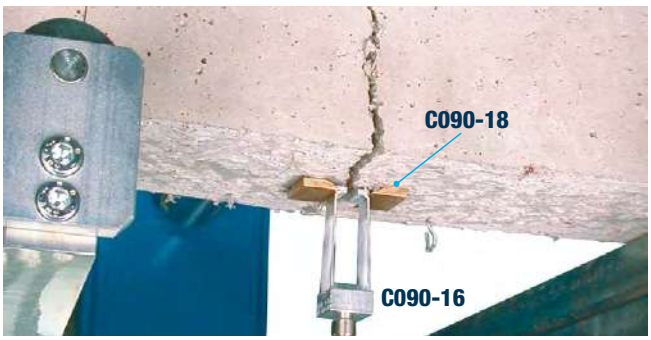
C109-14N
FIRMWARE/SOFTWARE for flexural stengths (first peak, ultimate and residual) EN 14488-3 (see p. 18).

C090-18 **C090-20**

C090-16
FORK FORM TRANSDUCER

STANDARDS: EN 11039-2, EN 14651

For the measurement of the Crack Mouth Opening Displacement (CMOD) and the Crack Base, Medium and Tip Opening Displacement (CTOD). Measuring range: 5 mm
Complete with cable and connector.



EN 14651 Clip gauge device

C090-18
DATUM BLOCK, to be glued on the lower side of the concrete beam for the first crack strength test (CMOD). Pack of 24 pieces.

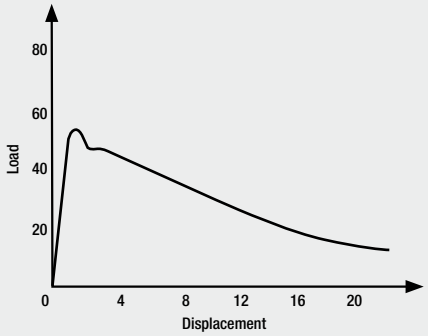
C090-20
DATUM BLOCK, square, to be glued on the concrete beam surface for the deflection measurement on the two opposite sides (CTOD). Pack of 24 pieces.

FIBER REINFORCED CONCRETE AND SHOTCRETE

In order to improve concrete performance in the plastic state, macrofibers are added to the concrete mix to increase the post-crack bending strength. This process improves the capacity of the material to absorb energy after cracking (toughness property). There are basically two test methods of the American Society of Materials Testing (ASTM) for evaluating the toughness of fiber-reinforced concrete:
ASTM C1609 for beams and ASTM C1550 for round panels. The European Committee for Standardization (CEN) proposes the method **EN 14651 for beam specimens and EN 14488-5 for square panels**.

Fibers-Reinforced Concrete Beam Specimens

The test evaluates the mechanical bending properties derived from the FRC in terms of area under the curve. This provides an indication of the **energy absorption capacity** (better known as **thougness**) of the beam and its magnitude depends directly on the geometric characteristics of the beam itself, with consideration of the applied load. The flexural test result can be represented by the load-deflection curve and index according to C1609; Or between the load and crack opening (CMOD, Crack Mouth Opening Displacement) of a notched beam, according to EN 14651.

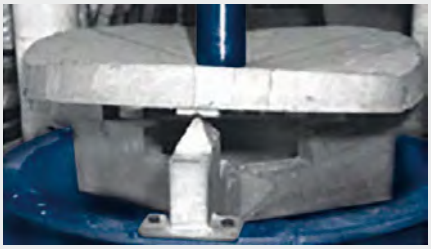


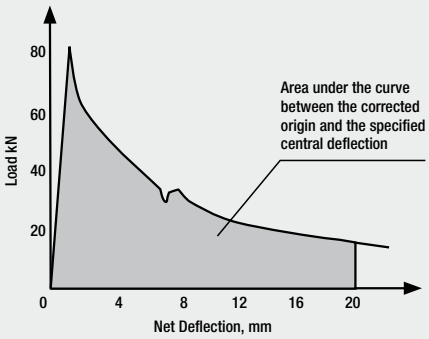
Load – Displacement curve according to EN 14651

Fibers-Reinforced Concrete and Shotcrete Panel Specimens

Since real structures are characterized by a high degree of hyperestaticity, whereby the redistribution of the stresses generates larger areas of fracture and therefore more energy absorbed, specimens with larger fracture areas can be required (such as large beams or panels).
The thougness is evaluated through the records of the load-displacement curve, where the load is monitored until a preset value is achieved. With the flexural test on square panels according to EN 14488-5, the concrete specimen rests on a rigid square frame and is loaded through a square steel block; In this case the sample is subjected to a previously set displacement level.

Accordingly to the above, thoughness can be specified as the energy absorbed for a given displacement.
On the other hand, the ASTM C1550 proposes a circular panel, better known as "Round Determinate Panel (RDP)".
In this reference test, the sample rests on symmetrical steel ball pivots (120°), resulting in a statically determined scheme.





Test on RDP and Load-deflection curve according to ASTM C1550

As the loading process develops, the strain is recorded in the center of the panel, so as it is possible to plot the load-deflection curve, which area is subsequently integrated, to obtain the energy- deflection curve.

- **MEASUREMENT OF DEFLECTION ON FIBRE REINFORCED CONCRETE BEAMS 100X100X400(500) MM AND 150X150X500(600) MM DURING FLEXURE TEST.**
  STANDARDS: EN 14488-3 | ASTM C1609, C1018
- **DETERMINATION OF TOUGHNESS, FIRST CRACK STRENGTH (CRACK OPENING) AND DUCTILITY OF FIBRE REINFORCED CONCRETE.** STANDARDS: EN 11039-2, EN 14651
- **FLEXURAL STRENGTHS (FIRST PEAK, ULTIMATE AND RESIDUAL) OF FIBRE REINFORCED BEAM SPECIMENS.**
  STANDARD: EN 14488-3

The equipment can be used **only** with the Servo-Plus Evolution machines.

Connected to the **Servo-Strain** Software/Firmware mod. C109-15N (see p. 283) for the automatic management of load and displacement.

It is necessary to contact Matest representative for the appropriate machine selection according to the FRC application.

The equipment consists of:

C090-15
DEFLECTION MEASUREMENT DEVICE

STANDARDS: EN 14488-3 | ASTM C1609, C1018

This device is fixed directly on the fiber reinforced concrete beam under test. The device is placed between the loading bearers of a flexure frame or of a flexure device in a compression frame.
The test is performed by applying a flexural load to the concrete beam with load and displacement control and with automatic deflection measurement of the loaded specimen.
It is possible to test fibre reinforced concrete beams 100x100x400 or 500 mm and 150x150x500 or 600 mm dimensions.
The deflection device is made with chromed finishing; it is supplied complete with transducer holders, vertically positioned on the two opposite sides of the beam, but **without** the two transducers, for the measurement of deflection (mod. S336-11), and **without** the fork form transducer (mod. C090-16) to be ordered separately.

Dimensions: 300x450x300 mm
Weight: 8 kg approx.

S336-11
DISPLACEMENT TRANSDUCER, HIGH PRECISION

STANDARDS: EN 14488-3 | ASTM C1609, C1018

To be attached to the device C090-15 for the measurement of deflection and determination of toughness on fibre reinforced concrete beams. Travel: 10 mm
Complete with cable and connector.
Two transducers are required.

C109-15N
FIRMWARE/SOFTWARE for:

- Measurement of deflection on fibre reinforced concrete beams.
- Determination of toughness, first crack strength and ductility.
- Energy absorption test on sprayed specimens. (see p. 18)

C109-14N
FIRMWARE/SOFTWARE for flexural stengths (first peak, ultimate and residual) EN 14488-3 (see p. 18).

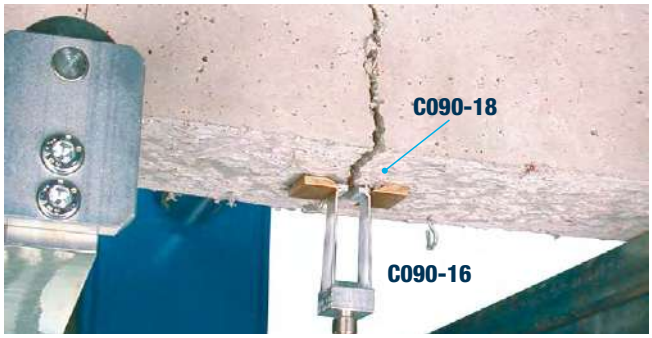
C090-18 **C090-20**

C090-15
Bending device for testing to ASTM C1609

C090-20
DATUM BLOCK, square, to be glued on the concrete beam surface for the deflection measurement on the two opposite sides (CTOD). Pack of 24 pieces.

C090-16
FORK FORM TRANSDUCER

STANDARDS: EN 11039-2, EN 14651
For the measurement of the Crack Mouth Opening Displacement (CMOD) and the Crack Base, Medium and Tip Opening Displacement (CTOD). Measuring range: 5 mm
Complete with cable and connector.



EN 14651 Clip gauge device

C090-18 DATUM BLOCK, to be glued on the lower side of the concrete beam for the first crack strength test (CMOD). Pack of 24 pieces.

C090-07N + C090-13 + C109-15N + C090-15 + S336-11
Sevo-controlled machine

ENERGY ABSORPTION TEST ON SPRAYED CONCRETE SPECIMENS

STANDARDS: EN 14488-05 | UNI 10834

The equipment can be used **only** with the flexure Servo-Plus Evolution testing machine mod:

C090-07N Flexure **high stiffness** 200 kN capacity

C095N Flexure **multipurpose** 320 kN capacity

C096N Flexure **polyframe** 360 kN capacity.

Connected to the automatic servocontrolled system of load and displacement **Servo-Strain** mod C109-15N (see p. 283)

The equipment consists of:

C109-15N
FIRMWARE/SOFTWARE for:

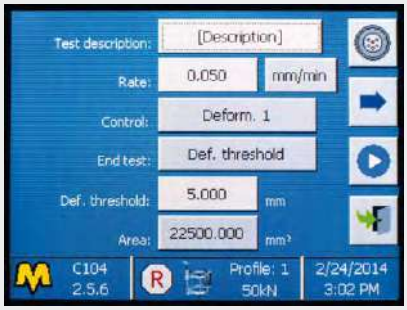
- Measurement of deflection on fibre reinforced concrete beams.
- Determination of toughness, first crack strength and ductility.
- Energy absorption test on sprayed specimens.

(see p. 18)

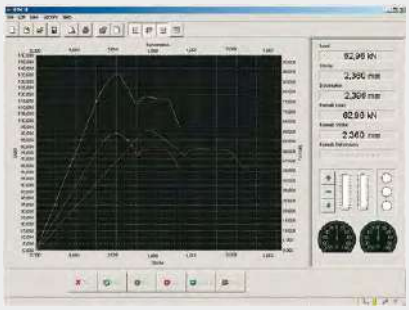
C090-07N + C109-15N + C090-14 + S336-14 + C090-19 + C104-04

Test on square panels according to EN 14488-5

C109-15N Test result



C109-15N Set up of deflection



C109-15N Test graph

Software for real time test plot and result determination

C090-14
SQUARE BASE FRAME

Dimensions 500x500 mm, complete with upper loading element, for energy absorption tests on sprayed concrete specimens.

C090-19
HOLDER FOR TRANSDUCER

To be fixed to the high stiffness frame with square base.

S336-14
DISPLACEMENT TRANSDUCER, HIGH PRECISION

To be fixed to the high stiffness frame equipped with the square base.
Travel: 50 mm
Full bridge at 350 Ohm
Indipendent linearity: < 0.1%
Standard sensitivity: 2 mV/V

CONCRETE PIPE TESTING MACHINE

Designed and manufactured to test concrete sewer and drain pipes used in drainage works, water and irrigation supply systems etc.
STANDARD: EN 1916 comparable to ASTM C301, C497 I BS 5911 I DIN 4035

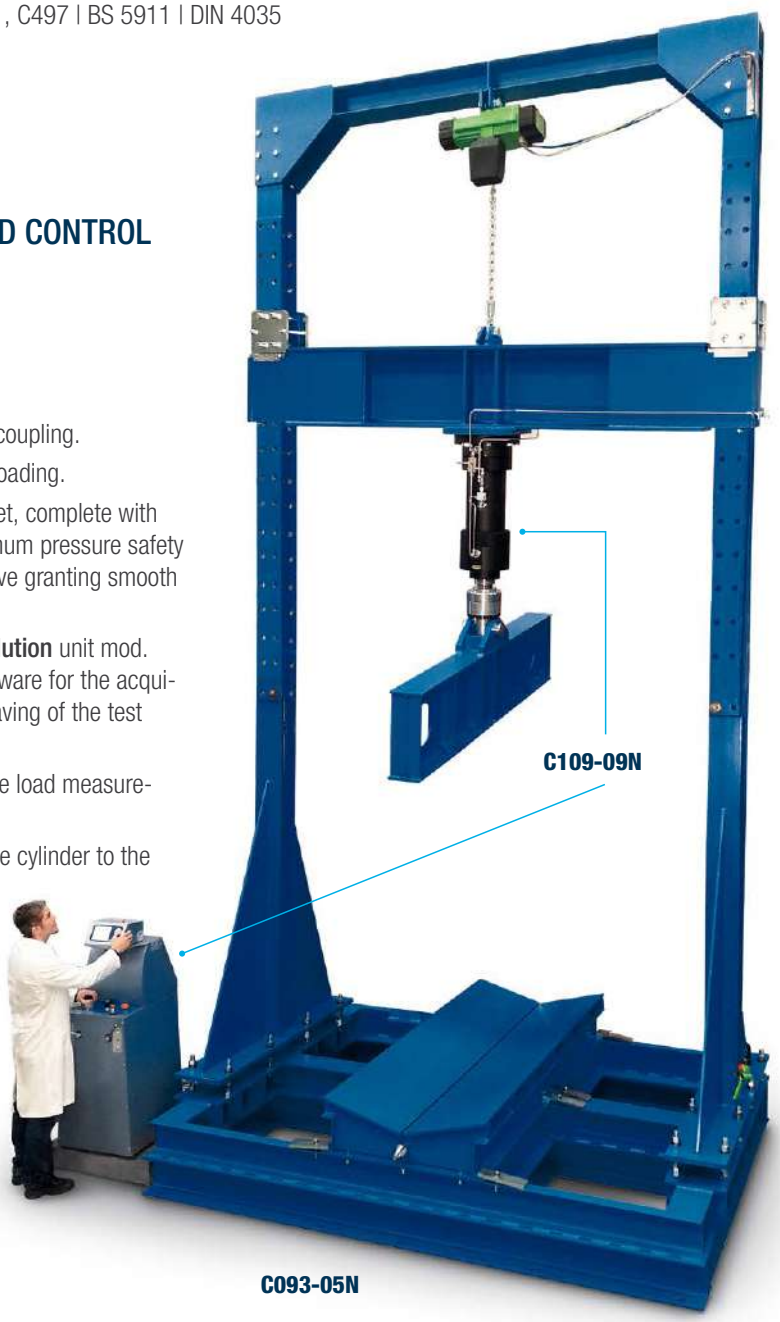
The machine is composed of two parts:

- Electro-Hydraulic loading and control system
- Testing frame, steel made

C109-09N
ELECTRO-HYDRAULIC LOADING AND CONTROL SYSTEM, 1000 KN CAPACITY

- Double action alloy steel ram + cylinder.
- Ram travel: 400 mm
- The ram is ground.
- Upper attachment for steel frame cross-beam coupling.
- Spherical seat fixed to the ram for an uniform loading.
- Hydro-Plus Evolution loading and control cabinet, complete with hydraulic multipiston power pack group, maximum pressure safety valve, decompression valve, oil flow control valve granting smooth and accurate load pace.
- Computerized graphic display **Cyber-Plus Evolution** unit mod. C109N (technical details: see p. 224) with software for the acquisition, visualization, processing, printing and saving of the test data and certificates.
- Electric load cell 1000 kN capacity, for accurate load measurement directly from the ram.
- Two flexible high pressure hoses, to connect the cylinder to the hydraulic power pack.

Power supply: 230V 1ph 50Hz 1000W
Dimensions: 500 x 530 xh 1300 mm
Weight: 150 kg approx.



C093-05N

C093-05N
TESTING FRAME, STEEL MADE

- Pipe max. diameter (external): 2600 mm
- Pipe min. diameter (external): 450 mm
- Pipe max. length: 2500 mm
- Lower bearers: 2500 mm long
- Upper crossbeam: 2500 mm long
- Frame of structural steel, bolted together with high strength bolts, so it can be easily assembled/disassembled for delivery or for site displacements. The frame has to be locked to a concrete base to be prepared by the customer.
- Two upper crossbeams, raised and lowered by a motor two speed operated winch. The upper frame crossbeam is locked in position by pins inserted through the columns.
- Two lower bearers supporting the pipe to be tested.
  The bearers are supplied both flat and "V" shaped as requested by the EN 1916 Spec.
- Upper loading beam, floating on a seat.

Power supply of the winch: 230/400V 3ph 50Hz 2000W
Frame dimensions: 3700x2500x6900 mm approx.
Weight: 7000 kg approx.

Note:
The testing frame is delivered disassembled and has to mounted on site following the instructions. The customer can also manufacture locally the testing frame, and purchase the loading/control system only.

Testing frames with different capacity and features can be manufactured as per customer's requirements.

Quoted testing frame cannot be sold in the CE markets.

C109-09N detail

UNIVERSAL FLEXURAL AND TRANSVERSE MACHINE 150 KN CAPACITY

FOR FLEXURAL TESTS ON CONCERTE BEAM SPECIMENS MAX. SIZE 200X200X800 MM, FLAT BLOCKS, FLAGSTONES, KERBS, TILES, SLABS, MASONRY UNITS, PIPES, AND ANY TYPE OF MATERIAL HAVING MAX. SIZE 550XH550 MM (LOWER ROLLERS MAX. LENGTH 1325 MM)

STANDARDS: EN 12390-5 | EN 1340:4 | ASTM C78, C293 | AASHTO T97 | BS 1881:118, 6073-1, 7263

150 KN CAPACITY

MAIN FEATURES

- Vertical daylight between upper/lower rollers: max. 825 - min. 65 mm adjustable each 76 mm by hand winch with counterweights
- Rollers dimensions: Ø 40x613 mm
- Complete with 4 adjustable and articulated rollers for two point loading
- Distance between lower rollers from 75 to 1325 mm
- Distance between upper rollers from 75 to 575 mm
- Ram travel 110 mm approx.
- Simple action piston with counterweights to optimize frictions
- Power supply: 230V 1ph 50Hz 750W
- Dimensions: 970x1400x2000 mm
- Weight: 800...850 kg approx.

INVERTER Details, p. 223

BARCODE Details, p. 223

C093-03N + PC

UNIVERSAL FLEXURAL 150 kN capacity		LOAD MEASURIG SYSTEM			
MODEL	Motorized	Cyber-Plus Evolution mod. C109N (p. 224)	Servo-Plus Evolution mod. C104N (p. 224)	Digitec mod. C108N (p. 219)	Autotec mod. C098N (p. 219)
C093-02N	▼	▼			
C093-03N	▼		▼		
C093-02D	▼			▼	
C093-03A	▼				▼

ACCESSORIES FOR UNIVERSAL FLEXURAL 150 kN

C091-13 UPPER TAMPER (steel made), for concrete KERBS tests. The tamper is mounted on a rotating coupling and fixed to the upper part of the machine to apply a flexural strength on three points on the kerb, without any torsional stress.
STANDARD: EN 1340


C091-13

C093-11 DEVICE for flexural tests on clay blocks for flooring.
STANDARD: EN 15037
UNI 9730-3


C093-11

C127N GRAPHIC PRINTER on thermo-paper on board

C115-01 TWO WAY HYDRAULIC VALVE, connected to the motorized pumping unit of the machine to activate a second frame.
Technical details: see p. 318


C115-01

C097-01 DUAL LOW CAPACITY DIGITAL RANGE, complete with **appropriate pressure transducer**.
Range selectable from 10 kN to 100 kN.
Technical details: see p. 313


C097-01

C097-05 CALIBRATION CLASS 1, starting from 1% of the full range. With a special calibration procedure it is possible to grant Class 1 practically on the full range of the flexural machine.

C100 SPLITTING TENSILE test device for cylinders.
EN 12390-6 | ASTM C496
Technical details and other models: see p. 314


C100

C103 SPLITTING TENSILE test device for self blocking pavers and cubes. EN 1338, 12390-6
Technical details: see p. 314


C103

E170 COMPRESSION DEVICE to test mortar specimens 40.1x40 mm EN 196 | ASTM C349
Technical details and other models: see p. 315


E170

E172-01 FLEXURE DEVICE for mortar prisms 40.1x40x160 mm. EN 196 / EN ISO 679 (it can be used only with the dual low capacity digital range 0-15kN).
Technical details and other models: see p. 428


E172-01

C099N NEW
INVERTER DEVICE
Applicable only on Cyber-Plus and Servo-Plus Evolution machines.
Technical details: see p. 223


C099N

SOFTWARE for DIGITEC / AUTOTEC or CYBER / SERVO PLUS models	
C109-16 (N)*	SOFTWARE for flexural tests on clay blocks
C123 (N)*	SOFTWARE **Servonet** for remote control through PC
C109-11 (N)*	SOFTWARE for flexural tests
C109-12 (N)*	SOFTWARE for splitting tensile

Technical detail: see p. 18
(N)* for Cyber - Servo Plus models.

UPGRADING OPTION: COMBINED TWO FRAMES GROUP

All motorized compression testing machines listed in the previous pages can be upgraded with an hydraulic two ways distribution valve for connection and control (alternative, and non-simultaneous) to a second frame, like for example flexural frame or cement compression frame, with obvious functional and economic advantages (especially in the digital solutions).

A hydraulic two ways distribution valve may activate the standard frame or the second combined frame by using only one hydraulic pressure source.

The load of the second combined frame is measured by using one of the channels foreseen on the readout unit connected to the specific pressure transducer fixed on the second frame.

The additional combined frame is supplied complete with a hydraulic two way distribution valve, specific pressure transducer connected to one channel of the digital readout unit, pipes, connectors, accessories, Matest calibration certificate.

The two frames group can be combined with many different solutions, according to the specific exigences of the customer, with the possibility to perform:

- **COMPRESSION TESTS ON CONCRETE CUBE, CYLINDER AND BLOCK SAMPLES,** by choosing the standard compression machine among our different available models from 1300kN to 5000kN capacity (see p. 230...281)
- **FLEXURAL TESTS ON CONCRETE BEAMS, FLAT BLOCKS, FLAGSTONES, KERBS, SLABS, TILES** etc. (see p. 288...303)
- **COMPRESSION AND FLEXURE TESTS ON MORTAR SPECIMENS** (see p. 412...431)

The composition of the combined group is obtained by:

C092-01
FLEXURAL FRAME 150 KN CAPACITY

(technical details and specific accessories at p. 290) complete with pressure transducer, two way hydraulic valve, used in conjunction with a digital compression machine (Digitec, Autotec, Cyber-Plus / Servo-Plus Evolution)
(see p. 230...281).

C092-11
FLEXURAL OPEN SIDED FRAME 150 KN CAPACITY

(technical details and specific accessories at p. 292) complete with pressure transducer, two way hydraulic valve, used in conjunction with a digital compression machine (Digitec, Autotec, Cyber-Plus / Servo-Plus Evolution)
(see p. 230...281).

C055N

C092-01

C077N

C092-11 + C091-12

C092-15
FLEXURAL HIGH STIFFNESS FRAME
200 KN CAPACITY

(technical details and specific accessories at p. 294) complete with pressure transducer, two way hydraulic valve, used in conjunction with a a digital compression machine (Digitec, Autotec, Cyber-Plus, Servo-Plus Evolution) (see p. 230...281)

C077N

C092-15 with accessories

C095N-05
FLEXURAL AND TRANSVERSE MULTIPURPOSE FRAME
320 KN CAPACITY
C-SHAPED OPEN FRAME

Technical details and specific accessories at p. 296.
Complete with pressure transducer, two way hydraulic valve, used in conjinction with a Servo-Plus Evolution compression machine (see p. 230...281).

C095N-05

C092-05
COMPRESSION FRAME ON MORTAR SPECIMENS
250 KN OR 500 KN CAPACITY

(mod. E159D, E159N, E159-01D,
E159-01N, E161A, E161N, E161-02A, E161-02N technical details and specific accessories at p. 416...421).
Complete with pressure transducer, two way hydraulic valve, used in conjunction with a digital concrete compression machine (Digitec, Autotec, Cyber-Plus / Servo-Plus Evolution)
(see p. 230...281).

C055N

C092-05 / C092-06

C092-06
COMPRESSION/FLEXURAL FRAME ON MORTAR SPECIMENS

Dual range:
0-250 kN (or 500 kN) for compression tests
0-15 kN for flexure tests (mod. E160N, E160-01N, E161-01N, E161-03N technical details and specific accessories at p. 422...425) complete with two pressure transducers, two way hydraulic valve, used in conjunction with a digital concrete compression machine (only Cyber-Plus / Servo-Plus Evolution) (see p. 230...281).

In addition to the proposed groups, it is possible to compose many other alternative testing groups, with the digital display measuring system, like for ex:
- Group formed by two concrete compression frames.
- Group formed by one concrete flexural frame and one mortar compression frame...etc.

Please contact Matest technicians for your needs and you will receive the most suitable solution.

Group Example

ITTECH
CYBER PLUS PROGRESS

C104-03N
SERVO-PLUS RESEARCH

HIGH PERFORMANCE SERVO-PLUS SERVO STRAIN
STANDARDS: EN 14488-3, 14488-5, 14651 | ASTM C1609, C1018, C1550

Servo-Plus Research is the ultimate Matest control unit which combines the highly reactive Cyber-Plus Progress electronics together with a hydraulic system specifically designed to execute accuracy tests where the highest performances are required.

Its versatility and number of possibilities make this control unit the best choice for R&D activities and research laboratories, perfect to perform and play with test conditions not yet described by any standards.

Fully customizable test ramps

Performs tests in load, displacement and strain rate control

Proportional valve granting prompt reaction for FRC tests

Inverter device for decreasing noise pollution, heating and mechanical stress

Firmware and software for FRC tests already included

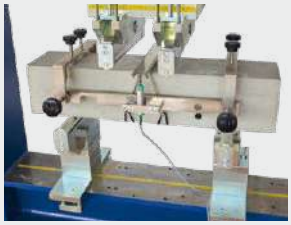
Possibility to pre-set different sampling frequencies at desired thresholds

Fully automatic frames control expandable to four with electrovalves

ADVANCED APPLICATIONS

In addition to the common and standard practices, **Servo Research runs high reactivity tests like those on fiber reinforced concrete** (Deflection, CMOD, CTOD, Energy Absorption, Post Faillure Behaviour etc.) and **modulus of elasticity** on several types of materials, allowing customization of ramps and cycles (upgrade kit C125-03N) and displaying load, stress, displacement and strain related graphs.

All tests can be run through its compact-PC touch interface, making personal computer not mandatory. An external PC can however be connected (H009-01, order separately) to control all tests from remote.


Deflection (ASTM C1609)


CMOD (EN 14651)


Flexural toughness (ASTM C1550)


Elastic modulus


Triaxial tests and stress path

HYDRAULIC SYSTEM SPECIFICATIONS

- Max hydraulic pressure: 700 bar
- 4 pistons pump granting oil supply up to 1.35 l/min
- Servo controlled proportional valve with high control frequency
- Inverter device
- Optional forced ventilation oil cooling system

HARDWARE AND FIRMWARE SPECIFICATIONS

- 16 channels, each one able to control the test and each one suitable to connect load sensors (load cells or pressure transducers), displacement transducers (potentiometric, full bridge, LVDT, magnetostrictive) and deformation transducers (extensometers, strain gauges)
- Each channel effective resolution 24-bit, 16'777'216 divisions
- Closed loop PID control
- Real time adjustment of PID parameters and pace rate during the test (on request)
- Control frequency up to 1 KHz
- Sampling frequency up to 2 kHz
- 7" LCD touch-screen

ANALOG INPUT CHANNELS

- Selectable power voltage for connection of load, displacement, deformation, LVDT, temperature (PT100, PT1000, NTC) transducers and strain gauges
- Data acquisition synchronized on all channels
- Calibration of the 16 channels in divisions (up to 40 steps), with polynomial function which allows the best approximation of readings accuracy over the whole test range

TEST EXECUTION

Compact PC for local control and software for remote control in order to perform the following tests:

- Compression, flexure and splitting
- Elastic modulus and Poisson's Ratio on rocks and concrete (add C125-03N)
- Triaxial and stress path test on rocks (add C125-03N and C104MLPP for lateral pressure)
- Toughness of FRC and energy absorption of sprayed concrete tests
- FRC tests: deflection, CMOD, CTOD and flexural test

C096F + C104-03N + C089F + E183F

ACCESSORIES

C115N
AUTOMATIC ELECTROVALVE
Optional valve to be added to C104-03N for automatic selection of extra frames (up to four).

C125-03N
Upgrade kit for elastic modulus and Poisson's Ratio tests allowing pace rate control also when releasing the load.

H009-01
PERSONAL COMPUTER
Complete with LCD monitor, keyboard, mouse, connection cables, it is applicable with all the Matest testing machines equipped with digital display measuring system. The PC supply includes the installation and the setting up of the purchased Software.

C127N
ON-BOARD GRAPHIC PRINTER
On-board printer for digital models.

C128
BENCH LASER PRINTER
For the graphic and test certificate printing, applicable on all Matest testing machines with digital display measuring system. The connection is direct by parallel interface also without PC

C104-14N
Support for mouse and keyboard

C104-13N
Optional cooling system for intensive use or warm environment

ORDERING INFO

	FRC TESTS		FRC TESTS ELASTIC MODULUS TESTS	FRC TESTS ELASTIC MODULUS TESTS
				TRIAXIAL TEST AND STRESS PATH
	ASTM C1609	ASTM C1550	EN 12390-13, EN 13412,	EN 14580, EN 1926,
	EN 11039-2		EN 13286-43	EN 1926, EN 14580
	EN 14651		ASTM C469	ASTM D7012,
	EN 14488-3		ISO 6784	ASTM D2664,
	EN 14488-5		UNI 6556	ASTM D3148,
			DIN 1048	ASTM D5407
			BS 1888:121	ISRM
C104-03N	•	•	•	•
C115N			•	•
C125-03N			•	•
Flexural frames:				
C090-06CF 200 kN, basic model	• (choose a frame)	• (choose a frame)	• (choose a frame)	• (choose a frame)
C095F 320 kN, advanced model				
C096F 360 kN, advanced model				
Compression frames:				
C086, C087, C088, C089 series 2000 up to 5000 kN frames only (check p. 260 of general catalogue)			•	•
C104MLPP (lateral pressure)				•

Notes: All accessories for C104-03N must be installed in factory
Specific accessories must be added basing on each test
Other suitable compression frames can be connected on request

ACCESSORIES TO COMPRESSION AND FLEXURAL TESTING MACHINES

C097-01
DUAL LOW CAPACITY DIGITAL RANGE

(From 1/3 to 1/20 of the nominal range), complete with **Appropriate pressure transducer**, hydraulic installation and cock, fitted on testing machines equipped with digital display measuring unit.
This solution offers very high accuracy also for measurements of low strength, which is necessary to perform compression tests on mortar specimens, flexural tests on concrete beams, split cylinder test on cylinder and cube specimens, tests on kerbs, slabs etc., by utilizing a concrete compression machine.

C097-01

C097-02
DUAL LOW CAPACITY DIGITAL RANGE 0-300 KN

Complete with **strain gage load cell**, cables, fitted on concrete compression testing machines equipped with digital display measuring system.
This solution eliminates the weights of the piston and lower compression platen, paking set frictions etc., granting very high accuracy (Class 1; max. error within ± 0.5%) in the measuring range 30...300 kN.

C097-02

C105
DEVICE WITH CENTRAL SCREW

Very practical to adjust the light between the compression platens of a machine, according to the height of the specimen to be tested. Recommended solution for machines equipped with big sized platens. This device can be foreseen on all models of concrete compression machines, except High Stability models.

C105

C097-05
CLASS 1 STARTING FROM 1% OF THE FULL RANGE

Applicable only to digital machines. By following a special calibration procedure, Matest is capable to grant the Class 1 practically on the full range, upgrading the machine to be used for a considerable number of applications where low strength value are expected, including:
- Lightweight concrete, or early strength concrete
- Small size samples, soil cement mixtures
- Flexural and tensile tests, slabs, kerbs, etc.

C097-08
OFFICIAL ACCREDIA HARDNESS CERTIFICATE

(Equivalent UKAS, ENAC, DAKKS, SAS, COFRAC etc.) of upper and lower compression platens. Minimum hardness: 55 HRC.

TEST REPORT

Number: SBO/091/13 Date: 28/11/2013
OMECO Ref.: 3349 Page 1 of 1
CUSTOMER Ref.: ORD.89671 25/11/13

MATEST S.P.A.
VIA DELLE INDUSTRIE, 25
24036 TREVIOLO BG

Sample: N. 2 PLATES Ø 287mm thk 60 mm
Identification: A1- B1
Date of receipt: 27/11/2013
Test standards: UNI EN ISO 6508-1:2006
Equipments: Hardness test machine identified SBO-0060

Obtained results :

Identif. N	ROCKWELL HARDNESS TEST HRC
A1	57.5 – 59.0 – 60.5
B1	58.5 – 59.0 – 61.0

This test report concerns only the sample submitted to the test. If not otherwise indicated, the sampling operation were performed by the Customer.

Date of execution: 28/11/2013 Att: OMECO Lab. – Albano S. Alessandro – Bg –

Notes: Measurement uncertainty we refer to table "Incertezza" of Omeco procedure PEM-010 Rev. 9 Ed. 11 (data available on request).

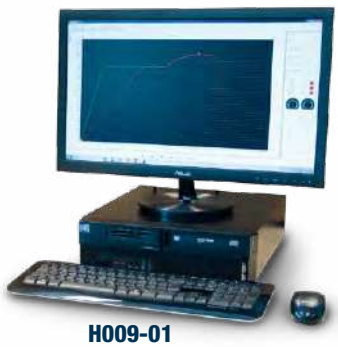
Operators	Technical Manager
A. BALVIONI	ING. M. CASIRIL

Document end

C097-08

H009-01
PERSONAL COMPUTER

Complete with LCD monitor, keyboard, mouse, connection cables, it is applicable with all the Matest testing machines equipped with digital display measuring system. The PC supply includes the installation and the setting up of the purchased Software (see p. 18)



H009-01

C128
BENCH LASER PRINTER

For the graphic and test certificate printing, applicable on all Matest testing machines with digital display measuring system.
The connection is direct by parallel interface also without PC.

C128

ACCESSORIES TO COMPRESSION AND FLEXURAL TESTING MACHINES

SPLITTING TENSILE TEST DEVICES

For cylindrical specimens.
STANDARDS: EN 12390-6 | ASTM C496 | NF P18-408

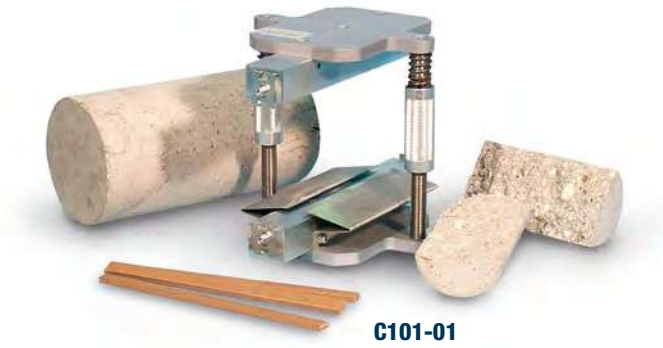
Model	Cylinders Ø x height mm	Weight kg	Height mm
C100*	150x300, 160x320, 6"x 12"	20	280
C101*	100x200, 110x220, 4"x 8"	12	220
C102*	40 x 80	1	90

C100 C101 C102

C101-01*
SPLITTING TENSILE TEST DEVICE

For cylindrical specimens from Ø 100x200 mm (4"x8") to Ø 160x320 mm (6"x12").
The base is equipped with flat springs centering and keeping in position the specimen.
Two columns with adjustable height sustain the upper plate by two springs.
This item is an alternative solution to mod. C100 + C101

Dimensions: 350x250xh264 mm
Weight: 17 kg approx.



C101-01

C103*
SPLITTING TENSILE TEST DEVICE

Used to perform tests on concrete cube specimens 100 and 150 mm and on concrete block pavers.
STANDARDS: EN 12390-6, EN 1338

Dimensions: 350x250x264 mm
Weight: 17 kg approx.

***Note:** To perform the test, these devices have to be used with a concrete compression machine equipped with a low capacity measuring range (see dual low range, p. 313), or with a flexural frame.

C103

C103-01*
SPLITTING TENSILE TEST DEVICE

Same as mod. C103 but to perform tests on concrete block pavers having max. dimensions 300 x 500 mm, and for tests on concrete cube specimens 100, 150, 200 mm, and any type of block and prismatic specimens. This splitting device is directly fixed on the compression platens of the block testers having 2000kN or 3000kN capacity.

Weight: 10 kg approx.

C103-01

C103-02

C103-02*
SPLITTING TENSILE DEVICE

Same to mod. C103-01, but to be fixed to the flexural frames serie C091-02N (p. 292), C090-06 (p. 294), C095N (p. 296) and C096N (p. 300).

ACCESSORIES

C100-01 STANDARD: EN 12390-6
PACKING STRIPS, dimensions 4x10x350 mm to be used for splitting tensile tests with mod. C100, C101, C101-01 C103. Pack of 100 pieces.

C100-02 STANDARDS: EN 1338, EN 12390-6
PACKING STRIPS, dimensions 4x15x350 mm to be used for splitting tensile tests with mod. C103.
Pack of 100 pieces.

C100-03 STANDARDS: EN 1338, EN 12390-6
PACKING STRIPS, dimensions 4x15x540 mm, to be used for splitting tensile tests with the device mod. C103-01.
Pack of 100 pieces

C109-12(N) SOFTWARE UTM2 (Universal Testing Machine 2)
Licence for TENSILE SPLITTING TESTS on cylinders, cubes and concrete blocks.
STANDARDS: EN 1338, EN 12390-6

General description and technical details: see UTM2 p. 18

ACCESSORIES TO COMPRESSION AND FLEXURAL TESTING MACHINES

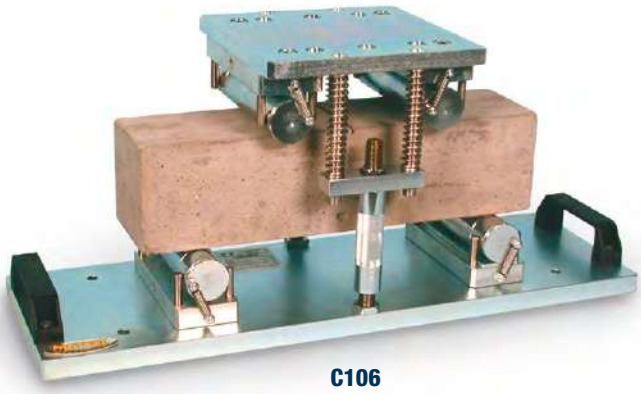
C106
FLEXURAL DEVICE FOR TWO POINT AND CENTRE POINT TESTS ON CONCRETE BEAMS 100X100X400/500 AND 150X150X600/750 MM

STANDARDS: EN 12390-5 | ASTM C78, C293 | AASHTO T97
BS 1881:118

Equipped with two lower rollers, one of them articulated, and two upper rollers for third point tests.
- Two fix distances between lower rollers: 300 and 450 mm
- Two fix distances between upper rollers: 100 and 150 mm

It is possible to place in the centre only one upper roller for centre point tests.
To perform the flexural test, this device has to be used with a concrete compression machine foreseen of low capacity measuring range (mod. C097-01, C097-02) see p. 313

Dimension: 610x200x320 mm
Weight: 27 kg approx.



C106

E170
COMPRESSION DEVICE TO TEST MORTAR PRISMS 40.1X40X160 MM BROKEN IN FLEXURE

STANDARDS: EN 196-1 | ASTM C349

To be used with a concrete compression machine foreseen of low capacity measuring range (mod. C097-01, C097-02) or with a flexural frame.

Dimensions: Ø 153xh182 mm.
Weight: 12 kg approx.

E170

E171
COMPRESSION DEVICE TO TEST MORTAR CUBE SPECIMENS 50 MM (2")

STANDARD: ASTM C109

It is possible to test also cylindrical specimens Ø 50xh50 mm.
To be used with a concrete compression machine foreseen of low capacity measuring range (mod. C097-01, C097-02) or with a flexural frame.

Weight: 12 kg approx.

E171

E171-01
COMPRESSION DEVICE TO TEST MORTAR CUBE SPECIMENS 70.7 MM

STANDARD: BS 4550

It is possible to test also cylindrical specimens Ø 70x70 mm.
To be used with a concrete compression machine foreseen of low capacity measuring range (mod. C097-01, C097-02) or with a flexural frame.

Weight: 12 kg approx.

E171-01

C091-13
CONCRETE KERBS AND SLABS DEVICE
FLEXURAL STRENGTH MEASUREMENTS

STANDARD: EN 1340

The equipment consists of a steel tamper mounted on a rotating coupling which is fixed to the upper part of the flexural testing machine (to be selected from serie mod. C090-06, C091, C093 and C095N) to apply a flexural strength on three points on the concrete kerb, without any torsional stress.

C091-13

ACCESSORIES TO COMPRESSION AND FLEXURAL TESTING MACHINES

UNBONDED CAPPING PADS AND RETAINERS

STANDARDS: ASTM C1231 I AASHTO T22, T851

Used for compression tests on concrete cylinder specimens, as an alternative method to the sulphur capping and grinding machine.
Two steel capping retainers are applied on the two flat surfaces of the cylinder.
Two neoprene pads are put between them, for a better load distribution.

The neoprene pads are available in two models:

- 60 shore hardness pads for expected strength from 10 to 48 MPa
- 70 shore hardness pads for expected strength over 48 MPa

The system is not applicable for expected strength lower than 10 Mpa

C107-29

C107-10

C107-20

Example of utilization

MODELS

C107-09 CAPPING RETAINERS (couple) for Ø 100x200 mm cylinders.

C107-10 CAPPING RETAINERS (couple) for Ø 150x300 mm and 6x12" cylinders.

C107-12 CAPPING RETAINERS (couple) for Ø 160x320 mm cylinders.

C107-18 NEOPRENE PADS (couple) 60 shore A for Ø 100x200 mm and 4"x8" cylinders.

C107-19 NEOPRENE PADS (couple) 70 shore A for Ø 100x200 mm and 4"x8" cylinders.

C107-20 NEOPRENE PADS (couple) 60 shore A for Ø 150x300 mm and 6"x12" cylinders.

C107-21 NEOPRENE PADS (couple) 70 shore A for Ø 150x300 mm and 6"x12" cylinders.

C107-25 NEOPRENE PADS (couple) 60 shore A for Ø 160x320 mm cylinders.

C107-26 NEOPRENE PADS (couple) 70 shore A for Ø 160x320 mm cylinders.

C107-29 NEOPRENE SHEET (couple) 60 shore A.
Dimension: 600x400x12 mm
For tests on blocks.

Note:
The capping retainers can be used only with compression testers having increased vertical clearance of the testing chamber, respectively to minimum 356 mm for the cylinders Ø 150x300 mm or 6"x 12"; and minimum 376 mm for the cylinders Ø 160x320 mm.

AUTO-CENTERING DEVICE

For cubes 100 and 150 mm side and cylinders Ø 100 and 150 mm
The lower compression platen of the testing machine is marked with a serie of concentric circles to facilitate the correct centering of the specimens. However to grant a rapid and accurate centering of concrete cube and cylinder specimens, this "Auto-Centering" device is recommended.

MODELS

C107 Auto-Centering Device, to be used with compression machine having platen Ø 216 mm (1300, 1500 and 2000 kN)

C107-01 Auto-Centering Device, to be used with compression machine having platen Ø 287 mm (3000 kN and high stability machines)

C107

C110-30
UPPER COMPRESSION PLATEN + SPHERICAL SEAT

For tests on cylinder specimens diameters 100x200, 150x300, 160x320 mm and 4"x8", 6"x12"(to fix on the testing machine, in replacement of the standard one where requested), to meet the ASTM C39, AASHTO T22 Specifications.
Platen dimensions: Ø 165x30 mm

Weight: 10 kg approx.

C110-30

ACCESSORIES AND SPARES TO COMPRESSION TESTING MACHINES

SAFETY GUARDS

Compliant with CE Safety Directive, manufactured of highly resistant transparent polycarbonate material and complete with hinges and lock. The guards are both on front and back sides.

C121

MODELS

C121 For machines 1300kN and 1500kN
C121-05 For machines 2000kN (mod C051 to C058-05N)
C121-01 For machines with block platens 2000kN (C073 to C078N)
C121-06 For machines high stability 2000kN (C089 to C089-04N)
C121-10 For machines high stability with block platens 2000kN capacity (mod C089B to C089-22N)
C121-07 For machines 3000kN (mod C066 to C071N) and high stability 3000kN (mod C089-06 to C089-10N)
C121-08 For machines with block platens 3000kN (mod C079-01 to C079-06N) and high stability with block platens 3000kN (C089-15 to C089-19N)
C121-04 For machines 5000kN (mod C086-02 to C086-03N)

C126
BENCH

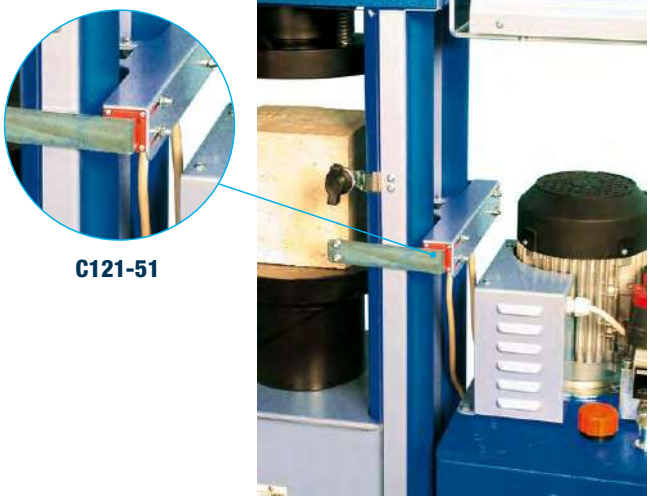
Used to hold the compression (or flexural) testing frame, to set the machine at a proper height for its utilization.
Alternative solution to a concrete holding base.
Made from heavy welded steel, it can be moved in the laboratory both from front or lateral side by a forklift.
When ordering, please specify the model of testing machine the bench is to be designed.

Weight: 55 kg approx.

C126

C121-51
DOOR STOP SAFETY SWITCH

This door locking electric switch if fixed on the front door of the compression machine as safety device. It cuts off mains and stops the machine when the door is open.
This locking switch can be installed only on digital compression machines equipped with safety guards with hinges and lock.



C121-51

GAUGE

Diameter 250 mm foreseen for max. load pointer, zero adjustment and mirror face. Spare part for compression and flexure machines. Supplied pre-calibrated.

C118-05

Models	Gauge
C118-14	Range 0 - 1300 kN
C118-03	Range 0 - 1500 kN
C118-04	Range 0 - 600 kN for 1300-1500kN machine
C118-05	Range 0 - 2000 kN
C118-06	Range 0 - 600 kN for 2000kN machine
C118-07	Range 0 - 3000 kN
C118-08	Range 0 - 600 kN for 3000kN machine
C118-09	Range 0 - 150 kN for flexure press C090 serie
C118-10	Range 0 - 150 kN for flexure press C091, C093 serie
C118-11	Range 0 - 1500 kN for tensile press H010
C118-12	Range 0 - 300 kN for cement machine
C118-13	Range 0 - 50 kN for cement machine

ACCESSORIES AND SPARES TO COMPRESSION AND FLEXURAL TESTING MACHINES

C113
PUMPING UNIT, HAND OPERATED
Complete with tank, accessories and connectors.
Spare part for compression and flexure machines.

Weight: 20 kg approx.

C114
PUMPING UNIT, MOTORIZED
Complete with tank, speed selector, hydraulic cock, accessories and connectors.
Spare part for compression and flexure machines.
Hydraulic pressure: 0...700 Bar
Oil supply from 0.05 to 0.7 litre/min.
Supplied **without** hydraulic oil to be ordered separately (see mod. C114-10N).

Power supply: 230V 1ph 50 Hz 750 W
Weight: 40 kg approx.

C114-01
PUMPING UNIT, MOTORIZED
Identical to mod. C114, but equipped also of a two way hydraulic valve (C115-01) to activate, alternatively, two testing frames.
Supplied complete.

C114-10N
HYDRAULIC OIL
For compression/flexural testing machines.
Can of 20 litres.

C115-01
TWO-WAY HYDRAULIC VALVE
Installed on the pumping unit mod. C114, to activate alternatively two testing frames by using the same pumping unit.
Complete with protection case.

C115N
AUTOMATIC HYDRAULIC VALVE NEW
Installed on the pumping unit of the Servo-Plus machines to automatically activate alternatively two testing frames. Upon request, it is possible to connect up to four different frames. Our technical dept. is at your disposal for any specific demand.

C115N four frames connection

PRESSURE TRANSDUCER
Used in conjunction with digital units Cyber-Plus C109N, Servo-Plus C104N, Digitec C108N, Autotec C098N.
Supplied complete with cable, calibration certificate.
Nominal sensitivity: 2 mV/V. Accuracy: ± 0.5%

Models	Pressure Transducer
C116-01N	range: 0 - 10 bar
C116-02N	range: 0 - 20 bar
C116-03N	range: 0 - 35 bar
C116-04N	range: 0 - 50 bar
C116-05N	range: 0 - 100 bar
C116-06N	range: 0 - 200 bar
C116-07N	range: 0 - 350 bar
C116-08N	range: 0 - 500 bar
C116-09N	range: 0 - 700 bar
C116-10N	range: 0 - 400 bar
C116-11N	range: 0 - 600 bar
C116-12N	range: 0 - 160 bar
C116-13N	range: 0 - 60 bar

C116-01N...C116-13N

C115-01
Without case

C114-01

C115-01

C113

C114

ACCESSORIES AND SPARES TO COMPRESSION AND FLEXURAL TESTING MACHINES

PACKING SET

Comprising three elements, for piston/cylinder coupling

MODELS

C122 For compression machine 1200 kN capacity
C122-01 For compression machines 1300-1500 kN capacity
C122-02 For compression machine 2000 kN capacity
C122-03 For compression machine 3000 kN capacity
C122-04 For flexure machine 150 kN capacity, C090 serie
C122-06 For flexure machine 150kN capacity, C091, C093 serie
C122-07 For flexure machine 200 kN capacity, C090-06 and C090-07 serie
C122-05 Packing set for the hand-operated pump of testing machines
E161-15 For Cement testing machines mod. E151 to E161
E183-11 For Cement machines mod. E181, E183, piston 250kN
E183-12 For Cement machines mod. E181, E183, piston 15kN

C122...E183-12

C110-15
LOWER COMPRESSION PLATEN

NEW

Hardened and rectified, Ø 216x40 mm, complrte with distance piece 20 mm high to test cubes 100, 150 mm and cylinders up to Ø 160x320 mm

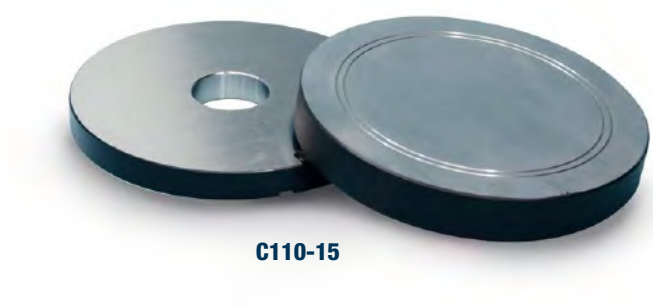
Weight: kg 11.3 + kg 3

This simple and low cost solution is recommended for an easier use of the **High Stability** Compression Testing Machines and the compression machines equipped with lower platen Ø 287 mm to test cube specimens 100 and 150 mm side and cylinders up to Ø 160x320 mm

It consists of replacing the **heavy** lower compression platen having Ø 287 mm by 60 mm height (weight 30.3 kg) with a smaller platen having only Ø 216 mm by 40 mm height (weight 11.3 kg), together with the suitable 20 mm high distance piece.

This test solution allows a much easier removal and positioning of the lower compression platen when the distance pieces have to be fitted in and out, based on the specimen size the user needs to test (cube 100 or 150 mm or cylinder 150x300 mm or 160x320 mm diameter).

This solution is **not valid** only when a cube specimen 200 mm side has to be tested. In this case the lower compression platen 287 mm diameter must be foreseen to cover the full surface of the 200 mm cube specimen.



C110-15

NEW

C089-02N with **C110-15** light lower plate Ø 216 mm (weight 11.3 kg)

C089-02N with standard lower plate Ø 287 mm (weight 30.3 kg)

ACCESSORIES AND SPARES TO COMPRESSION AND FLEXURAL TESTING MACHINES

COMPRESSION PLATENS

Surface hardened over 55 HRC and finish-grinding.

UPPER PLATEN

Model	Ø mm	Machine
C110	165x30	1200kN
C110-01	216x30	1300kN, 1500kN and 2000kN
C110-02	287x51	3000kN and 2000kN serie C058
C110-03	287x60	2000kN and 3000kN high stability complete with “ball seating”

LOWER PLATEN

Model	Ø mm	Machine
C110-11	165x30	1200kN
C110-12	216x30	1300kN, 1500kN and 2000kN
C110-13	287x51	3000kN and 2000kN serie C058
C110-14	287x60	2000kN and 3000kN high stability

C112-10
UPPER and LOWER COMPRESSION PLATENS, complete with “ball seating”, dimensions 510x245x55 mm for tests on blocks.

C112-11
UPPER and LOWER COMPRESSION PLATENS, complete with “ball seating”, dimensions 510x320x55 mm for tests on blocks.

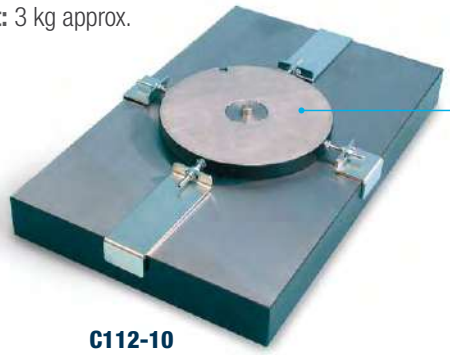
C112-05
Kit of 4 handles to lift the lower platen, making the positioning of distance pieces easier.

AS AN ALTERNATIVE

C111-50
DISTANCE PIECE

To be used with compression testers equipped with rectangular platens 510x320 mm to test blocks.
This device eliminates the heavy procedure to lift the lower rectangular platen and to add distance pieces to perform compression tests also on cube specimens.
This distance pieces is fixed over the lower rectangular platen through 4 adjustable couplers allowing a quick, correct and stable fixing.
On the distance piece it is now possible to put the round compression platen Ø 216 or 287 mm foreseen by the specific machine.
This distance piece is finish-grinded (suitable also for high stability testers), has Ø 210 mm, height 20 mm.

Weight: 3 kg approx.



C112-10


C112-05

DISTANCE PIECES

Used to reduce the vertical clearance between the compression platens, according to the height of the specimen to be tested, so to avoid the ram to make its max. excursion (approx. 50-55 mm) without having compressed the specimen.
The distance pieces are placed between the ram and the lower compression platen.

MODELS

DISTANCE PIECES Ø 140 mm for machines: 1200kN, 1300kN, 1500kN, 2000kN (C051 to C056N)

C111-30 High 20 mm
C111-21 High 50 mm
C111-03 High 100 mm
C111 High 176 mm
C111-02 High 226 mm

DISTANCE PIECES Ø 200 mm for machines: 2000kN (C058 to C058-05N), 3000kN (C066 to C071N), 2000kN blocks (C073 to C078N), 3000kN blocks (C079-01 to C079-06N)

C111-31 High 20 mm
C111-22 High 50 mm
C111-26 High 76 mm
C111-04 High 126 mm

SLOTTED DISTANCE PIECES Ø 150 mm for central screw machines: 2000kN (C073 to C078N), 3000kN (C079-01 to C079-06N)

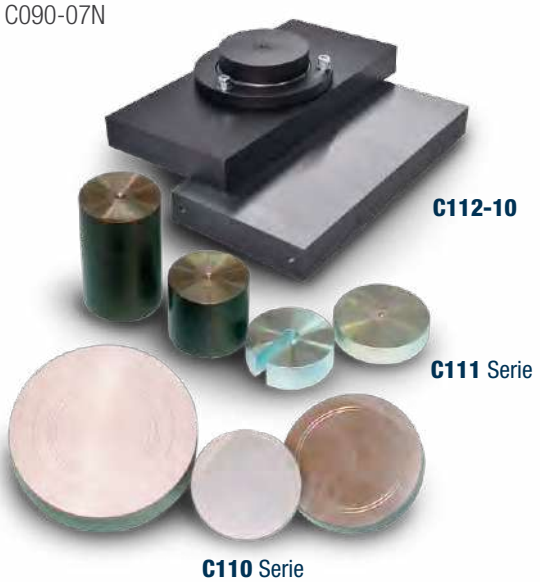
C111-27 High 20 mm
C111-23 High 50 mm
C111-28 High 76 mm
C111-08 High 126 mm

DISTANCE PIECES Ø 210 mm, finish-grinding, for **high stability** machines: 2000kN, 3000kN, 2000kN blocks and 3000kN blocks.

C111-32 High 20 mm
C111-24 High 50 mm
C111-25 High 73 mm

C111-16 DISTANCE PIECE, high 50 mm for flexure machines serie C090

C111-17 DISTANCE PIECE, high 40 mm for flexure machines serie C090-07N



S205N

UNITRONIC 50 KN NEW

UNIVERSAL MULTIPURPOSE FRAME

FOR COMPRESSION / FLEXURAL TESTS, 50 KN MAX. CAPACITY LOAD

WITH AUTOMATIC LOAD OR DISPLACEMENT/DEFORMATION CONTROL, testing:

Concrete:

- FLEXURE ON BEAMS
- FLEXURE ON TILES

Clay Blocks, Tiles:

- PUNCHING
- TRANSVERSE/DEFORMATION on adhesives for tiles - EN 12002 (see p. 506)

Cement, Asphalt, Metal, Wires, Ropes, Plastic, Papers, Textiles, etc.

Rock and stones, Soil

Unitronic technical details and aditional specific tests are described at p. 500

S205N + S337-34

SPECIFIC APPLICATIONS

FLEXURAL TEST WITH CENTRE POINT ON CONCRETE BEAMS AND CLAY TILES

STANDARDS: EN 12390-5 | ASTM C78, C293 | BS 1881:118

Test development with load control.

NEEDED ACCESSORIES

S337-34 STRAIN GAUGE LOAD CELL, 50 kN capacity

S205-18 FLEXURE DEVICE for centre point loading to test clay tiles and concrete beams dimensions 100x100x400(500) mm
Consisting of lower beam with two bearers (one articulated) adjustable from 100 to 315 mm, and upper central articulated bearer fixed to the load cell.
Bearer dimensions: Ø 38 mm by 300 mm long.

Weight: 20 kg approx.

C109-11N SOFTWARE for flexure tests on concrete beams.

S205-18

PUNCHING TEST ON CLAY BLOCKS

STANDARDS: EN 15037 | UNI 9730-3

Test development with load control.

NEEDED ACCESSORIES

S337-32 STRAIN GAUGE LOAD CELL 10 kN capacity.

C093-11 FLEXURAL PUNCHING DEVICE

S205-15 HOLDING BEAM for the punching device

C093-11

C095-05

FLEXURE TEST ON CLAY BLOCK PORTION

STANDARD: UNI 8942-3, 9730-3

The apparatus consists of:

- digital loading balance 16 kg capacity x 0.1g sens, with software to display and hold the failure load
- flexure device fitted on the balance, with central rotating knob for load application.

The strip sample is got from one internal wall of the clay block. The load is obtained by simply rotating the knob that applies a flexural pressure on the strip sample up to the failure. The balance displays and holds the failure load.

Weight: 14 kg approx.

C095-05

S206N

UNITRONIC 200 KN

UNIVERSAL MULTIPURPOSE FRAME

FOR COMPRESSION / FLEXURAL TESTS, 200 KN MAX. CAPACITY LOAD AND TENSILE TESTS 50 KN MAX. LOAD

WITH AUTOMATIC LOAD OR DISPLACEMENT/DEFORMATION CONTROL, testing:

- FLEXURE ON CONCRETE BEAMS AND TILES
- COMPRESSION ON MORTAR CUBES 40, 50, 70 MM
- PUNCHING ON CLAY BLOCKS FOR FLOORING

Asphalt, Metal, Wires, Ropes, Plastic, Papers, Textiles, etc.

Rock and stones, Soil

Unitronic 200 kN technical details and aditional specific tests are described at p. 508

S206N

SPECIFIC APPLICATIONS

FLEXURAL TEST WITH CENTRE POINT

ON CONCRETE BEAMS AND CLAY TILES

STANDARDS: EN 12390-5 | ASTM C78, C293 | BS 1881:118

S205-18

Flexure device with centre point loading to test clay tiles and concrete beams dimensions 100x100x400(500) mm Consisting of lower beam with two bearers (one articulated) adjustable from 100 to 315mm, and upper central articulated bearer fixed to the load cell. Weight: 20 kg approx.

S205-18

C109-11N

Software for flexural tests on concrete beams (p. 18)

TWO POINT FLEXURAL AND TRANSVERSE TESTS

ON CONCRETE BEAMS AND BENDING TEST METHOD ON GLASS-FIBRE REINFORCED CONCRETE

STANDARDS: EN 1170-4, EN 12390-5 | ASTM C70, C29

S205-16

Two-point flexure device to test glass-fibre reinforced cement.
Rollers dimensions: Ø 40 by 310 mm long. Lower rollers adjustable from 110 to 310 mm. Upper rollers adjustable from 45 to 120 mm.
Weight: 20 kg approx.

S205-16

C109-11N

Software for flexure tests on concrete beams (p. 18)

FLEXURAL TEST ON CONCRETE BEAMS

STANDARDS: EN 12390-5 | ASTM C78, C293 | AASHTO T97
NF P18-407 | BS 1881:118 | UNE 83305

C106 Flexure device (p. 315)

C109-11N Software for flexural tests on concrete beams (p. 18)

C106

SPLITTING TENSILE TEST ON CONCRETE CYLINDERS

STANDARDS: EN 12390-6 | ASTM C496 | NF P18-408 | BS 1881:117

C101-01

Splitting tensile test device (technical details p. 314)

C100-01

Packing strips (100 pieces)

C109-12N

Software for splitting tensile test (p. 18)

C101-01

C100-01

SPLITTING TENSILE TEST ON CONCRETE CUBES AND BLOCK PAVERS

STANDARDS: EN 1338 | EN 12390-6

C103

Splitting tensile test device (p. 314)

C100-02

Packing strips (100 pcs)

C109-12N

Software for Splitting tensile test (p. 18)

C103

C100-02

PUNCHING TEST ON CLAY BLOCKS

STANDARD: EN 15037 | UNI 9730-3

C093-11

Punching device for clay block for flooring tests

S205-15

Holding beam for the device

C109-16N

Software for the punching test (p. 18)

S337-32

C093-11

S205-11

C094N
PORTABLE DIGITAL PRESS, 56 KN CAPACITY

Used for compression tests on small cylinder specimens and core samples up to Ø 60x100 mm
The load is applied by a hand pump, and is measured by **a high precision electric load cell** with a digital display unit range 0-56 kN providing:
- 65,000 divisions
- 0.001 kN resolution
- Linearity: 0.05%
- Hysteresis: 0.03%
- Repeatability: 0.02%

The compression platens have Ø 65 mm, the upper one has a spherical seat and the vertical daylight is 110 mm
Complete with wooden carrying case, accessories.

Dimensions: 370x320x710 mm
Weight: 25 kg approx.

C094N

ACCESSORY

A125-01 SET OF TWO HARDENED CONICAL POINTS, to modify the press mod. C094N into the **Point load tester** (see section aggregates mod. A125N p. 64), for the rock strength index test.


A125-01

C095T
FLEXURAL TESTING MACHINE, CAPACITY 50 KN

This simple hand-operated testing machine allows to perform flexural tests on concrete tiles EN 491, clay tiles EN 538, hollow tiles UNI 2107, flat blocks, paving slabs, tiles, bricks, as well as punching tests on clay bricks.
The machine consists of a steel frame, one upper rotating bearer and two lowers one with adjustable distance, a mechanical hand-operated jack and a load proving ring of 10 kN capacity precision to measure the applied load.

C095T

TECHNICAL SPECIFICATIONS

- 10Kn load ring, complete with calibration certificate (on request rings with inferior or superior capacity up to 50kN)
- Horizontal span: 520 mm
- Maximal vertical span (accessories not included) 670 mm
- Distance between lower bearers adjustable from 50 to 500 mm
- Precision: 1% of applied load

Dimensions: 620x650x1500 mm
Weight: 120 kg approx.

C096
IMPACT FAILURE TEST ON TILES AND PAVING MATERIALS

STANDARD: Art. 3 n° 2234 - 1939

Utilized to verify the quality of paving materials like tiles, ceramics, bricks, floor tiles etc. by the impact method.
The specimen under test is placed on the base of the device which has been previously filled with sand. Then a spherical ball of approx. 1000 gr. is dropped on the tile from a known height, to measure the height under which the specimen will break.

Dimensions:
810x810x1300 mm
Weight: 70 kg approx.


C096

ABRASION MEASURING BASED ON BÖHME

C129
ABRASION TESTER BÖHME

STANDARDS: EN 1338, 1339, 1340 | EN 13748-2, 13892-3
EN 14157 | DIN 52108

C129

The instrument measures a volume loss in a specimen under abrasion test and it's used in tests such as:

- paving stones
- concrete slabs
- slabs made of natural rocks
- natural stone slabs
- terrazzo tiles

The test is performed by positioning a specimen to be verified in a abrasion tester Böhme apparatus on the test track on which has been spread normalized abrasive; the grinding wheel it's made rotate and the specimen submitted to the abrasive load of 294 N for a certain number of cycles.
Before doing a test, establish the specimen's bulk density by measuring weight and thickness.
Perform the test for 16 cycles composed of 22 turn each, calculating at the end a worn as a average loss in volume and weight.

The apparatus is basically composed of:

- Cast iron horizontal disc with a speed of 30 rpm and a diameter of 750mm furnished of a 200mm test track to position a specimen.
- Separate control panel with digital revolutions counter with automatic stop after preset revolutions.
- Specimen's holder.
- Adjustable charger used to produce a force of 294 N ± 3 N on a specimen.

Power supply: 230V 50Hz 1PH 800W
Dimension: 1500x1000x850 mm
Weight: 320 kg approx.

ACCESSORIES

C129-01N ABRASIVE MATERIAL composed of fused alumina (artificial corundum)
Pack of 25 kg

C129-02

C129-02 MEASURER THICKER REDUCTION, composed of dial gauge with anular contact face with a diameter of 8-5 mm and measuring board.

A113
SKID RESISTANCE AND FRICTION TESTER

STANDARDS: EN 1338, EN 1340, EN 1341, 1342, EN 1339
Used for tests on concrete block pavers, natural stones, and skidding tests on wooden floor.
Technical details: see p. 56

A113

ACCESSORIES

A110-11 METAL BASE PLATE.

A110-13 CLAMPING DEVICE for tests on concrete block pavers (EN 1338); natural stones (EN 1341, 1342); skidding tests on wooden floor (EN 1339).

VERIFICATION OF FORCE TRANSFER

STANDARDS: EN 12390-4 | BS 1881:115 | DIN 51302

The equipment to perform this test is composed of:

C155N
DIGITAL MEASURING TESTER
CYBER PLUS EVOLUTION TOUCH-SCREEN

This unit reads simultaneously the four values supplied by the electric strain load cell. The values are memorized, automatically elaborated and visualized, to directly supply the various coefficients resulting by the calculations, and printed on laser printer (accessory C128) directly connected via USB to the tester.
The unit, through the wide display, shows to the utilizer the different test procedures, as requested by previously selected specification (EN, BS, DIN).
At the end of the test, the display automatically visualizes the test results, by informing also if the frame under test is conforming to the requirements of the selected specification as regards the stability (axial transmission of the loads, self-alignment of the seat ball etc.).
The digital readout unit is also foreseen of a fifth digital reading channel allowing to perform load calibration tests on compression machines up to 3000 kN capacity.
Supplied complete with kit of 5 cables and connectors for load cell coupling, accessories, carrying case.

Power supply: 230V 1ph 50Hz
Dimensions: 450x350x160 mm
Weight: 8 kg approx.

C154
ELECTRIC STRAIN LOAD CELL 3000 KN CAPACITY

Consisting of a strain steel cylinder where four balanced strain gauge bridges are centered to measure the deformation on 4 generatrix in relation with two diameters, orthogonal between them, so that both axial and circumferential deformations can be measured.
The cell incorporates a fifth strain gauge utilized for load measurement calibration tests.
Supplied complete with connectors, cables, calibration certificate.

Dimensions: Ø 130 by 200 mm high.
Weight: 18 kg approx.

C154-01
POSITIONING DEVICE

Manufactured with special steel, hardened and rectified, it allows to correclty position the load cell on the lower platen of the compression frame, to carry out the footemeter test as described by the Standards.

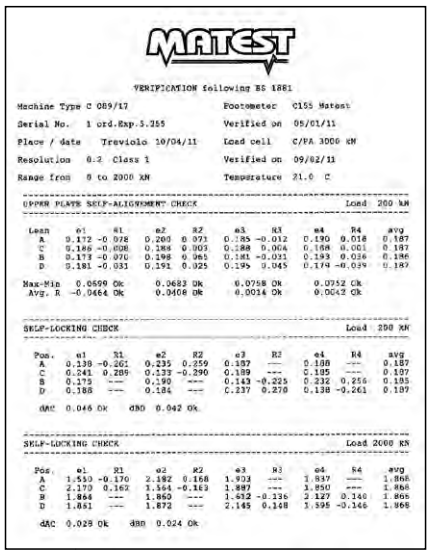
Dimensions: 150x150x50 mm

C155-05

CALIBRATION PROCESS of the load cell to the digital tester, complete with Matest calibration certificate.

ACCESSORY (recommended)

C155-10N SOFTWARE
To download to PC the results with possibility of certificate printout. Supplied on CD Rom for PC installation.


MATEST

VERIFICATION following BS 1881

Machine Type C 089/17 — Footometer C155 Matest
Serial No. 1 ord.Esp.5.155 — Verified on 05/01/11
Place / date Treviolo 10/04/11 — Load cell C/PA 3000 KN
Resolution 0.2 Class 1 — Verified on 09/02/11
Range from 5 to 2000 KN — Temperature 21.0 C

UPPER PLATE SELF-ALIGNMENT CHECK — Load 200 kN

Lean	e1	R1	e2	R2	e3	R3	e4	R4	avg
A	0.172	-0.078	0.208	0.073	0.185	-0.012	0.190	0.018	0.187
C	0.166	-0.008	0.184	0.003	0.188	0.004	0.188	0.001	0.187
B	0.173	-0.070	0.198	0.065	0.181	-0.031	0.193	0.026	0.186
D	0.181	-0.031	0.191	0.025	0.195	0.045	0.179	-0.039	0.187
Max-Min	0.0690 Ok		0.0683 Ok		0.0758 Ok		0.0352 Ok		
Avg. R	-0.0464 Ok		0.0408 Ok		0.0014 Ok		0.0042 Ok		

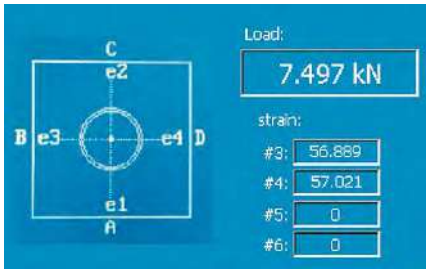
SELF-LOCKING CHECK — Load 200 kN

Pos.	e1	R1	e2	R2	e3	R3	e4	R4	avg
A	0.138	-0.261	0.235	0.259	0.197	---	0.188	---	0.187
C	0.241	0.289	0.137	-0.290	0.189	---	0.185	---	0.187
B	0.175	---	0.190	---	0.143	-0.225	0.232	0.256	0.185
D	0.188	---	0.184	---	0.237	0.270	0.138	-0.261	0.187
dAC	0.046 Ok		dBD 0.042 Ok						

SELF-LOCKING CHECK — Load 2000 KN

Pos.	e1	R1	e2	R2	e3	R3	e4	R4	avg
A	1.530	-0.170	2.182	0.168	1.933	---	1.837	---	1.868
C	2.170	0.162	1.564	-0.163	1.887	---	1.850	---	1.868
B	1.864	---	1.860	---	1.632	-0.136	2.127	0.140	1.866
D	1.851	---	1.872	---	2.145	0.148	1.595	-0.146	1.868
dAC	0.028 Ok		dBD 0.024 Ok						

Certificate example



C138M
UNIVERSAL DIGITAL TESTER WITH MICROPROCESSOR FOR LOAD CELLS

CYBER PLUS 8 PROGRESS

STANDARDS: EN ISO 376 I EN 10002-3 I UNI 6326
DIN 51220 I NF P18-411
ASTM E74 I BS 1610

C140...C142-07

C138M

C140-01

MAIN FEATURES

- Up to 5 decimal points visualization.
- LCD display 800x480 pixel.
- Large internal memory for load cell calibrations.
- Lan and RS232 connections.
- Language selection.

This user friendly menu driven digital display, connected to load cells (mod. C140 to C140-10 and mod. C142 to C142-08) allows to perform an accurate verification of the loads measured from machines under control and it allows to produce the corresponding certificate.
The instrument foresees three memorized cycle verification program composed of ten measurements each.

At the end of the test the unit automatically elaborates the stored value and displays:

Effective applied load;
Measured load (over three verification cycles);
Average measured load;
Accuracy in %;
Repeatability;
Relative readability;
Max error.
The tester's accuracy is ± 0.5% of the indicated load.

TECHNICAL SPECIFICATIONS

HARDWARE:
- High resolution converter up to 24 bit.
- Excitation at 5Vcc
- Standard signals: feed + feed – (0V) signal + signal – and shield
- Remote push button to facilitate the readings' confirmation during the calibration and the execution of the cycle of verification.

FIRMWARE:
- Software administration up to ten load cells. It can be used one cell at a time, selectable among with the ones correctly configured and installed
- Load measuring range: kN, kg, lb
- Date of test and/or calibration
- Linearization steps or polynomial
- Digital filter of the first programmable order that is able to filter and settle the value acquired by the electrical cell.

FUNCTIONS:
- Unlimited execution of verification tests
- Code of the device under verification
- Execution of the verification cycles according to the European EN Standards
- Calculation of all the fundamental parameters required: repeatability and accuracy percentage error, residual error on the 0 point, maximum relative resolution and class of the device under verification
- Sending all the data tests to PC, importable in excel
- Direct USB printer connection (PCL compatible printers)
- Administration of tests by Matcal software (accessory).

MAIN PAGE:
- Visualization of all the device data of the selected cell
- Date and time
- Available languages: Italian, English, French, German and Spanish, Polish (other languages on request).

SOFTWARE:
To download to PC the results (accessory C155-10N).

Hardware technical details: see p. 18

The apparatus, and all the accessories, is contained in a strong and practical suitcase, immersion resistant with a depressurisation valve.

Power supply: 110-230V 1ph 50-60 Hz
Dimensions: 360x300x200 mm
Weight: 5 kg approx.

C138-05 FORCE CALIBRATION PROCESS of one load cell to the digital tester, complete with Matest calibration certificate. EN ISO 376 I EN 10002-3 Class 2

ACCESSORY (recommended)

C155-10N SOFTWARE
To download to PC the results with possibility of certificate printout.

STANDARD LOAD CELLS

TO BE USED WITH THE C138N DIGITAL INDICATOR FOR CALIBRATION OF TESTING MACHINES

STANDARDS: EN ISO 376 I EN 10002-3 Class 2 I ASTM E74 Class A

These load cells are suitable for the calibration of compression testing machines. They consist of a high quality steel block, named sensitive element, where some strains have been fitted: the whole is housed in a stainless steel sheathing. While the load is applied, strains are transmitted to an amplifier (mod C138N) which gives a load digital reading. Further advantages is the possibility to equip different load cells on the same measuring tester and therefore to check all load capacities.

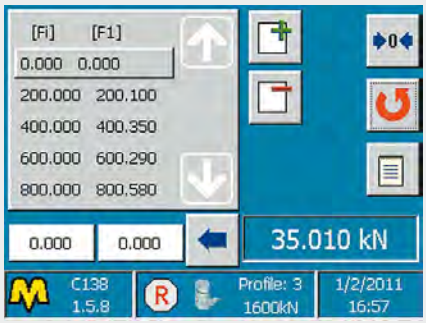
Model	Capacity kN	Dimensions Ø x height mm
C140	25	82x59
C140-01	50	82x59
C140-02	75	82x59
C140-03	100	82x59
C140-04	300	135x160
C140-05	600	135x160
C140-06	1000	135x200
C140-07	2000	135x200
C140-08	3000	135x200
C140-09	5000	180x200
C140-10	500	for tensile tests

TECHNICAL SPECIFICATIONS

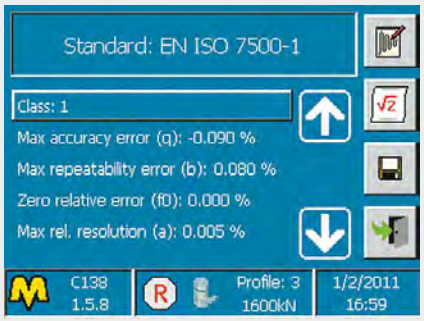
- Full Scale nominal output: 2 mV/V
- Linearity + Hysteresis: ± 0.3% of full scale
- Repeatability: ± 0.03% of full scale
- CLASS: A

C140...C142-07

SCREEN EXAMPLE:



Main Window



Cell's calibration

STRAIN LOAD CELLS HIGH PERFORMANCE

TO BE USED WITH THE C138N DIGITAL INDICATOR FOR CALIBRATION OF TESTING MACHINES

STANDARDS: EN ISO 376 I EN 10002-3, Class 1 I ASTM E74 Class AA

These electrical strain gauge load cells of high accuracy and stability, are proposed as an alternative to the standard load cells, for verification and calibrations of high precision, repeatability, and are recommended for a professional use, Metrologic Laboratories, SIT centres. To be used with the Digital Indicator mod. C138N.

Model	Capacity kN	Dimensions Ø x height mm
C142	30	100x127
C142-01	100	105x160
C142-02	300	140x160
C142-03	600	140x160
C142-04	1000	150x200
C142-05	2000	135x200
C142-06	3000	135x200
C142-07	5000	135x200
C142-08	600	tensile/compression

TECHNICAL SPECIFICATIONS

- Full Scale nominal output: 2 mV/V
- Linearity + Hysteresis: ± 0.1% of full scale
- Repeatability: ± 0.03% of full scale
- CLASS: AA

C138-11 to C138-14
CALIBRATION CERTIFICATE, issued by an Official Calibration Institute (ACCREDIA) for one load cell connected to the digital tester mod. C138N

TURBO FORCED MIXERS, PAN TYPE WITH VERTICAL AXIS

STANDARD: EN 12390-2

Used to prepare concrete specimens or mixtures, these mixers ensure an uniform, efficient and fast mixture action.
They are of easy and practical utilisation, absorb fewer air during mixing and are suitable for laboratory and field purposes.

TECHNICAL SPECIFICATIONS

- Parallel shaft gearbox (mod. C163, C164, C165)
- Oil bath epicycloidal gearbox (mod. C164-01)
- Wear-resistent steel pan (mod. C163, C164, C165)
- Pan and main parts in wearproof steel (mod. C164-01)
- Safety grid with bag breaker
- Adjustable mixing blades
- Manual discharge mouth on the bottom
- Wheels + tow bar (mod. C163, C164, C165)
- Axele with tire wheels and drive drawbar (mod. C164-01)
- Electric control with magnetothermal overload cutout
- Power supply: 230V 1ph 50Hz (mod C165, C163SP)
- Power supply: 400V 3ph 50Hz (mod C163, C164, C164-01)

C164-01

Models		C165	C163/C163SP	C164	C164-01
Pan capacity (volume)	Litres	100	150	200	300
Yeld per mixture	Litres	55	80	135	220
Pan dimensions (Ø x h)	cm	70x30	70x43	80x40	110x40
Motor power	KW	1.1	1.8	4	5.5
Dimensions (Ø x h)	cm	71x115	71x150	110x137	130x135
Weight	kg	115	130	225	420

C164

C163

C165

C165N
PAN TYPE MIXER, HIGH QUALITY

STANDARD: EN 12390-2

This High quality mixer guarantees excellent mixing results particularly using the smallest quantities of material.
High level mixing performances for both mortar and concrete (mixtures up to a grain size of 16mm)
Quick and practical drainage through a valve placed in the base of the drum.
Very long lifespan thanks to a solid and robust construction.
Pan capacity: 100 litres
Mixing amount: max. 60 litres
Pan dimension: Ø 642x310 mm

Power supply: 230V 50Hz 1ph
Dimensions: 675x825x1215 mm
Weight: 162 kg approx.

C165N

C165N Detail

C162
PAN TYPE MIXER 56 LITRES CAPACITY

STANDARD: EN 12390-2

This multiflow mixer absorbs fewer air during mixing, requires shorter mixing time and grants a perfect homogeneity in mixtures having a low water cement ratio.
The pan is easily removable by means of a trolley (accessory).
The blades are hardened against wear.
Mixing pan: Ø 640 mm x 330 mm deep
Not sellable in CE markets without security cabinet
(see mod. C162-02)

Power supply: 230V 1ph 50Hz 2 Hp
Dimensions: 800x850x850 mm
Weight: 250 kg approx.

C162

C162-01

ACCESSORIES FOR MOD. C162

C162-01 TROLLEY for fast and easy removal of the mixing pan of the multi-flow mixer
C162-02 SECURITY CABINET, manufactured from steel sheet, conforming to CE Safety Directive.

C161
DRUM TYPE MIXER

Suitable for field mixes of low/medium strength concrete.
Drum volume: 130 litres
Yield: 75 litres of concrete

Power supply:
230V 1ph 50-60Hz - 0.3HP
Dimensions:
720x1320x1280 mm
Weight: 60 kg approx.

C161

TESTING FRESH SELF COMPACTING CONCRETE (S C C)

ERMCO/EFNARC European Guidelines.

FREE FLOW AND TIME FLOW DETERMINATION

SPRAY-TEST

STANDARD: EN 12350-8

To evaluate the deformability of fresh concrete through free flow, and the time needed to spread a 500 mm diameter.
Applicable to concrete with aggregates of 25 mm max. size

C181 SLUMP CONE, galvanized steel, to EN 12350-2 Spec.

C170-01 PLATE, galvanized steel made, dimensions 900x900 mm, with engraved two circles having 210 and 500 mm diameter and central X cross.

FLOW TIME DETERMINATION V-FUNNEL TEST

STANDARD: EN 12350-9

To evaluate the segregation resistance of self-compacting freshly mixed concrete through the flowing speed from a funnel.
Applicable to concrete with aggregates of 25 mm max. size.

C171 V-FUNNEL, **stainless steel** made, stand mounted. The upper edge of the funnel is smooth and reinforced, and the outflow orifice is equipped of an openable seal valve.
Dimensions: 640x340x1050 mm
Weight : 20 kg approx.

C171-11 FILLING HOPPER stainless steel made, to pour the concrete into the funnel in one operation, as specified by the Standard.

V127 BOX, polythene made, to collect the concrete.

C262 STRAIGHT EDGE, 460 mm, to level the concrete.

CONFINED FLOWABILITY DETERMINATION

L-SHAPE BOX

STANDARD: EN 12350-10

To determine the confined flowability of self-compacting freshly mixed concrete, and to evaluate the filling and passing ability and segregation resistance.
Applicable to concrete with aggregates of 25 mm max. size.

C172 L-BOX, **stainless steel** made, consisting of:
- container with inside rigid surfaces,
- obstacle of two different interchangeable set of grids:
- one set of 3 vertical bars having Ø 12 mm and free light of 41 mm
- one set of 2 vertical bars having Ø 12 mm and free light of 59 mm
- gate in guillotine form

Dimensions: 712x280x682 mm
Weight: 40 kg approx.

S200-11 STRAIGHT EDGE, 300 mm long, galvanized steel, to level the concrete.

CONFINED FLOWABILITY DETERMINATION

U-SHAPE BOX

STANDARDS: UNI 11044 | RILEM report N. 23

To evaluate the filling speed and height of the concrete sample under its own self-weight, in the U-shape filling box, to determine the self-compactability. The test is performed with highly fluidised fresh concrete with superplasticiser.
Applicable to concrete with aggregates of 25 mm max. size.

C173 U-BOX, **stainless steel** made, with inside smooth walls, equipped of a flow obstacle formed by four vertical reinforcement bars. The bars have Ø 10 mm and the light between them is 35 mm.
A gate in guillotine form splits the vertical portion of the box from the horizontal one.

Dimensions: 480x250x680 mm
Weight: 20 kg approx.

S200-11
STRAIGHT EDGE, 300 mm long, galvanized steel, to level the concrete.

CONFINED FLOWABILITY DETERMINATION

J-RING APPARATUS

STANDARD: EN 12350-12

To determine the flowability, i.e. the flow time and the capability of the self compacting concrete to pass through obstacles.

C174 N

J-RING APPARATUS, galvanized steel made, having rectangular section 30x15 mm and median diameter of 300 mm.
The median circumference of the ring is drilled, and n. 16 cylindrical bars Ø 18x140 mm are fixed into the holes.
The bars have a close distance of 41 mm between them, to simulate a condition of higher density of the reinforced bars.

C174-01N

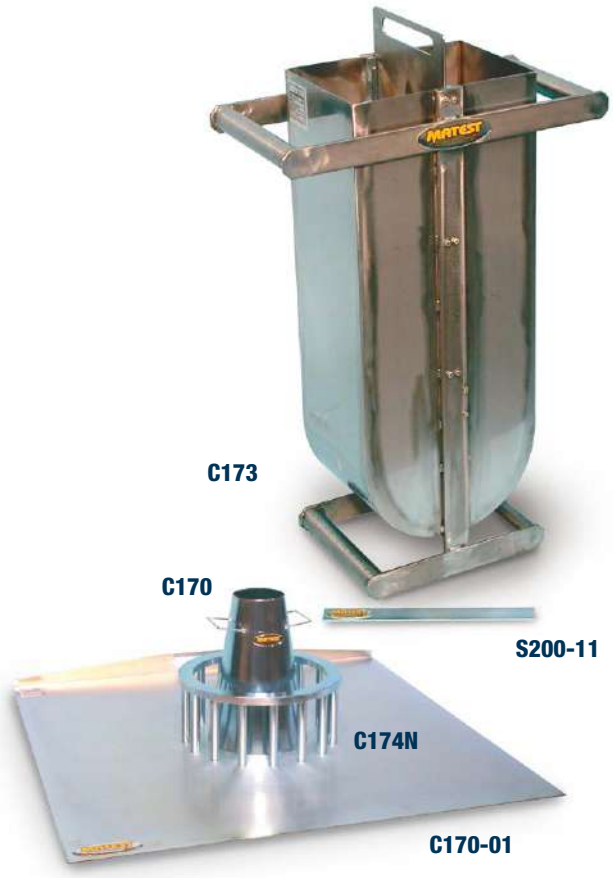
J-RING APPARATUS, similar to C174N, but having n° 12 cylindrical bars and 59 mm distance between them, to simulate a condition of standard density of the reinforced bars.

C170

SLUMP CONE, galvanized steel, conforming to EN 12350-2 Spec.

C170-01

PLATE, galvanized steel made, dimensions 900x900 mm, with engraved two circles having 210 and 500 mm diameter and central X cross.



C183N
VEBÉ TIME CONSISTOMETER NEW

STANDARD: EN 12350-3

The Vebé consistometer determines the consistency and workability of concrete, based on the same principle of slump test, but with the advantage of a mechanical action. The concrete is subjected to vibration after the cone has been removed, until a transparent disk placed on the material makes completely contact with it. The time required to perform the operation indicates the workability or VE-BE degree.
Supplied fully equipped.

Power supply: 230V 1ph 50Hz 250W
Dimensions: 400x250x690 mm
Weight: 100 kg approx.

C184N
VIBRATING TABLE (Vebé consistometer)

STANDARD: ASTM C1170-14

For determining the consistency and density of roller-compacted concrete. Similar to mod. C183, but conforming to ASTM C1170-14 Spec. with sliding weight of 50 lbs

*** Power Supply:** 230V 1F 50Hz 180W
Dimensions: 280x400x900 mm
Weight: 110 kg approx.

***Note:** The vibrating table is available also at: 230V 60Hz and 110V 60Hz

ACCESSORY for the C184N table

C184-10N SLIDING WEIGHT 20 LBS (that replaces the standard 50 lbs one) + base to fix a cylinder mould Ø 6"x12" (optional mod. C258-03) to conform the Vibrating Table to the ASTM C1176-14 Specifications.

SLUMP CONE TEST KITS

STANDARDS: EN 12350-2 | EN 12350-8 | ASTM C143
BS 1881:102 | AASHTO T119 | NF P18-305

SLUMP CONE COMPLETE TEST KITS. Matest proposes different versions:

C180-KIT SLUMP CONE, COMPLETE SET, ideal for laboratory tests including:

C180-01 Slump Cone, **stainless steel** made

C180-02 Tamping rod, galvanized steel, Ø 16x600 mm

C180-03 Slump Cone funnel, galvanized steel

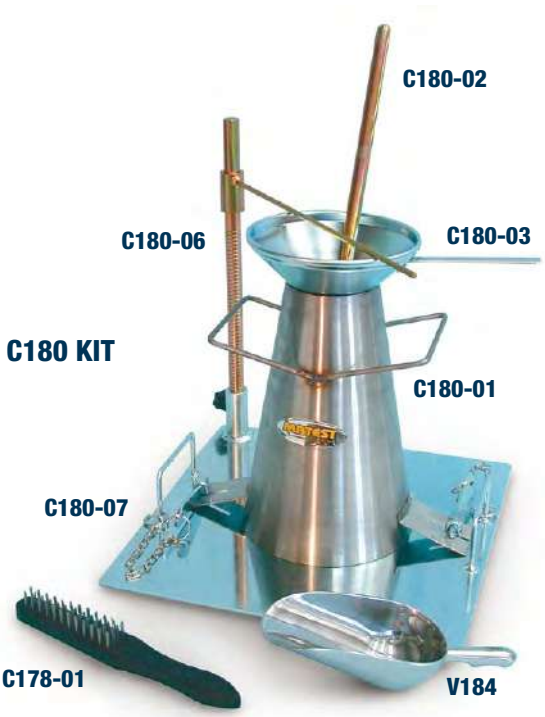
C180-06 Graduated slump scale **engraved in 0.5 cm** increments with sliding measuring rod

C180-07 Base, galvanized steel, complete

V184 Aluminium scoop, 500 cc capacity

V178-01 Fine wire brush

Weight: 10 kg approx.



C182 KIT

C178-KIT PORTABLE SLUMP CONE TEST SET, including:

C181 Slump Cone, **galvanized steel**

C179-02 **Graduated** steel tamping rod, galvanized, Ø 16x600 mm

C179-01 Base, manufactured from heavy duty galvanized steel, complete with clamps and measuring bridge which is also used as carrying handle.
The slump is measured using the tamping rod having a graduated scale engraved in 1 cm increments.
The components of the set are fitted together for easy carrying. Very practical, robust, ideal for site use.

Weight: 8 kg approx.

C178 KIT

C182-KIT SLUMP CONE, COMPLETE SET, including:

C181 Slump Cone, **galvanized steel**

C180-02 Tamping rod, galvanized steel, Ø 16 x 600 mm

C180-04 Base plate, galvanized steel

V176-01 Stainless steel rule, 300 mm long

V184 Aluminium scoop, 500 cc capacity

V178-01 Fine wire brush

Weight: 5 kg approx.

C179 KIT

C179-02 Detail

C179-KIT PORTABLE SLUMP CONE TEST SET, including:

C180-01 Slump Cone, **stainless steel** made

C179-02 **Graduated** steel tamping rod, galvanized, Ø 16x600 mm

C179-01 Base, galvanized steel, complete with clamps and measuring bridge, as described above.

Weight: 8 kg approx.

Note:
Each component of the kits can be ordered separately.
The user can personalize the kit composition for the Slump Cone test.

C182P KIT
SLUMP CONE, PLASTIC, complete set including:

C181P Slump Cone, **plastic**. Max. temperature: 40 °C
Weight: 750 g
C180-02 Tamping rod, galvanized steel, Ø 16x600 mm
C180-04 Base plate, galvanized steel
V176-01 Stainless steel rule, 300 mm long
V184 Aluminium scoop, 500 cc capacity
V178-01 Fine wire brush

Weight: 5 kg approx.

ACCESSORY

C180-03P Cone Filling Funnel, **plastic**. Weight: 250 g

Note: Each component of this kit can be ordered separately.

C180-01
SLUMP CONE only, manufactured from **stainless steel**, diameter 100/200 mm, height 300 mm, thickness 1.5 mm

Weight: 2 kg approx.

C181
SLUMP CONE only, **galvanized steel**, Ø 100/200 mm, height 300 mm, thickness 1.5 mm

Weight: 2 kg approx.

V185-03
SCOOP, STAINLESS STEEL

STANDARD: EN 12350-1

Used to sample fresh concrete
Capacity: 5 kg of concrete
Dimensions: Ø 125x250 mm

C185
COMPACTING FACTOR APPARATUS

STANDARD: BS 1881:103

Designed to undertake a more precise and sensitive test procedure than the simple slump test.
The apparatus consists of two conical hoppers mounted on a cylinder.
Each hopper has a hinged flange with quick release mechanism and everything is mounted on a rigid steel stand.
The compacting factor is the ratio between the weight of the partially compacted concrete and the weight of the fully compacted concrete.
Supplied complete with tamping rod diameter mm 16x600 long.

Dimensions: 500x400x1510 mm
Weight: 55 kg approx.

C192 KIT
FLOW TABLE

STANDARDS: EN 12350-5 | DIN 1048

The apparatus comprises a galvanized steel conical mould, Ø 130/200x200 mm, double steel flow table with galvanized top plane, guide device, wooden tamper.
Used to determine the workability of concrete. The top table has a square surface of 700x700 mm, hinged on one side.

Weight: 30 kg approx.

SPARES

C192-01 Conical mould, galvanized steel made, Ø 130/200x200 mm
C192-02 Wooden tamper

C187
K-SLUMP TESTER

STANDARD: ASTM C1362

To determine the degree of compaction and the workability of fresh concrete. Used for in-situ measurements or inside test moulds. Test results can be correlated against the slump values.

Weight: 500 g

C187 C188 V189-01

C188
WALZ CONSISTOMETER

STANDARDS: EN 12350-4 | DIN 1048

To measure the consistency of fresh concrete.
It consists of a metal box with handles 200x200 mm by height 400 mm, painted for rust protection.

Weight: 6 kg approx.

ACCESSORY

V189-01 TROWEL 90x115x165 mm conforming to EN 12350-4

C189
CONCRETE WORKABILITY METER

STANDARD: NF P18-452

The concrete workability meter (also known as plastometer) is designed to test concrete for dynamic workability.
It is suitable for field and laboratory tests to check:
- concrete mix for consistency, expecially water content
- optimum proportioning of concrete constituents (sand, gravel, water, cement)
- possible improvment when admixing a plastifier
- comparing two concrete types

The unit consists of a prismatic receiver divided into two unequal volumes by a removable partition, and an electric vibrator.
The fresh concrete is poured into the large volume space, the separating partition is removed, and the vibrator starts automatically.
The test consists in measuring the time required for the concrete to reach an uniform distribution in the receivers

Power supply: 230V 1ph 50Hz 300W
Dimensions: 820x420x410 mm
Weight: 80 kg approx.

C186
KELLY BALL APPARATUS

STANDARD: ASTM C360

Consisting of a hemispherically ended cylinder with guiding frame and a handle graduated in inch, it is used to determine the workability of fresh concrete. The ball is lowered into the concrete and the penetration measured.
It can be used on site or in laboratory.
Cadmium plated for rust protection.

Weight: 15 kg approx.

C186

C190
PLASTICITY METER

Used for quick and easy measurements of the plasticity of mixtures, especially concrete, and so to detect rapidly any excess of water.
The measuring system is related to the shear strength applied by a three blade head to the mixture under test.
It is possible to measure the plasticity at several different points, and directly in the mixture, with multiple checking, and obtained values can be easily compared with the values got by the slump Abrams cone test.

Dimensions: Ø 130x180 mm
Weight: 2 kg

C190

C189

SETTING TIME OF CONCRETE BY PENETRATION

STANDARDS: ASTM C403 | AASHTO T197 | UNI 7123

C213
CONCRETE PENETROMETER

Used to determine the setting time of the mortar fraction in concrete mixes with slump greater than zero, by testing mortar sieved from mix. The apparatus consists of a spring penetrometer (capacity 100 kgf, precision 1 kgf) and six interchangeable stainless steel needle pointers of 16-32-65-160-325-650 mm2 area. A sliding ring indicates the reached load on the handle of the penetrometer. Supplied complete with carrying case.

Dimensions: 450x160x70 mm
Weight: 5 kg approx.

C213

C194
CONCRETE POCKET PENETROMETER

Used for the evaluation of the initial set of the concrete mortar. The penetration plunger has a tip area of 32 sq/mm. It is plunged into the mortar to a depth of 25.4 mm. indicated on the plunger. The resistance expressed in Kpa and Lbf/sq.in. is shown on the marked direct-reading scale.

Dimensions: Ø 25x210 mm
Weight: 400 g

C194

C194-01
CONCRETE POCKET DIAL PENETROMETER

To evaluate the initial set of concrete, and the effect of the retarders in the setting time.
The plunger has Ø ¼" (32.3 sq.mm.); the dial has dual scale: 0-700 p.s.i. and 0-50 kg/sq.cm.
Supplied complete with plastic case.

Weight: 300 g approx.

C194-01

C211
JOISEL APPARATUS Ø 140X220 MM HIGH

STANDARD: LCPC French Method
Used to separate the various elements of the fresh concrete such as cement, sand, aggregates. All made from stainless steel.

Weight: 2 kg

C211

C220
WATER TEST SET FOR CONCRETE MIXING WATER

STANDARDS: EN 1008 | EN 206 | DIN 4030

This kit, utilized to test the water mixing concrete, is composed by different dropping bottles, water-proof colors scales, test strips. It is suitable, to carry out more than 50 analysis of: total or momentaneous pH, magnesium, ammonium, chloride, sulphate, lime dissolving CO2, carbonate hardness, total hardness etc.
Contained in carryng cases.

Weight: 2 kg

C220

C195
AIR ENTRAINMENT METER, WATER COLUMN TYPE
5 LITRES CAPACITY

STANDARDS: EN 12350-7 I ASTM C231 type A

Made from cast aluminium alloy. It records directly the percentage of air enclosed in freshly mixed concrete by operating according to the air pressure principle.
The instrument is supplied complete with pressure gauge tamping rod and hand pump.
Air content range 0...8% - div. 0.1%

Dimensions: Ø 250x700 mm
Weight: 13 kg approx.

ACCESSORY

C195-01
CALIBRATION CYLINDER to check and calibrate the air meter mod. C195

C195

C195-01

C196
AIR ENTRAINMENT METER, PRESSURE GAUGE TYPE
8 LITRES CAPACITY

STANDARDS: EN 12350-7 I DIN 1048 I ASTM C231 type B

It consists of an aluminium vessel with built in hand operated pressure pump, connected to the measuring gauge showing directly the air content in percentage.
Air content range: 0...10% div. 0.1% up to 8% and 0.5% over
Dimensions: Ø 250x450 mm
Weight: 12 kg approx.

C196

C197

C197
AIR ENTRAINMENT METER, PRESSURE GAUGE TYPE
8 LITRES, ELECTRIC

Identical to mod. C196 but with built in automatic electric air compressor giving air pressure, and keeping it constant all along the test.

Power supply: 230V 1ph 50-60Hz
Dimensions: Ø 250x450 mm
Weight: 14 kg approx.

ACCESSORY

C197-01
FILLING HOPPER for the air entrainment meters C196 and C197

C198

C198
AIR ENTRAINMENT METER, PRESSURE GAUGE TYPE
7 LITRES CAPACITY

STANDARDS: EN 12350-7 I ASTM C231 type B I AASHTO T152

It consists of an aluminium cylindrical vessel with airtight cover assembly incorporating an air pump, a precision pressure gauge 90 mm dia. and valves.
Capacity: 7 litres.
Air content range: 0 - 100%
Gauge graduations: 0.1% up to 6% of the scale; 0.2% from 6% to 10% of the scale. Lightweight, compact and durable, this meter allows quick clamping system and testing with few pump strokes. It is not affected by change in atmospheric pressures. The container can be used also for unit weight measures of fresh concrete and aggregates. Supplied complete with calibration kit, accessories, robust plastic carrying case.

Dimensions: Ø 250 by 500 mm approx.
Weight: 10 kg approx.

DENSITY OF FRESH CONCRETE

C199
UNIT WEIGHT MEASURE, 10 LITRES CAPACITY

STANDARD: EN 12350-6

Used to determine the weight per cubic metre of freshly mixed and compacted concrete.
Made from steel, 4 mm thick, with inside radius between wall and base of 20 mm, with machined rim and base.
Inside diameter 200 by height 320 mm

Weight: 9 kg approx.

C199

UNIT WEIGHT MEASURES

STANDARDS: Comparable to ASTM C29, C138 | AASHTO T19

Made from heavy steel sheet, they are used to determine the weight per cubic metre of freshly mixed and compacted concrete, and as per ASTM Standards also the air content of fresh concrete.

C200...C205-01

C199T
UNIT WEIGHT MEASURE, 9 LITRES CAPACITY

STANDARD: UNI 7122:2008

Bucket for determining the weight per cubic meter of fresh concrete.
Made of enamelled steel with handles.

Inside dimensions: Ø 240 x h200 mm

C199T

ADMIXTURES FOR CONCRETE, MORTAR AND GROUT.

DETERMINATION OF BLEEDING OF CONCRETE

STANDARD: EN 480-4

C199-10

CONTANIER, having Ø 250 mm by 280 mm height, complete with cover. **Stainless steel manufactured**, it is used for the determination of the relative bleeding of a fresh concrete sample, using aggregates having max. size of 50 mm.

Weight: 5 kg approx.

ACCESSORY

C199-11

TAMPER, **stainless steel** made, Ø 100 mm

C199-11

C199-10

Models	Capacity Litres	Inside diameter mm	Useful height mm	Sheet thick mm	Weight kg
C200	1	108.3	108.6	3	2
C201	2	108.3	217.1	3	3
C201-01	3	160	149.2	3	3.5
C202	5	187.7	180.7	3	4
C202-01	7	187.7	253	3	5
C203	10	265	181.3	4	7
C204	14	265	253.8	4	9
C204-01	15	265	272	4	12
C205	28	345.6	298.5	5	14
C205-01	30	345.6	319.8	5	15

CONCRETE FLOW TABLE

STANDARD: ASTM C124

Used to determine the flow of concrete. The apparatus consists of a flow table, stainless steel flow mould, tamping bar.

MODELS

C208 FLOW TABLE
Hand-operated by crack handle.
Table diameter 762 mm

Weight: 100 kg approx.

C208-01 MOTORIZATION KIT to be connected to the flow table mod. C208 and to get it automatic.
Complete with separate control panel and automatic digital drops counter.

Power Supply: 230V 1ph 50Hz 750W
Weight: 15 kg approx.

C216
FOUR CHANNELS THERMOMETER
NEW

K-TYPE THERMOCOUPLE

Used to automatically measure and store the temperature of concrete casting during the curing phase.

- The thermometer is provided with four inputs to connect separately four K-type thermocouple probes.
- It can measure and store up to four simultaneous different points at selectable sampling intervals from 1 to 3600 seconds.
- Measuring range: from -100 °C to 1370 °C
- Resolution: 0.1 °C
- Reading selectable: °C and °F
- Display size: 52x38 mm with green backlight (ON/OFF)
- **SD memory card capacity 8Gb, USB/SD adapter**
- Microcomputer circuit provides intelligent function and high accuracy.
- Real time SD memory and Datalogger, built-in Clock and Calendar, real time data recorder.
- Innovation and easy operation, after tests execution, just take away the SD card from the meter and plug into the PC; it down load all the measured values and the user can make the further data or graphic analysis.
- Automatic temperature compensation and linear compensation for the full range.
- Auto power off if any button is not pressed within 10 minutes.
- Operating conditions: 0 to 50 °C and less than 85% R.H.

Supplied complete with: 50 meters coil K-type thermocouple, set of 4 probes with male connectors, USB/SD adapter, SD card 8Gb, batteries, carrying case.

Power supply: 6 x 1.5V battery.
Dimensions (of the thermometer): 177x68x45 mm
Weight: 500 g approx.


C216

SPARE

C216-01 K-Type Thermocouple coil (50 meters)

C214
CEMENTOMETER

For the rapid determination of moisture content in wet cement and concrete.
Fast and easy to use; simply insert the prongs into the material being tested,
Accurate and instantaneous readings, digital portable meter.
Ratio range: 0.35 to 0.70 water/cement.
The unit can store over 150 readings.
Data can be recalled via RS-232 interface to using WIN98 and above.

Power: 4AA Batteries
Weight: 2 kg approx.

C214-01
CEMENTOMETER

Same to mod. C214 but with ratio range: 0.25 to 0.5 for low water cement ranges


C214

VERIFICATION OF FLATNESS, PERPENDICULARITY, STRAIGHTNESS AND DIMENSIONS OF MOULDS AND SPECIMENS

STANDARD: EN 12390-1

The appendix of EN 12390-1 Standard calls for a set of instruments to be used for dimensional and tolerance verification of the mould and the specimens got from the same.

V175-03
VERNIER CALIPER, digital, 153x0.01 mm, for dimensional measurements.

V175-03CER
VERNIER CALIPER, digital, 153x0.01 mm, for dimensional measurements, complete with Calibration Certificate issued by an Accredited Laboratory (SIT).

in alternative:

V175-02
VERNIER CALIPER, digital, 200x0.01 mm, for dimensional measurements.

V175-02CER
VERNIER CALIPER, digital, 200x0.01 mm, for dimensional measurements, complete with Calibration Certificate issued by an Accredited Laboratory (SIT).

C250-10
RULE RIGHT ANGLE (square), steel made, 150x100 mm, rectangular section.

C250-12
FEELER GAUGE, comprising a set of strips from 0.05 to 0.50 mm, with blade 100 mm long.

C250-14
RULE (straightedge), 300 mm long.

C250-16
GO-NOT GO GAUGE, for 100 mm cube moulds.

C250-16CER
GO-NOT GO GAUGE, for 100 mm cube moulds, complete with Calibration Certificate issued by an Accredited Laboratory (SIT).

C250-17
GO-NOT GO GAUGE, for 150 mm cube moulds.

C250-17CER
GO-NOT GO GAUGE, for 150 mm cube moulds, complete with Calibration Certificate issued by an Accredited Laboratory (SIT).


Dimensional verification


Flatness verification


Go-not go verification

PLASTIC CUBE, CYLINDER AND BEAM MOULDS MADE IN MATEST

These one-piece moulds, very appreciated by the user, are made from hard plastic, strong, light, undeformable; resistant to vibrations shocks and wear. They do not require mounting and dismounting operations, thus saving time and labour. They just require a simple clean and demould oiling before being ready for use again for many times. The specimen is expelled from the mould by compressed air or water.

The moulds: C223, C224, C230L, C230N, C232N, C228, C229 are produced by Matest and have competitive manufacturer prices.

CUBE MOULDS 150 MM SIDE

The cube moulds 150 mm side can be supplied in three different models, each one with different characteristics and weight.
All the models have a reinforced band on the walls, and the inside surfaces are very smoothed getting easier the specimen's ejection.
Models C223 and C224, Matest made, have also **reinforced corners**, granting an additional resistance, and foresee a **X reinforced band on the base**, improving the strenght of the mould, and allowing the user to give small blows with a rubber heated hammer (mod. V195) by easing the specimen's ejection. All the moulds are supplied with engraved the logo Matest.
All the moulds are also available unbranded, and on request they can be supplied with engraved the customer's logo.

MODELS

C223 MADE IN MATEST

CUBE MOULD, 150 mm side, with X reinforced band on the base, and reinforced corners.
Weight: 1300 g approx.

C223R NEW

CUBE MOULD, 150 mm side, reinforced. **Weight** 1200 g ca.

C223R

C224 MADE IN MATEST

CUBE MOULD, 150 mm side, **HIGH DENSITY**,
with X reinforced band on the base and reinforced corners.
The mould same to mod. C223 is manufactured from **high density mixture** with total weight 1600 g, by obtaining a higher hardness and strength of the plastic material.
- It increases the abrasion resistance, by reducing the wear action.
- It improves the pressure resistance during the specimen's ejection, by reducing mould breakages.
- It ensures a larger number of utilisations (with the same use care).

Weight: 1600 g approx.

Reinforced corners

C223 / C224

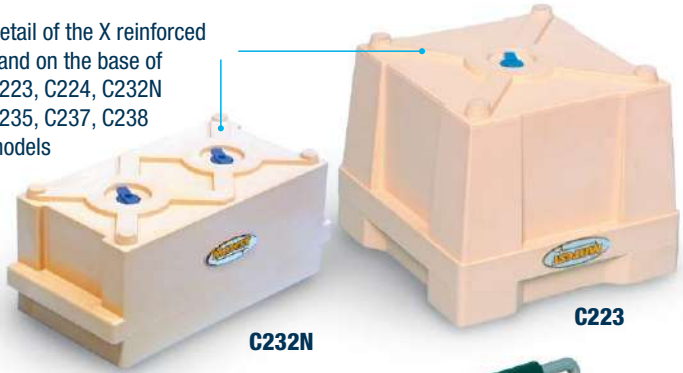
C232N MADE IN MATEST

CUBE MOULD, 100 mm side, TWO GANGS, with X reinforced band on the base. The inside surfaces are very smoothed getting easier the specimen's ejection. **Weight:** 1050 g approx.

C232

CUBE MOULD, 100 mm side, TWO GANGS, with reinforced corners and band on the walls. **Weight:** 1200 g approx.

Detail of the X reinforced band on the base of C223, C224, C232N C235, C237, C238 models



C232N

C223

C232

C232N

C230N MADE IN MATEST

CUBE MOULD, standard, reinforced band, 150 mm side.

Weight: 1250 g approx

C230-03

C230N

C230L MADE IN MATEST

CUBE MOULD, 150 mm side, standard,**lighweight, entry level price**.

Weight: 850...950 g approx

NEW

C230L

C235
CUBE MOULD, 200 mm side, with X reinforced band on the base and upper double reinforced walls and corners.

Weight: 2550 g approx.

C235

C238

C237

C237
BEAM MOULD, 100x100x500 mm sides, with X reinforced bands on the base and upper double reinforced walls and corners.
Weight: 2100 g approx.

C238
BEAM MOULD, 150x150x600 mm sides, with X reinforced bands on the base and upper double reinforced walls and corners.
Weight: 4400 g approx.

C228 MADE IN MATEST
CYLINDER MOULD, Ø 150x300 mm with upper and lower reinforced bands. **Weight:** 2150 g approx.

C228-01
CYLINDER MOULD, Ø 100x200 mm with reinforced bands.
Weight: 920 g approx.

C229 MADE IN MATEST
CYLINDER MOULD, Ø 160x320 mm with upper and lower reinforced bands. **Weight:** 2200 g approx.

NEW

C228-01 C228 C229

C230-05

C223-01

C234-03

ACCESSORIES

C223-01 COVER, plastic, for C223, C224, C230N, C230L moulds. Useful for transportations. Pack of 10 pcs.

C234-03 STOPPER, plastic, to plug the hole of the moulds C223, C224, C228, C230N, C230L, C229. Pack of 10 pcs.

C232-01 STOPPER, plastic, to plug the hole of the mould C232N Pack of 10 pcs.

C235-01 STOPPER, plastic, to plug the hole of the moulds C228-01, C232, C235, C237, C238. Pack of 10 pcs.

C230-01 FILLING HOPPER, stainless steel made, for an esier filling of fresh concrete into the moulds: C223, C224, C230, C230N Supplied complete of clamping elastics.

C230-03 GRASPING PLIERS for C230 and C230N moulds, to get easier the carriage.

C230-05 GUN, to connect to a water or air pressure, to eject the specimen from the mould.

C222-10 COVER, plastic, for C223R and C230N moulds.

C223-05
IDENTIFICATION LABEL
Pack of 250 labels

C233-05

C231N1
POLYSTYRENE CUBE MOULD 150 MM, ONE GANG

This cube mould, polystyrene made, is utilized for only one test, because it must be broken when the specimen is demoulded.
It gives different advantages:
- it is provided of a top cover keeping inside heat and humidity constant and acting as a curing room
- it protects the specimen as a packing during trasnsport of the same
- it is extremely light
- any trouble concerning the cleaning, demoulding and maintenance of the mould are eliminated.

Pack of 45 pieces.

C231NI

STEEL CUBE, CYLINDER AND BEAM MOULDS

Nominal moulds dimensions meet to requirements of
STANDARDS: EN 12390-1 I BS 1881:108 I ASTM C192, C39 I AASHTO T23, T126 I NF P18-400

STEEL CUBE AND BEAM MOULDS

These models of steel cube and beams moulds are extremely sturdy and the inside surfaces are accurately machined.
Nominal dimensions meet to EN 12390-1 requirements.

Cube Mould	Dimensions	Gang	Weight
C247	100 mm side	1 gang.	6 kg
C247-01	150 mm side	1 gang.	13 kg
C247-02	200 mm side	1 gang.	25 kg
C247-03	300 mm side	1 gang.	90 kg
C248	100 mm side	2 gangs.	11 kg
C248-01	150 mm side	2 gangs.	30 kg
C248-02	200 mm side	2 gangs.	45 kg
C248-03	100 mm side	3 gangs.	17 kg
C248-04	140 mm side	3 gangs.	30 kg
C248-05	150 mm side	3 gangs.	38 kg
C249	100 mm side	4 gangs.	20 kg
C249-01	150 mm side	4 gangs.	45 kg

C247...C249-01

Beam Mould	Dimensions	Weight
C254	100x100x400 mm	20 kg
C254-01	100x100x500 mm	23 kg
C254-02	150x150x600 mm	44 kg
C254-03	150x150x750 mm	47 kg
C254-04	200x200x800 mm	86 kg
C254-05	140x140x560 mm	38 kg

C254...C254-05

C230-01

FUNNEL (FILLING HOPPER) for an easier filling of fresh concrete into the cube moulds C247-01, C253-01, C253-03. Stainless steel sheet made.

C230-01

STEEL CYLINDER MOULDS

STANDARDS: EN 12390-1 I ASTM C39, C192
AASHTO T23, T126 I NF P18-400
Internal surface, base, top and bottom ring are accurately machined.

Models	Dimensions Ø x height	Weight
C258	100x200 mm	8 kg
C258-01	112.8x220 mm	8 kg
C258-02	150x300 mm	15 kg
C258-03	6" x 12"	15 kg
C258-04	159.6x320 mm	17 kg
C258-04 CO	159.6x320 mm fast clamping	18 kg
C258-05	250x500 mm	80 kg
C258-06	150x150 mm	10 kg

C258...C258-06

C258-04CO

CAST IRON SPLIT CYLINDER MOULDS

Cast iron made, heavy duty, they are checked in the shape, dimensions and tolerance with instruments certified by an Official Institute. Foreseen with fast clamping system with inbuilt revolving screws. They are easy to use with practical and fast demoulding; recommended for field use. Complete with base, clamp type.

MODELS

C259-05
CAST IRON SPLIT MOULD, to produce a Cylinder Specimen
Ø 150x300 mm
STANDARDS: EN 12390-1 | ASTM C39 | AASHTO T23, T126

Weight: 10 kg approx.

C259-06
CAST IRON SPLIT MOULD, to produce a Cylinder Specimen
Ø 160x320 mm
STANDARD: NF P18-400

Weight: 11.2 kg approx.

C259-05 **C259-06**

C253 **C253-01** **C253-06**

NEW

C180-02...V195

C302-02

CAST IRON CUBE MOULDS, ONE GANG

These moulds are checked in the shape, dimensions and tolerance with instruments certified and have a Serial Number marked on each side.
Complete with base plate, clamp type.

Two models are available:
- four part wall equal design
- two part wall "V" shaped

C253-01

C253

C253-03 Disassembled

C253 Disassembled

Models	Description	Weight kg
C253	Cube Mould 100 mm **four part**	8.3
C253-01	Cube Mould 150 mm **four part**	15.5
C253-02	Cube Mould 100 mm **two V shaped part**	8.3
C253-03	Cube Mould 150 mm **two V shaped part**	15.5
C253-06	Cube Mould 200 mm **four part**	27.0

ACCESSORIES FOR MOULDS

C180-02 TAMPING ROD, Ø 16 mm x 610 mm long.
C261 TAMPING BAR, 25 mm square area x 380 mm long.
C262 STRAIGHT EDGE, 460 mm long.
V178-01 WIRE BRUSH, used to clean moulds.
C265N DEMOULDING OIL. Can of 10 litres
C302-02 GRASPING PLIER for cube specimens, side 15 cm NEW
V184-01 ROUND ALUMINIUM SCOOP 1000 ml capacity
V187 TROWEL STAINLESS STEEL 120x260 mm
V195 RUBBER MALLET, head Ø 55 mm
V182 MIXING TRAY, galvanized 600x600x80 mm

VIBRATING TABLES

STANDARDS: EN 12390-2 | BS 1881:108

Used for the compaction of concrete specimens in laboratory, they are manufactured from rugged steel sheet.
Equipped with motor-vibrator having 3000 vibrations-minute, it is possible to vary the vibration intensity by acting on the excentric masses.
The height of the table is 410 mm.
All the vibrating tables accept the clamping device, pedal swith or control panel (see accessories).

Power supply: 230V 1ph 50Hz

Models	Table dimensions mm	Power W	Weight kg	*Clamping device
C278	600x400	180	60	C281-01
C278-01	800x400	180	85	C281-02
C278-02	800x800	180	115	C281-03
C279	1100x550	180	145	C281-04

* The clamping device is used to fix the moulds to the table during the vibrating action.

C278 with moulds **C253-01**

C279

C281N

PORTABLE VIBRATING TABLES

Similar to the above Vibrating Tables, suitable for site and laboratory use, they accept ONE GANG cube moulds (max. 200 mm side) or cylinders max. 160x320 mm, both plastic and metal made.

Table dimensions: 400x300 mm, height 200 mm
Weight: 16 kg approx.

MODELS

C281N
VIBRATING TABLE, PORTABLE, 12V DC

Suitable for site use, where no electric supply is available.
Lightweight and small sized, it can be handled by one person and easily stored in the car trunk.
Supplied complete with On/Off switch and connector for the vehicle cigar lighter, and elastic bands to fix the mould to the table.

C282

C282
VIBRATING TABLE

Similar to mod. C281N, but for laboratory use

Power supply:
230V 1ph 50Hz 110W

C282

ACCESSORIES FOR VIBRATING TABLES

C279-04 PEDAL SWITCH, water tight. It can be fixed to the table **only as an alternative** to the Control Panel mod. C279-02

C279-02 CONTROL PANEL, separate, complete with On/Off switch and timer, getting also the tables to CE Safety Directive. It cannot be used with the table mod. C281N

C281-05 CLAMPING DEVICE, to fix the mould to the table, suitable **only** for tables mod. C281N and C282. Alternative solution to the elastic bands. Recommended for the laboratory table C282

C279-01 MOTOR-VIBRATOR, additional, (only for table mod. C279) to obtain an unidirectional vibration and a vibrating power of 300 kg of mass.

POKER VIBRATORS

STANDARDS: EN 12390-2 | ASTM C31, C192 | AASHTO T23, T126
Suitable for the internal compaction of concrete specimens both in laboratory and in site.

The diameter of the needle must not exceed the 25% of the smallest dimension of the specimen.

Different models available: electric, petrol, battery operated.

C271N

POKER VIBRATOR, portable, petrol operated.
Honda motor, 4-stroke, 1.6HP, 35,8cc
Tip dimensions: Ø 25 mm by 250 mm long.
Flexible shaft: 2 metres long.
Frequency: 10000 vibrations/min.
Supplied complete with knapsack.

Weight: 7 kg approx.

C271N

C272 NEW

POKER VIBRATOR, portable, electric.
Tip dimensions: Ø 25 mm by 290 mm long.
Flexible shaft 2 meters long.
Frequency: 12000 vibr./minute.
Amplitude: 0.65 mm
Centrifugal force: 0.8 kN (80 kg)

Power supply: 230V 1ph 50/60Hz 2300W
Dimensions: 180x350x220 mm approx.
Weight: 9 kg approx.

C272

SPARES

C272-10 TIP, Ø 25 mm by 290 mm long, complete with flexible shaft 2 metres long, for the vibrator mod. C272.

C271-10N TIP, Ø 25 mm by 250 mm long, complete with flexible shaft 2 metres long, for the vibrator C271N

C274M-KIT

C274M-KIT NEW

POKER VIBRATOR, battery operated, original Makita,
Tip dimensions: Ø 25 mm by 250 mm long.
Flexible shaft: 800 mm long
Frequency: 13000 vibr./minute
Battery power: 18V 3.0Ah
Supplied complete with rechargeable battery and battery charger, original Makita.

Weight: 3 kg approx.

ACCESSORY

C274-03M CARRYNG CASE for Makita vibrator and accessories.

SPARES

C274M Poker Vibrator, **without** battery and charger.
C274-01M Battery Charger, original Makita.
C274-02M Rechargeable battery, original Makita.

CURING TANKS FOR CONCRETE SPECIMENS

STANDARDS: EN 12390-2 I ASTM C31, C192 I AASHTO T23

C302 KIT
CURING TANK 650 LITRES CAPACITY

HEAVY PLASTIC

Made from extremely robust and stable polyethylene, complete with base rack.
Supplied **without** thermostat heating system, to be ordered separately (see accessories).

Inside dimensions: 1040x1040x605 mm
Weight: 60 kg approx.

C302-10 KIT
CURING TANK, 550 LITRES CAPACITY

HEAVY PLASTIC

Same to mod C302 KIT but having:
Water discharge cock incorporated into the tank

Inside dimensions: 1100x710x690 mm
Overall dimensions: 1200x80x850 mm
Weight: 55 kg approx.

C304
CURING TANK 1000 LITRES CAPACITY

Made from steel sheet, zinc coated to prevent it from corrosion.
Complete with base rack and stopper for an easy water discharge.
Supplied **without** thermostat heating system, to be ordered separately (see accessories).
The tank can accommodate up to 64 cubes 150mm side, or up to 48 cubes 200mm side.

Inside dimensions: 1500x750x750 mm
Weight: 120 kg approx.

NEEDED ACCESSORY

Available in two versions:

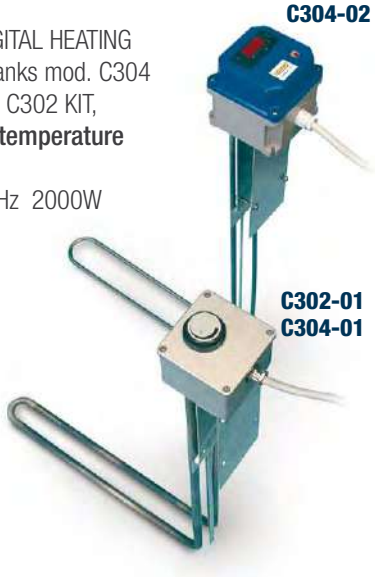
C302-01 THERMOSTAT ANALOGIC HEATING SYSTEM, for the tank mod. C302 KIT
230V 1ph 50-60Hz 2000W

C304-01 THERMOSTAT ANALOGIC HEATING SYSTEM, for the tanks mod. C302-10 KIT and C304
230V 1ph 50-60Hz 2000W

AS AN ALTERNATIVE

C304-02 THERMOSTAT DIGITAL HEATING SYSTEM for the tanks mod. C304 C302-10 KIT and C302 KIT, **ensuring better temperature accuracy**
230V 1ph 50-60Hz 2000W

C304-02 Detail



ACCESSORIES FOR CURING TANKS

C305-01 PLASTIC COVER for the C302 KIT tank
C302-11 PLASTIC COVER for the C302-10 KIT tank
C306-04 STEEL ZINC COATED COVER for the C304 tank
C306-01 UPPER RACK for the C304 tank to store cubes max.150 mm Max. 8 racks per tank

C306-02 SUBMERSIBLE WATER CIRCULATING PUMP, also used for an easy water discharge from the tank 230V 1ph 50/60Hz

C306-03 SEPARATE CONTROL PANEL, complete with switch and electric protections, to get the tanks to CE Safety Directive

C306-05
ANALOGIC THERMOSTAT

Complete with heating element. Used to thermostatise any type of tank from 300 to 1000 litres capacity.

Power supply:
230V 1ph 50-60Hz 2000W

E141
WATER REFRIGERATOR

It cools the water from room temperature up to +10 °C. It is connected to the tank where a lower temperature than the room one is required. See Section “E” Cement, p. 411

C307
ACCELERATED CONCRETE CURING TANK

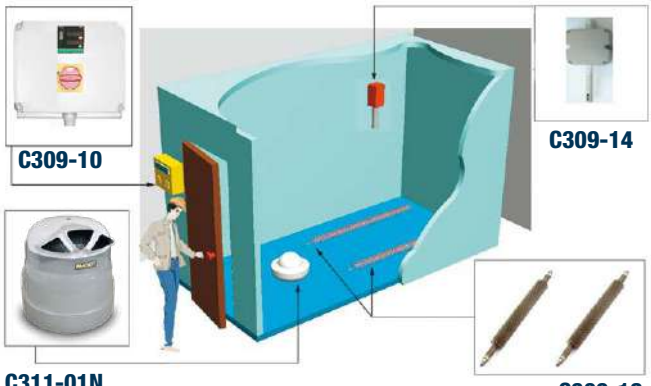
STANDARDS: ASTM C684 | BS 1881:112

This tank has been designed for accelerated concrete strength curing. It comprises a fully insulated double wall tank with cover, inside all from stainless steel, outside from steel painted sheet with an intermediate layer of insulating mineral wool.
This tank can hold up to 16 cubic 150 mm side specimens; or 16 cylindrical Ø 150 mm specimens; or 8 cubic 200 mm side specimens.
The test consists essentially in curing the concrete specimens with water heated by 3 electric elements of 1500W each.
Temperature range: from ambient to 100 °C.
The separate control panel is provided with a thermoregulator, timer, pilot lights, main switch.

Inside dimensions: 910x660x680 mm
Overall dimensions: 970x720x900 mm
Power supply: 230V 1ph 50-60 Hz 4500W
Weight: 130 kg approx.

EQUIPMENT TO PREPARE A TEMPERATURE AND HUMIDITY CONTROLLED ROOM

The following equipment are suggested as alternative to the curing tanks and climatic chambers indicated in this catalogue or by necessity of a wide area for curing a big quantity of specimens. They are suitable to prepare an already existing room/box or one to be realized by the customer. The temperature of the room can be only increased compared to the external temperature but not decreased.



Example how to prepare a curing room

NEEDED DEVICES

C309-10 CONTROL PANEL of temperature and humidity.
It is usually placed on the outer side of the room, and allows to set, display and control the desired parameters of temperature and humidity.
Power supply: 230V 1F 50-60Hz
Dimensions: 240x130x310 mm **Weight:** 5 kg

C309-12 HEATING RESISTANCE in tubular frame, finned type. Normally one heating resistance is enough for its purpose, provided that the range between the external and internal temperature set in the room (anyway well insulated) is kept within 15 °C.
Dimensions: Ø 40x1100 mm **Weight:** 2000 g approx.

C309-14 SENSOR PROBE to measure temperature and humidity. Temperature measuring range from -10 to +90 °C and humidity up to 100%. It is fixed inside the room and connected to the control panel.

C311-01N VAPORISER
Used to humidify curing rooms up to 80 cubic/metre.
Technical data: see p. 350

CLIMATIC CABINETS

NEW

The climatic cabinet is available in two versions:

- **C313N** Temperature and humidity controlled from -30 to +70 °C and 20% to 95% respectively for testing concrete, cement, aggregates and many other applications.
- **C316N** Only temperature controlled from -30 to +70 °C for the determinations of the behavior and resultance to freezing and thawing of aggregates and different other applications on concrete and building materials.

MAIN FEATURES

- Real-Time display of temperature and humidity parameters.
- High quality thermal insulation material.
- Temperature control from -30 to +70 °C with high stability (± 0.15 °C).
- Humidity control from 20% to 95% with ± 5% stability and ± 1% accuracy (within temperature +10 to +70 °C).

C313N
TEMPERATURE AND HUMIDITY CONTROLLED CABINET 535 LITRES CAPACITY

STANDARDS: EN 196-1, EN 1367-1, EN 12390-9

Designed for all research and control laboratories to perform: cold and/or hot temperature measurement at controlled humidity conditions, any kind of freezing/thawing tests and accelerated curing tests. Used to cure concrete and cement specimens and analyze the behavior to freezing and thawing of aggregates and concrete.
Internal and external frame is made of stainless steel AISI 304.
Polyurethane insulation: 60 mm thick.
Internal ventilation.
Door with 180° opening angle, equipped magnetic gasket and integrated heater against freezing.
Shelves can be taken off and adjustable in height; adjustable feet.
Temperature and humidity sensors wall mounted inside cabinet
The cabinet is supplied with a **two stage filter**; mechanic and mixed ionic/cationic resins. It works with demineralized, softened waters, or tap water with hardness rate up to 300 PPM assuring an excellent functioning along the time.
Equipped with microprocessor temperature/humidity controller with integrated cycles multiple segments programmer.

- panel mount 144×130 mm format
- 5" color graphic display
- 50 programs with 100 segments and real time clock
- Logging function with PC interface (optional)

Visual alarm for minimum and maximum temperature
Supplied complete with 3 adjustable shelves suitable to withstand weights up to 40 kg

Inside dimensions: 590x670x1360 mm
Overall dimensions: 710x820x2080 mm
Power supply: 230V 1ph 50-60Hz 2570W
Weight: 170 kg approx.

C313N

C313-01N
TEMPERATURE AND HUMIDITY CONTROLLED CABINET 1200 LITRES CAPACITY

Same as C313N model, but with an internal capacity of 1200 liters.
Internal ventilation. Door with 180° opening angle, equipped magnetic gasket and integrated heater against freezing.
Shelves can be taken off and adjustable in height; adjustable feet.
Temperature and humidity sensors wall mounted inside cabinet
Visual alarm for minimum and maximum temperature
Supplied complete with 6 adjustable shelves suitable to suitable to withstand weights up to 40 kg.

Inside dimensions: 1300x670x1360 mm
Overall dimensions: 1500x820x2080 mm
Power supply: 230V 1ph 50-60Hz 2900W
Weight: 230 kg approx.

Note:
as far the C313N and C313-01N performances, the humidity range indicated in the product description may be narrower vs. the given interval depending on the selected temperature. Please contact our sales team to investigate the suitability for your requirements.

C316N
TEMPERATURE CONTROLLED CABINET
535 LITRES CAPACITY
STANDARDS: EN 1367-1

Technical specifications:
Same as mod. C313N, except for the humidity control that is not included.

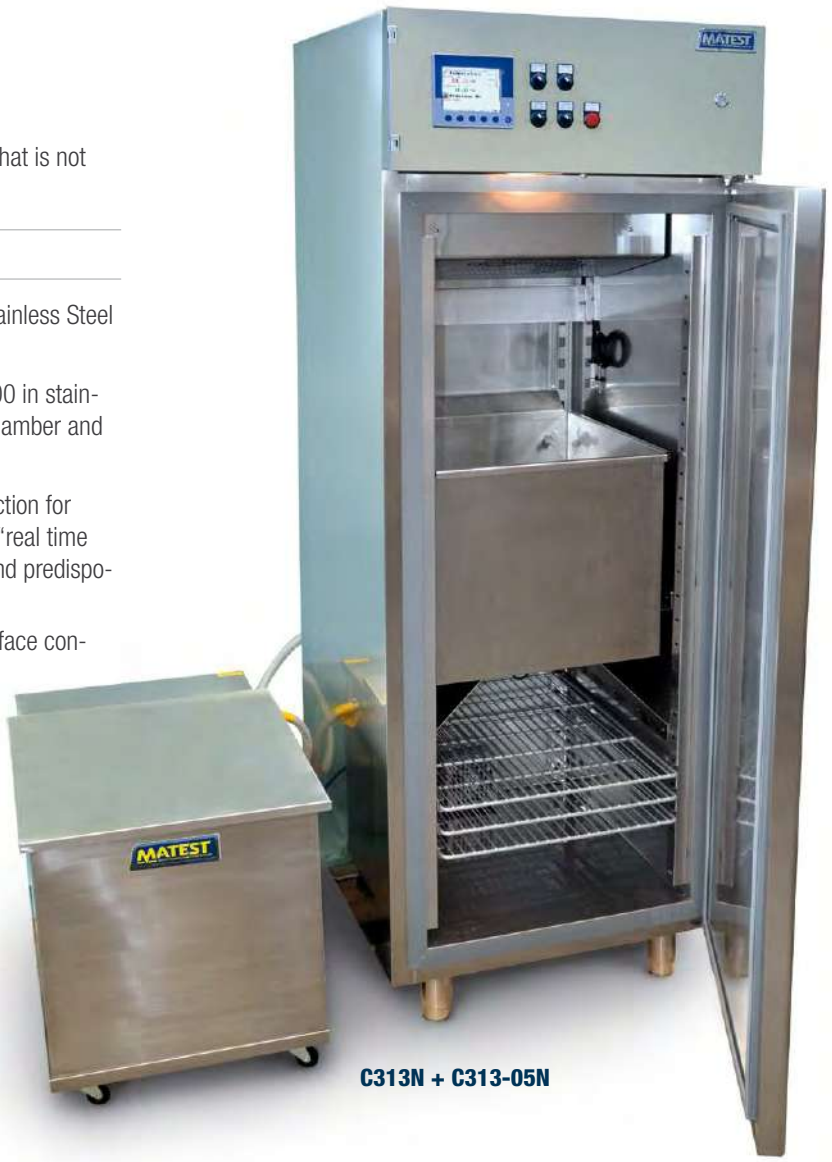
ACCESSORIES

C313-11N ADDITIONAL BASKET SHELVE : Made of Stainless Steel grid, suitable for loads up to 40 Kg.

C313-12N MOBILE TEMPERATURE PROBE: Type PT100 in stainless steel bulb for free positioning in the chamber and on the specimen.

C313-13N LOGGING FUNCTION: Logging upgrade function for on-board Jumo controller with enabling of “real time trend” and “Historical trend” of variables and predisposition of PC interface.

C313-15N PC INTERFACE: Consist of Cables, PC interface converter and Jumo software for editing and real-time view.



C313N + C313-05N

ADHESIVES FOR TILES NEW
DETERMINATION OF TENSILE ADHESION STRENGTH FOR CEMENTITIOUS ADHESIVES
STANDARDS: EN 1348 | EN 12004

C313-05N
INTERNAL FLOODING SYSTEM

Applicable only to temperature and humidity controlled cabinets C313N, C313-01N.
Used for the determination of tensile adhesion strength for cementitious adhesives.
It is composed of two stainless steel vessels and a discharging system for the water.
The system allows to empty and fill the inner vessel with water without opening the climatic cabinet.
Inner vessel water level is limited by a sensor.
Filling and drainage of water are regulated by a valve positioned on the bottom of both vessels.
Inner vessel volume is 150 l, while outer vessel volume is 170 l.
Water temperature range is from 10 °C to 40 °C, demineralized water must be used.
Temperature stability: ± 2 °C
Water pressure range is from 0.2 to 5 bar.
Flooding system can be installed also in C313N already supplied if returned in Matest factory.
System must work with no organic compounds.

Outer vessel dimensions:
816x588x600 mm
Weight: 50 kg approx.

Control panel


Two stage filter

UNBONDED CAPPING PADS AND RETAINERS

STANDARDS: ASTM C1231 I AASHTO T22, T851

Used for compression tests on concrete cylinder specimens, as an alternative method to the sulphur capping and grinding machine.
Two steel capping retainers are applied on the two flat surfaces of the cylinder.
Two neoprene pads are put between them, for a better load distribution.
The neoprene pads are available in two models:
- 60 shore hardness pads for expected strength from 10 to 48 MPa
- 70 shore hardness pads for expected strength over 48 MPa
The system is not applicable for expected strength lower than 10 Mpa
The couple of retainers + neoprene pads have a total thickness of 46 mm. Therefore the testing chamber of the press must have more vertical clearance than the height of the specimen + 46 mm.

MODELS

C107-09 CAPPING RETAINERS (couple) for Ø 100x200 mm cylinders.

C107-10 CAPPING RETAINERS (couple) for Ø 150x300 mm and 6x12" cylinders.

C107-12 CAPPING RETAINERS (couple) for Ø 160x320 mm cylinders

C107-18 NEOPRENE PADS (couple) 60 shore A for Ø 100x200 mm cylinders

C107-19 NEOPRENE PADS (couple) 70 shore A for Ø 100x200 mm cylinders

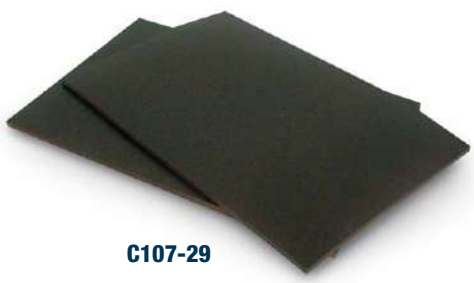
C107-20 NEOPRENE PADS (couple) 60 shore for Ø 150x300 mm and 6"x12" cylinders

C107-21 NEOPRENE PADS (couple) 70 shore for Ø 150x300 mm and 6"x12" cylinders

C107-25 NEOPRENE PADS (couple) 60 shore for Ø 160x320 mm cylinders

C107-26 NEOPRENE PADS (couple) 70 shore for Ø 160x320 mm cylinders

C107-29 NEOPRENE SHEET (couple) 60 shore A dimensions: 600x400x12 mm for test on blocks.



C107-29

Pads + Retainers
+ Specimen configuration

C107-12

C107-10

C107-20

C312-02
CURING ROOM VAPORISER UP TO 280 M³

Same as mod. C311-01N, but more powerful for rooms up to 280 cubic/metre capacity.
Supplied complete of **level regulator** with antioverflow, that allows the direct connection to the water net, for a continuous use of the vaporiser.

Power supply: 230V 1ph 50 Hz
Dimensions: Ø 420x350 mm
Weight: 8 kg approx.

C312-02

C311-01N

C312-10

C311-01N
CURING ROOM VAPORISER UP TO 80 M³

Used to humidify curing rooms for concrete and mortar specimens.
Max. room capacity: 80 cubic/metre.
Supplied complete of **level regulator** with antioverflow, that allows the direct connection to the water net, for a continuous use of the vaporiser.

Power supply: 230V 1ph 50 Hz
Dimensions: Ø 430x420 mm
Weight: 6.9 kg approx.

ACCESSORY FOR MOD. C311-01N, C312-02

C312-10 HUMIDISTAT to automatically control the room humidity, range 30...100 %

SPARE

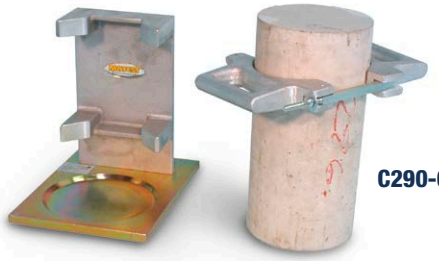
C312-11 Level regulator, complete of antioverflow.

CYLINDER CAPPING EQUIPMENT

SULPHUR METHOD

STANDARDS: EN 12390-3 | ASTM C617, C31, C192 | AASHTO T231, T126 | NF P18-416

The above mentioned Specifications require that the two faces of the concrete core or cylinder specimen must be made perfectly flat and parallel, by using sulphur capping equipment.



C290-01 **C290-02**

CYLINDER CAPPERS

To obtain plane end surfaces perpendicular to the axis of the cylinder.

Model	Cylinder Ø x h	Weight kg
C290-01N	150x300 mm, 6”x12”	9.5
C291-01	160x320 mm	6
C292-01N	100x200 mm	6.3
C294-01	250x500 mm	41
C294-05	60x120 mm	1.5
C294-05SP	50x100 mm	3.5

C290-02
CYLINDER CARRIER, for Ø 150x300 mm, 160x320 mm and 6”x 12”. For an easier handling of the specimens.

Weight: 1.4 kg

C294-02
CYLINDER CARRIER for Ø 250x500 mm

MELTING POT FOR CAPPING COMPOUND.

Used to melt the sulphur capping compound. Complete with thermoregulator. Suitable also for general laborataory purposes.

A106N
MELTING POT, capacity: 5 litres
Temperature range: +50 to +350 °C.
accuracy: ± 1.5 °C.
Complete with pilot lamp, fully isolated to CE Safety Directive. Internal dimensions: Ø 200x160 mm
230V 1ph 50-60Hz 800W.

Weight: 3 kg approx.

A106N

V186-01

C290-06
SULPHUR MORTAR CAPPING COMPOUND, ultra-thin flakes.
The compressive strength after 2 hours is greater than 8000 psi.
Melting point is 115 to 143 °C (ideal 130 °C)
Bag of 22.5 kg (50 lbs)

V186-01
LADLE, stainless steel made.

C290-06

C296
STEEL CAPPING PLATE, used for capping concrete blocks up to 500x300 mm.
The plate surface is accurately machined.

Dimensions: 500x300x20 mm
Weight: 30 kg approx.

GYPSUM METHOD NEW

STANDARDS: ASTM C31, C39, C192, C617| AASHTO T231

As an alternative to the sulphur method, the above mentioned standards allow to use high strength gypsum paste. The application of this capping compound requires an easier and faster procedure which doesn’t develop any harmful substances.

C290-05
HIGH STRENGTH GYPSUM CAPPING COMPOUND
The compressive strength after
30 minutes is greater than 8000 psi.
Water/gypsum ratio: 17-18%
Bag of 25 kg (55 lbs)

C290-05

ACCESSORIES

C290-15 Glass plate 200x200x8 mm for levelling

C290-16 Bubble level

C290-15 | C290-16

C299
AUTOMATIC SPECIMEN GRINDING MACHINE

STANDARDS: EN 12390-2 | ASTM D4543 | UNI 6132

Designed to grind and polish concrete cube and cylinder specimens, blocks, natural stones, rocks, ceramic materials etc.
Specimens are easily fixed to the table by proper locking stirrups (see accessories) allowing to grind at a time:
- n° 3 cube specimens 100 mm side, or
- n° 3 cube specimens 150 mm side, or
- n° 2 cube specimens 200 mm side, or
- n° 2 cylinder specimens Ø 100x200, 110x220, 150x300, 160x320 mm, or
- n° 1 block with max. dimensions 390x250 mm

The radial mouvement of the head is equipped with end of stroke system, granting the fully automatic displacament in both directions.
The column is completely protected against the abrasive dust.
The vertical lowering of the grinding head is achieved with infinitesimal adjustments by operating on the top handwheel having 0.05 mm graduations.
The machine, made from rugged plate, is supplied complete with control panel, coolant/decantation tank (by water and emulsifying oil), motor pump, set of abrasive sectors, safety chip guard that when removed, stops automatically the machine.

The standard supply **does not include** the locking stirrups and the diamond sectors (8 pieces) that must be ordered separately (see accessories).

C299 with **C300-06N** holding one 150 mm cube

MAIN FEATURES

- Designed for grinding concrete cube and cylinder specimens, blocks, natural stones, rocks etc.
- Simultaneous grinding of many specimens.
- Motorized radial displacement of the revolving abrasive head in both directions.
- Automatic mouvements of the head in both directions and controlled by travel limit switches.

NEEDED ACCESSORIES

C300-06N LOCKING STIRRUPS for cube specimens side 100, 150, 200 mm complete with distance piece 85 mm high.

AS AN ALTERNATIVE

C299-10
FAST LOCKING DEVICE, for:
cubes 150 and 200 mm;
cylinders Ø 100 to 160 mm
Each device accepts only one specimen.
It is possible to grind at a time:
1 cube 200 mm;
2 cubes 150 mm;
2 cylinders.


C299-10

C300-02 DIAMOND GRINDING SECTOR (8 pieces required) **particularly recommended** because of their long duration and good grinding action.


C300-02

TECHNICAL SPECIFICATIONS

Table dimensions:	775x280 mm (usefull: 750x235 mm)
Grinding wheel Ø:	330 mm
Vertical span width:	min. 175 mm (95 mm with the distance piece) max. 380 mm
Grinding height range:	95...380 mm
Grinding head stroke:	215 mm
Grinding wheel speed:	1400 rpm.
Power supply:	400V 3ph 50Hz 2700W
Dimensions:	1220x1080x1730 mm
Weight:	410 kg approx.

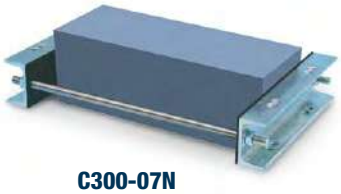
ACCESSORIES

C300-03 LOCKING STIRRUPS for cylinder specimens Ø 100, 110, 150, 160 mm. They can be used only in conjunction with the C300-06N stirrups.

C300-03SP LOCKING STIRRUPS for cylinder specimens Ø 50 to 100 mm, minimum height 95 mm.
They can be used only in conjunction with the C300-06N stirrups.

C300-05N LOCKING STIRRUPS for cube specimens side 50 mm to 70 mm. They must be used only in conjunction with the C300-06N stirrups.

C300-07N LOCKING STIRRUPS to grind blocks of different sizes, but with max. dimensions of 390x250 mm.



C300-07N

C300-08 CORE FACE PREPARATION DEVICE
It prepares parallel and flat core faces or rock samples.
The device accepts up to 4 core samples from Ø 20 to 55 mm and can be mounted on most grinding machines.

Weight: 7 kg approx

C300-08

C300-05N

C300-09N DEVICE to collect the produced powder during the drying grinding procedure.
The device must be connected to an aspirator (not included).
The four collecting pipes have a max. extension of 3 meters (different extensions on request).
The terminal diameter of the device is: 160 mm

Weight: 15 kg approx.

C300-01 ABRASIVE GRINDING SECTORS, spare, set of 8 pieces.

NEW

C300-09N

C299 with **C300-06N** holding 3 cubes 150 mm

C377
MICRO-CORING EQUIPMENT

STANDARD: UNI 10766

The extraction of a micro-core sample from a concrete structure or masonry is an extremely valid non-destructive method, as it allows analysis and accurate evaluations of the manufacture (compression resistance, ecc.) without causing any damages to the structure, considering the dimension of the hole that can be eventually clogged with mortar.
Micro-coring system is additionally valid and reliable if combined with ultrasonic tester and concrete hammer.
Micro-core extraction is easy and requires the presence of one operator only.
The equipment comprises:
- Suitable electric drill. 230V 1F 50Hz
- Flanged guide assembly
- Drilling mask
- Impregnated diamond bit for cores with Ø 28x100 mm
- Impregnated diamond bit for cores with Ø 28x200 mm
- 2 Self-blocking pincers to fit the flanged guide assembly to the surface

Set of accessories including: anchors, bits, wrenches, screws.
Carrying case.

Dimensions: 550x400x200 mm approx.
Weight: 10 kg approx.

C377

C377-01

C377-05
TRIMMING/CUT-OFF MACHINE FOR CORES

Suitable to cut and trim cores to be prepared for compression tests, where the flatness of both surfaces is a basic condition to obtain correct results.
The equipment is made of stainless steel and aluminum and is supplied complete with diamond blade Ø 180 mm.
For this purpose it must be used the drill mod. C377-10 (enclosed into micro-coring equipment) and the water tank with foot pump mod. C377-01.

C377-05

Note:
The maximum values foreseen for compression tests on micro-cores are usually lower than 60 kN. Portable compression machine mod. C094N (see p. 323), or a cement compression tester (see p. 418) may be conveniently used.
Trimming of cores may be even obtained with the grinding machine mod. C299 + device mod. C300-08 (see p. 352)

C377-02

ACCESSORIES

C377-01 WATER TANK WITH FOOT PUMP, that leaves the hands of the operators free for coring

AS ALTERNATIVE:

C377-02 AIR-WATER PRESSURE TANK, 10 liters capacity

SPARES

C377-10 ELECTRIC DRILL, suitable for the microcoring purposes.

C377-15 DIAMOND BIT, Ø 28x100 mm

C377-16 DIAMOND BIT, Ø 28x200 mm

CORE DRILLING MACHINES LIGHTWEIGHT, PORTABLE

These drilling machines are extremely practical, lightweight and easy to use.
The base is from aluminium alloy, the steel column can be tilted up to 45°, the motor support is fixed on a saddle sliding on teflon runner granting high performances. The motor incorporates a water swivel to cool the diamond bit.
The machine is supplied complete, **except** for: diamond bit, spanner, core extractor (see accessories p. 357) to be ordered separately.

C318N
CORE DRILLING MACHINE, ELECTRIC MOTOR

Electric motor at three speeds: 530, 1280, 1780 rpm, with speed reducer, provided of multifunction electronic friction device and switch to CE Safety Directive.
The machine accepts bits diameters from 50 to 150 mm

Power supply: 230V 1ph 50-60Hz 2200W
Dimensions: 600x320x1020 mm
Weight: 24 kg approx.

C318N tilted

C318N

C324N
ELECTRIC CORE DRILLING MACHINE WITH VACUUM FACILITY

The frame and the electric motor are the same as mod. C318N.
The machine is supplied complete with lubricated vacuum pump and pressure accumulation reservoir, which is very useful because it maintains for some times a valid vacuum level also with electric blackout, by avoiding the fall or disconnection of the unit from the wall.
The pump is connected to the utility by means of a ball tap to which a vacuum gage is fitted, that constantly indicates the pressure inside the tank.
Coring angle: 0 to 360° under the condition that the surface is sufficiently flat, and not too porous, to allow the vacuum attachment.

Power supply: 230V 1ph 50-60Hz 2200W
Dimensions: 600x320x1020 mm + pump
Weight: 24 kg + pump 15 kg approx.

C324N

C332 PORTABLE ELECTRIC GENERATOR
To use with electrically driven machines where electrical power is not available. The generator is rated at 4000 Watt and supplies: 230V 1ph 50Hz.
Complete with tank, accessories.

Weight: 60 kg approx.

C332

ACCESSORY

C318-10 WATER COLLECTING RING, confining waste water on the surface, for machine mod. C318N and C324N.
It has to be connected to a suitable electric pump.

C318-10

CORE DRILLING MACHINES HIGH PERFORMANCE

These drilling machines are extremely robust, heavy duty, compact and reliable.
The sliding group is rectified in order to assure a very soft and accurate drilling movement.
The drilling excursion is 550 mm and the machine can drill cores up to 200 mm of diameter.
Built in water swivel to cool the diamond bit.
The robust steel base is equipped with wheels for easy site displacements, together with four levelling and stabilizing feet.
All working and moving parts are cadmium plated for rust protection.
The machine is supplied complete **except** for: diamond bit, core extractor and spanner (see accessories) which have to be ordered separately.

MODELS

C319
PAVEMENT CORE DRILLING MACHINE 5HP
4-STROKE PETROL ENGINE

This rugged, compact and portable machine with vertical screw feed, is used for pavement core sampling where it is not easy to get electrical power.
Petrol engine 5 HP power, 4-stroke Briggs & Stratton model.

Dimensions: 850x580x1230 mm
Weight: 135 kg approx.

MAIN FEATURES

- Original Briggs & Stratton motor.
- It can drill cores up to Ø 200 mm.
- Vertical rectified screw feed.
- Built in water swivel to cool the bit.
- Rugged, compact, wheels mounted.

C319-02

C319-02
PAVEMENT CORE DRILLING MACHINE 12.5 HP
4-STROKE PETROL ENGINE

Same as mod. C319, but activated by a petrol engine 12.5 HP power 4-stroke Briggs & Stratton model.

Weight: 150 kg approx.

C319

SPARES

C331 Petrol engine, for C319 machine 5 HP power, 4-stroke Briggs & Stratton model. Supplied complete with tank, accessories Weight: 20 kg approx.

C331-02 Petrol engine for the C319-02 drilling machine. 12.5 HP power, 4-stroke Briggs & Stratton model. Supplied complete with tank, accessories. Weight: 25 kg approx.

C322
UNIVERSAL ELECTRIC CORE DRILLING MACHINE

Coring angle: 0 to 360°
The excursion group is rectified to assure a very soft and accurate drilling movement. The excursion is 550 mm.
Electric motor at three speeds: 670, 1140, 1580 rpm with speed reducer, provided of friction device and switch to CE Safety Directive.
The height of the vertical column is 1000 mm and is pre-built for extension column connection (accessory mod. C322-01).

Power supply: 230V 1ph 50-60Hz 2200W
Dimensions: 440x750x1300 mm
Weight: 85 kg approx.

C322

ACCESSORY

C322-01 EXTENSION COLUMN, 1000 mm long, to connect to mod. C322 for drillings over 1 metre from the ground.

DIAMOND CORE DRILL BITS
WITH BACKEND SCREWED CONNECTOR

Designed for making holes and getting cores from hard materials, like concrete, reinforced concrete, rocks, stones, bituminous materials.
The diamond utilized for these bits is quality impregnated sinterized type.
The diamond segment is **9 mm high**. The 9 mm high segment is important for the bit life, because the diamond is about 85% of the bit value.
The coupling between the bit and the motor shaft is direct through the backend screwed connector.
This diamond bit model is suitable to drill both reinforced concrete and also bituminous materials.

C344 Strap wrench useful for unblocking any type of bit.
C344-01 Strap wrench useful for unblocking only the bits with backend screwed connector.
C345 Extension rod 300 mm. long (used for deep holes).

C339-01...C339-05

Note:
Matest can also provide high-performance diamond core drill bits having the same diameter (models with a HP code) but with a quantity of diamonds greater than 50%, to guarantee even faster and more precise drilling, as well as a longer life.

Model	HP Model	Outside Ø mm	Inside Ø mm	Bit length mm	Expander Coupling	Core Extractor
C339-01	C339-01 HP	57	50	450	no	C346
C339-02	C339-02 HP	82	75	450	no	C346-01
C339-03	C339-03 HP	108	100	450	no	C346-02
C339-04	C339-04 HP	160	152	450	no	C346-03
C339-05	C339-05 HP	210	200	500	no	C346-04

C348T
SPECIMEN CUTTING MACHINE

with sliding supports.
The machine accepts blades up to Ø 400 mm
Useful cutting height: 130 mm
Dimensions of the sliding table: 460x400 mm
Blade rotation speed: 2800 rpm
Supplied **without** blade
(see accessories)

Power supply:
230V 1ph 50Hz 3Hp
Dimensions:
1185x660x1400 mm
Weight:
79 kg approx.

C352

C348T

C350T
SPECIMEN CUTTING MACHINE

Used to cut concrete specimens and any type of construction material like blocks, tiles, pipes, rock cores etc. The machine is equipped of an electro-pump for water cooling, pedal guide for vertical cutting, safety device against breakage of blade.
The machine accepts blades up to Ø 450 mm
Useful cutting height: 165 mm
Supplied **without** blade (see accessories)

Power supply: 400V 3ph 50Hz 4Hp
Dimensions: 1330x600x1370 mm
Weight: 128 kg approx.


C352

C350T

C350-01T
SPECIMEN CUTTING MACHINE

Identical to mod. C350T, but with:

Power supply: 230V 1ph 50Hz 3Hp

C349T
SPECIMEN CUTTING MACHINE

Basically similar to mod. C350T, but it can accept blade having max. Ø 600 mm
Useful cutting height:
230 mm with blade Ø 600 mm

Power supply: 400V 3ph 50Hz 5.5Hp

C351
SPECIMEN BENCH CUTTING MACHINE

The machine accepts blades up to Ø 350 mm
Useful cutting height: 120 mm
Blade rotation speed: 3900 rpm
Supplied complete with abrasive blade Ø 350 mm

Power supply: 230V 1ph 50Hz 2000W
Dimensions: 560x460x390 mm
Weight: 20 kg approx.

ACCESSORIES

C350-12 DIAMOND BLADE Ø 450 mm, having long life for a faster and more precise cutting operation. Suitable for models C350T and C350-01T.
C350-13 DIAMOND BLADE, Ø 350 mm for mod. C351
C350-14 DIAMOND BLADE, Ø 400 mm for mod. C348T
C350-17 DIAMOND BLADE, Ø 600 mm for mod. C349T
C350-10 ABRASIVE BLADE Ø 350 mm for mod. C351

Note:
It is recommended to use the blade having the max. diameter accepted by the cutting machine.


C351

C352
DEVICE FOR CYLINDERS AND CORES
To clamp and cut cylinders and cores diameter 100 to 160 mm.
The device is fixed to the table of the cutting machines mod. C348T, C350T, C350-01T, C349T. Weight 10 kg approx.

C352 SP
DEVICE FOR CORES, as above, but Ø 55 to 160 mm.

C353
DEVICE FOR IRREGULAR SHAPES
To clamp and to cut irregular shaped specimens, like rocks, stones etc. The device is fixed to the table of the cutting machine mod. C348T, C350T, C350-01T, C349T.
Weight: 5 kg approx


C353

MECHANICAL STRAIN GAUGES

STANDARDS: ASTM C426 | BS 1881:206

Used to determine the strain (length changes) in concrete specimens and structures, rock strata, different parts of a structure, in remote areas and under adverse conditions, using a single instrument. Different models are available with analogic or digital gauge, 100, 200, 300 mm measuring length, depending on the standard length to be measured. The instrument can also be used for other structures like steel and wood.

The KIT comprises:
- Strain gauge (extensometer) complete with analogic or digital indicator 0.001 mm graduations (see available models)
- Calibration bar used also to fix the datum disc on the structure.
- 50 datum discs.
- Adhesive compound for datum discs.

The whole contained in carrying case.

C361 KIT

MODELS with **analogic gauge** 0.001 mm graduations:

C360 KIT STRAIN GAUGE, **100** mm measuring length.

C360-01 KIT STRAIN GAUGE, **200** mm measuring length.

C361 KIT STRAIN GAUGE, **300** mm measuring length.

C361-01 STRAIN GAUGE, **600** mm measuring length.

C363-01 KIT

C363 KIT

MODELS with **digital gauge**, battery feeded, with reading values in mm (sens. 0.001 mm) and in inch (sens. 0.0001").
Complete with battery and RS232 connector to PC.

C363 KIT STRAIN GAUGE, **300** mm measuring length.

C363-01 KIT STRAIN GAUGE, **100** mm measuring length.

C363-02 KIT STRAIN GAUGE, **200** mm measuring length.

C363-03 STRAIN GAUGE, **600** mm measuring length.

ACCESSORY for C363 serie models

S382-13 CABLE to connect S382-01 and S383 to PC through USB port for direct visualization and recording of the measurement.

SPARES

C362-01 Datum disc (pack of 50)
C362-02 Adhesive compound.

C399
CRACK DETECTION MICROSCOPE

Used to measure crack width in concrete structures, by operating via an adjustable light source.
High definition unit, provided by power batteries, carrying case.
The eyepiece scale can be turned through 360° to align with the direction of the crack under detection.
Measuring range:
4 mm and div. 0.02 mm.
Magnification: x35

Weight: 600 g

C399

FLAT JACKS - TESTS ON BRICKWORKS

DETERMINATION OF RESISTANCE AND DEFORMATION UNDER LOAD
EVALUATION OF TENSILE STRESS
MEASUREMENT OF ELASTIC MODULUS AND BREAKING LOAD

The complete test is developed in two steps:

DETERMINATION OF STATIC LOAD (TENSILE STATUS)
One flat jack is used.
Two datum points are fixed across a mortar joint and the distance between the points is measured.
Successively a horizontal cut is carried out with the suitable tool (drill, cutting saw) level with the mortar layer, and it is measured the variation of the two datum points.
The flat jack must be introduced, it is pressurized in different growing phases and the variation between the datum points is measured, by determining the static load.

DETERMINATION OF DEFORMATION AND RESISTANCE (IN-SITU STRESS)
Two flat jacks are used.
It must be done a second cut, parallel to the first one, level with the mortar layer, having a distance of approximately 50 cm from the first cut.
Another flat jack must be introduced.
Three couples of datum points are placed on the brickwork portion between the two cuts.
Start to pressurize the two flat jacks at growing phases.
The variation of distances of the datum points at different pressure steps allows to delineate a strength-deformation curve, obtaining elastic modulus, Poisson and breaking point values.

C358-01
RECTANGULAR FLAT JACK high deformability, max. pressure 50 bar, dimensions 400x200x4 mm. Steel sheet 0.8 mm thick
Complete with nuts and groins.

C358-11
N° 6 STEEL SHEETS, dimensions 400x200 mm, three pieces 1 mm thick, three pieces 1.5 mm thick

C358-02
SEMI-OVAL FLAT JACK ad high deformability, max. pressure 50 bar, dimensions 350x260x4 mm. Steel sheet 0.8 mm thick.
Complete with nuts and groins.

C358-12
N° 6 STEEL SHEETS, dimensions 350x260 mm, three pieces 1 mm thick, three pieces 1.5 mm thick.

C358-05
STOPCOCK (valve) high pressure complete with fittings, to close the oil flow in the jack and stop the pressure.

LOAD APPLICATION

C358-06 HYDRAULIC HAND PUMP, complete with integral reservoir with oil, to apply pressure to the jacks.

C358-15 Flexible rubber TUBE, 3 meters length, for the connection to one jack.

or:

C358-16 Flexible rubber DOUBLE TUBE, 2 and 3 meters length, for the connection to two jacks.

C358-08 MANOMETER high precision 0 - 60 bar range, with fast jack, to be fixed on the pump to read the applied pressure.

STRAIN MEASUREMENT

C361 KIT STRAIN GAUGE-EXTENSOMETER with mechanical strain gauge, 300 mm length

or:

C363 KIT STRAIN GAUGE-EXTENSOMETER with digital strain gauge, 300 mm length

Other strain gauge models with accessories described in detail at p. 359

C361 KIT

As alternative to the strain gauge, the data acquisition and processing system can be used, with the following equipment:

C358-21

ELECTRONIC EXTENSOMETER, supplied with linear displacement transducer having 10 mm stroke and 0.1% linearity, fitted in a tubular anodized aluminum frame, complete with electrical cable and connector .
Span: 300 mm

Weight: 300 g approx.

Aplication exemples

C358-23N

PRESSURE TRANSDUCER, 50 bar capacity, to be fitted to the hand pump (as alternative to the manometer).
Complete with fast jack to the pump, electrical cable and connector.

C405-15M

CYBER-PLUS 8 PROGRESS TOUCH SCREEN
8 Channels acquisition and processing data system, 24 bit resolution. Electronic advanced technology, **display** LCD, TFT, 800x480 pixels, 7", **touch screen**, high graphic performances, the unit automatically performs test and data processing. A certificate can be printed through an external USB printer (optional).
The Cyber-Plus is equipped with LAN port for connection to PC and with USB port for an unlimited memory storage.
Contained in a practical and sturdy watertight carrying case, can be powered from an electrical network 90-270 V or use the internal battery and charger granting one full day on-site use.
Hardware technical details: see p. 18

S337-51

CALIBRATION process between the electronic extensometer or the pressure transducer to the data acquisition unit C405-15M

C405-15M

C358-21

TESTING OF HARDENED CONCRETE

HYDRAULIC SHRINKAGE DETERMINATION

To measure the axial and/or superficial dimensional shrinkage of concrete specimens during hardening process in a curing room.
STANDARDS: UNI 11307 | UNI 6555 (comparable to ASTM C426)

The specimen is prepared by a mould having dimensions 100x100x500 mm, with aggregates up to 30 mm max. diameter, and after housed in the measuring apparatus that determines the axial shrinkage.
The two UNI Standards require two different systems to prepare the specimen:

- The UNI 11307 requires reference pins to be sticked on the specimen.
- The UNI 6555 requires inserts fixed into the mould and let into the specimen.

EQUIPMENT ACCORDING TO UNI 11307:

C254-01
BEAM MOULD, steel made, to prepare a concrete specimen 100x100x500 mm
Weight: 23 kg approx.

C366-12
REFERENCE PIN, to be sticked in the intersection of the longitudinal axis of the specimen with its bases.
Pack of 10


C366-12

EQUIPMENT ACCORDING TO UNI 6555 (comparable to ASTM C426):

C365
SHRINKAGE MOULD, steel made, complete with inserts, to prepare a concrete beam specimen 100x100x500 mm
Weight: 23 kg approx.

C366-11
INSERTS, stainless steel, spares to C365 mould. Pack of 10

NEEDED ACCESSORIES, ACCORDING TO: UNI 11307 AND UNI 6555

C364 MEASURING APPARATUS, for 100x100x500 specimens, complete with reference bar, but **without** dial gauge to be ordered separately. **Weight:** 23 kg approx.

S375 DIAL GAUGE, 5 mm stroke by 0.001 mm sens.

AS AN ALTERNATIVE:

S376 DIAL GAUGE, 10 mm stroke by 0.01 mm sens.

AS AN ALTERNATIVE:

S382-01 DIGITAL GAUGE indicator, with readings in mm (sens. 0.001 mm) and in inch (sens. 0.0001"), battery feeded. Complete with battery and RS232 connector to PC.

S382-13 CABLE to connect S382-01 and S383 to PC through USB port for direct visualization and recording of the measurement.

DETERMINATION OF RESTRAINED EXPANSION OF CONCRETE OR MORTAR SPECIMENS CONTAINING THE EXPANSIVE AGENT, AND THE EFFECT OF THE AGGREGATES ON THE DRYING SHRINKAGE OF CONCRETE

STANDARDS: UNI 8147 | UNI 8148

The mould, steel made, is supplied complete with 3 screwed rods and 6 restrained end plates.

MODELS

E114 THREE GANG PRISM MOULD, to produce 80x80x240 mm specimens. Weight: 15 kg approx.
STANDARD: UNI 8148

E114-02 Restrained end plate 80x80 mm; spare to E114 mould.

E115 THREE GANG PRISM MOULD, to produce 50x50x250 mm specimens. Weight: 10 kg approx.
STANDARD: UNI 8147

E115-02 Restrained end plate 50x50 mm; spare to E115 mould.

E115-01 Steel screwed rod 280 mm long; spare to E114 and E115 moulds.

ACCESSORIES

E078 KIT LENGTH COMPARATOR, with digital dial to measure linear variations.
Technical details and other models: see p. 397

E078-05 REFERENCE ROD, 280 mm long

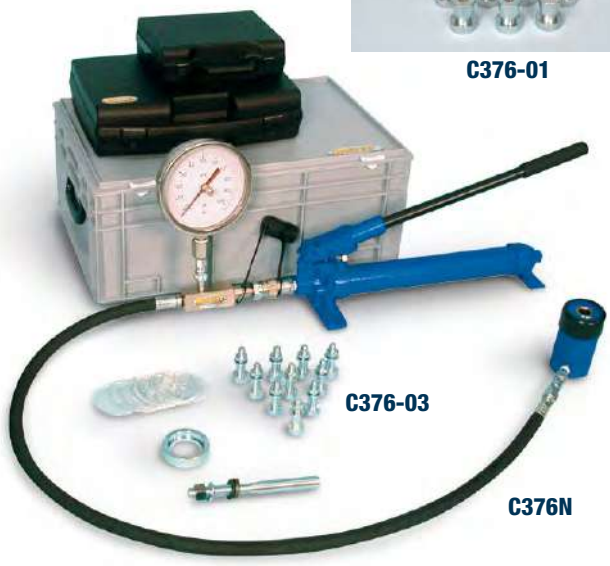
C376N
PULLOUT TEST APPARATUS

STANDARDS: EN 12504-3 | UNI 10157, UNI 9536, comparable to ASTM C900

Used to evaluate the concrete resistance as per the strength applied to extract a disc embedded into concrete.
The standard equipment comprises hydraulic extraction unit 100 kN capacity with pump, precision manometer 0-100 kN, bearing ring, 10 steel discs Ø 25 mm (EN 12504-3), carrying cases.

Weight: 18 kg approx.

C376-01



C376-03

C376N

ACCESSORIES

C376-01 INSERTS, 30 mm Ø (UNI 9536) to embed. Pack of 25 pieces.

C376-03 DISCS, 25 mm Ø (EN 12504-3) to embed. Pack of 25 pieces.

DETERMINATION OF POWER EXTRACTION THROUGH INSERTS POST INTRODUCED, WITH FORCED AND GEOMETRICAL EXPANSION

STANDARD: UNI 10157

It's used to determine the needed power to extract from a concrete element a metallic insert that is introduced in the element by perforation.
This extraction power it's used:

a) To investigate on concrete mechanic proprieties in site.
b) To estimate the in site concrete's compression resistance in a case of specific calibration curve.

The equipment is composed of:

C376 N Pullout test apparatus

C376-10 Connecting rod furnished with bearing ring, to be used with the pull-out instrument to hook the C376-11 insert.

C376-11 Geometric expansion pull-out insert dia. 18x80 mm. Pack of 10 inserts.

C376-12 Hardened drill beat to perform a hole as required from UNI standard and to put in a insert.

C376-13 Drill with SDS mandrin

C376-14 Striker, to put a insert into the hole

C376-15 Aspirant pump to clean the hole from detritus and dust

E142
DIGITAL PULL-OFF (BOND) STRENGTH TESTER
CAPACITY: 16 KN

STANDARDS: EN 1542, EN 1348, EN 1015-12, EN 13687-2 EN 13963, 14496 | NF P18-858 | BS 1881:207 ISO 4624

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.
Thecnical details, more accurate description and accessories:
see p. 406

E142

E142-01
DIGITAL PULL-OFF (BOND) STRENGTH TESTER
CAPACITY: 0-5 KN

Identical to mod. E142 but with load cell and digital display range 0-5 kN for more accurate measurements on low strength values.
Technical details: see p. 406

C374
MOISTURE METER - SURVEYMASTER

Used to measure the damp conditions in concrete structures, masonry, gypsum, both on surface and at depth with non-destructive method.
Measuring range: from 7.9% up to the nominal value of the 99% with ± 0.1% accuracy.
Digital reading of values, audible alarm.
Battery operated.

Dimensions: 170x54x42 mm
Weight: 200 g approx.

C374

C374-06
AQUAMETER, UNIVERSAL MOISTURE METER

This pocket electronic instrument measures the quantity of water in various solid materials such as concrete, masonry, gypsum, brick, woods, mortars etc.
Using a high frequency capacitive sensor, a large volume of material (approx. 50x75x25mm) is sampled instantaneously.

Features:

- Direct read-out of moisture content; no charts or tables required
- Resolution: ± 0.1%
- Accuracy: ± 0.2% at constant temperature
- Sensing field volume: approx. 90 cm^3
- Program mode on concrete, masonry, gypsum, brick, most woods available for maximum accuracy, with special user calibrated mode and averaging function.
- No prongs, probes or holes to be drilled

Typical Applications:

- Locate leaking pipes in walls and floors
- Locate seeping water in basements and masonry tanks
- Check moisture level of materials before applying coatings or adhesives
- Curing condition of wood, stucco and other construction materials

Powered by: battery 9 V
Dimensions: 110x70x50 mm
Weight: 250 g approx.

C374-06

A028
CARBIDE METER FOR SURFACE DAMPNESS

For the rapid and accurate determination of moisture content.
The sample is drilled or scraped from the surface and introduced into the bottle with the carbide reagent.
The meter is suitable for moisture tests on sand, aggregates, soil etc.
It is possible to vary the sample weight from 3 to 100 g for the complete reaction between sample and carbide with accurate moisture measurements from 0 to over 20%
The glass ampoule containing the calcium carbide is broken when the bottle is closed and shaken, granting better accuracy to the test.
The instrument comprises the testing bottle with manometer, small balance, 20 ampoules of reagent, accessories, case.

Dimensions: 520x340x140 mm
Weight: 6 kg approx.

A028

C375-02N
CARBONATION TEST

STANDARD: EN 13295
The test allows the measurement of the depth of carbonation through the surface of concrete.
The set consists of :
- phenolphthalein solution (1000 ml)
- demineralized water (5000 ml)
- depth measuring gauge
- two washing bottles 250 ml capacity

C375-02N

The surface of the concrete specimen under test is sprayed with phenolphthalein solution to detect the loss of alkalinity associated with carbonation. The risk of carbonation induced corrosion can be measured, if correlated with the concrete cover to reinforcement.

Weight: 6 kg approx.

C375-01
CHLORIDE FIELD TEST SYSTEM

STANDARD: AASHTO T260, Comparable to ASTM C114

The determination of the chloride ion concentration in concrete is essential in assessing the need for maintenance on, for example, bridge decks and parking structures. The test can also be used to ensure that materials used in new construction are free from potentially harmful chloride ion levels.
With this method, the concentration of acid soluble chlorides is measured. In most cases this is equivalent to total chloride concentration.

MAIN FEATURES

- Fast results within minutes at the site
- Low cost per sample compared to laboratory testing
- Accurate results are comparable to laboratory testing
- Covers wide range from 0.002% to 2% chloride by weight
- Automatic compensation for changes in ambient temperature
- Digital display for direct reading of lbs./cu.yd. and percentage of chloride by weight

The test system includes:

- Electronic meter, high impedance with temperature compensation and microprocessor for direct conversion to percentage of chloride. Battery powered.
- Chloride combination electrode with temperature sensor
- 12 jars each with 20 ml of extraction liquid
- 5 jars of coloured calibration liquid
- Scale for 3 g samples weighing, accessories, carrying case

Weight: 5 kg approx.

The equipment comprises: manual vacuum pump, digital pressure measuring system, stainless steel chamber for surface measurements, 25 silicone rubber plugs, clamping pliers, drill bits, anchors, accessories. The whole contained in carrying case.

Dimensions: 430x300x150 mm
Weight: 6 kg approx.

SPARE

C375-03 Pack of 12 jars of 20 ml extraction liquid and 5 jars of colored calibration liquid.

C375-10 KIT
AIR AND WATER PERMEABILITY OF CONCRETE
FIGG TECHNIQUE

The ingress of air and moisture into the concrete can cause corrosion of the steel reinforcement and lead to a deterioration in concrete strength.
Therefore, a measure of the ease of movement of liquids and gases through the surface layer of the concrete is a better method of assessing the soundness and expected life of concrete than strength alone.
Permeability is recognized as being the most important parameter in assessing concrete durability.
The depth test is performed by drilling a hole 10 mm diameter x 40 mm deep, and plugged with a silicone rubber plug.
A hypodermic needle is passed into the stopper; the water permeability test is performed by measuring the time of absorption needed by the water introduced into the void by pressure.
For the air permeability test, a vacuum pressure is created in the void, and the time needed to rise this pressure is measured.
Surface permeability tests can be carried out by clamping a stainless steel chamber on the smooth surface of the concrete.

SPARE

C375-11 Silicone rubber plugs. Pack of 25 pcs.

C375-10 KIT

C375-01

RAPID CHLORIDE PERMEABILITY OF CONCRETE

C378N
CHLORIDE ION PENETRATION METER

STANDARDS: ASTM C1202, ASTM C1760 I AASHTO T277

Laboratory test device for the measurement of the resistance of the concrete against the penetration of chloride.
The measurement data can be used to estimate the chloride diffusion coefficient of concrete for the service life prediction and design of concrete structures as well as the durability-based quality control of concrete.

C378N

MAIN FEATURES

The following are unique features of this device:

- Stand alone operation.
- Easy-to-assemble.
- Accurate (± 0.1 mA)
- Flexible logging interval time (1 to 10 min)
- Automatic temperature control system.
- Four measurement channels.
- User-friendly PC software.
- Customizable setup.
- USB connection to computer.

Applications:

The device can be used for testing the durability of concrete exposed to chloride-contaminated environment including:

- Concrete ability to resist chloride ion penetration (ASTM C1202, AASHTO T277).
- Bulk electrical conductivity of concrete (ASTM C1760).
- Performance-based quality control of concrete.
- Estimation of chloride diffusion coefficient of concrete.
- Estimation of chloride migration coefficient of concrete
- Service life design of concrete structures.
- Estimation of the remaining life of concrete structures.

Compliance:

- The only instrument in the market that meets the specifications of ASTM and AASHTO Standard for sample cell.
- Electrical safety certification mark for use in concrete laboratories.

Supplied complete with set of test cells, temperature sensors, test cables, power cord, USB cable, communication software, user manual.

The METER is supplied complete with VACUUM PUMP + DESSICATOR and accessories to saturate the specimen with water (required by ASTM C1202).

Specifications:

Type	Value
Applied voltage (ASTM C1202 test)	60 ± 0.1 V
Range of current measurement	0 - 500 mA ± 0.1, ± 0.2%
Temperature measurement range	0 - 100 +/- 1°C
Operating temperature	15°C - 45°C
Operating humidity	30% - 80%
Measurement channel	4
Short circuit protection system	Yes
Measurement display on LCD	Yes
Remaining time display on LCD	Yes
LCD display area	65 x 33 mm
Operating voltage:	100-240V 50-60Hz 1ph
Dimensions of device	280x240x104 mm
Weight	2 kg

C373-10N

CROSS HOLE ULTRASONIC SYSTEM - TWO CHANNELS, FOR DEEP FOUNDATIONS

STANDARD: ASTM D6760-02

The Cross-hole Sonic Logging (CSL) method is used to perform high-resolution quality control on deep foundations.
The system uses an ultrasonic wave sent from an emitter to a receiver while both are pulled through water-filled access tubes embedded in the concrete. The measured arrival time and energy are directly related to concrete quality.
The control unit must be connected via USB port standard to a regular notebook computer or Tablet PC (not included) on which, should be installed the software (included) for testing, analysis and real time reporting in 2 D Tomography.
Easy to use: the user-friendly software makes it possible to master the instrument in less than a day. No additional expensive training required.
Powerful tomography features are available.

SPECIFICATIONS

- Housing: rugged, environment-proof, water-resistant housing.
- Temperature range: -25 to 60 °C (operating), -40 to 70 °C (storage).
- Transducers: dual-purpose transceivers, 50 kHz nominal, pressure-tested housing, Ø 25 mm
- Cables: detachable heavy-duty polyurethane wound on reel.
- Cable length: 50 m (100 m and 150 m cables are available upon request).
- Sampling rate: 500 kHz (2 µs resolution).
- Gain: 8 level automatic gain control (AGC).
- Depth meters: two 24-bit counters, <0.1% error.
- Pile measuring range: 1 to 145 m
- Tube spacing: up to 4 m in good concrete.
- Productivity: up to 3000 m/Day by a single operator.
- Memory storage: unlimited.
- PC minimum requirements: Windows 2000/XP, 300 MHz, 128 Mb, 800x600 resolution (not included).
- Reporting: arrival time, energy and wave speed curves, **waterfall** presentation, dual presentation, fuzzy-logic, tomography.
- The package includes: a computerized central unit, two ultrasonic transducers, two 50 m cable reels, two depth meter pulleys, cables and AC power adapter, and the software.
- Language: Multi-lingual user-interface and reporting.
- Power supply: internal rechargeable lithium ion battery (two days of typical use), external 100-240V AC (operation/charging).
- Dimensions: 430x325x105 mm (instrument only).
- Weight: 3.8 kg (instrument only).

ACCESSORIES

C373-12 TWO 100 m CABLE REELS (instead of 50 m standard ones)

C373-13 TWO 150 m CABLE REELS (instead of 50 m standard ones)

C373-10N

REBOUND CONCRETE TEST HAMMERS

STANDARDS: EN 12504: Part 2 | ASTM C805 | DIN 1048
BS 1881:202 | NF P18-417

Designed to perform non-destructive tests on concrete structures, it gives an immediate indication of the compressive strength of the concrete using the calibration curve supplied with.

MODELS

C380
CONCRETE TEST HAMMER MADE IN MATEST

Spring impact energy 0.225 mkg. (2.207 Joule or Nm)
Suitable for finished concrete structures and buildings having strength resistances from 10 to 70 N/sq.mm. **This concrete test hammer, entirely produced by Matest, has aluminium frame and thanks to its very accurate manufacture processing and selected components ensures high precision test results in the time. The top quality test hammer available on the market.**
Supplied complete with calibration curve chart in N/mm² (Mpa) values, abrasive stone, carrying case.

Dimensions with the case: 330x100x100 mm
Weight: 2 kg

C380

C380 with case

C380-01
CONCRETE TEST HAMMER MADE IN MATEST

Exactly the same as mod. C380, but with calibration curve chart in Psl values as requested by ASTM Specifications.

C381
CONCRETE TEST HAMMER MADE IN MATEST

Similar to mod. C380, but with impact energy of 0.735 Joule (Nm). Ideal to test small sized, sensitive and thin walled materials. Suitable to test also rock core samples.

C381

C390
ANVIL

STANDARD: EN 12504:2
Used for the verification of the calibration of the concrete test hammers. Special steel alloy made.

Dimensions: Ø 150 by 320 mm.
Weight: 16 kg approx.

C380

C390

Note:
The EN 12504:2 Specification requires obligatory the use of the anvil for the hammer tests.
The Standard specifies:
- Before a sequence of tests on a concrete surface, take and record readings using the steel reference anvil and check to ensure that they are within the range recommended by the manufacturer. If they are not, clean and/or adjust the hammer.
- After tests, take readings using the steel anvil, record them and compare them with those taken prior to the test. If the results differ, clean and/or adjust the hammer and repeat the test.

ORIGINAL "SCHMIDT" TEST HAMMERS

C382

Standard model **N** for normal concrete casting.
Impact energy 2.207 Nm

C382

C383-10
SILVER SCHMIDT

Digital concrete test hammer. Impact energy: 2.207 Nm.

C383-10

C386M
DIGITAL CONCRETE TEST HAMMER WITH MICROPROCESSOR MADE IN MATEST

STANDARDS: EN 12504:Part 2 | ASTM C805 | BS 1881:202 | NF P18-417 | DIN 1048 | UNI 9189

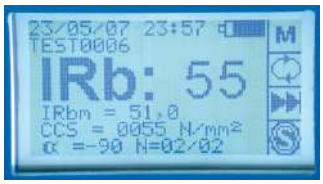
This digital concrete test hammer, microprocessor operated, entirely designed and manufactured by Matest with advanced technology, performs basic concrete testing with continuous automatic recording of all parameters in accordance with EN 12504-2 Specifications, register and process data and then transfer them to a PC

The unit consists of the standard mechanical model C380, but equipped with an electronic transducer that measures the rebound values and supplies automatically the results on a graphic display.

During test performing:

- Shows index value
- Shows average index value
- Allows to select measuring system in N/mm² (MPa) or Psi
- Shows numbers of performed rebounds
- Shows date and time
- Identifies tested element
- Identifies automatically and shows rebound angle
- Shows battery life

C386M with case



MAIN FEATURES

- Possibility to store, display on graphic LCD 128x64 and download data to PC over 15000 tests
- Automatic statistical processing and readings
- Automatic conversion of rebound index to equivalent compression strength in psi, N/mm², kg/cm²
- High accuracy and resolution

C386M

TECHNICAL SPECIFICATIONS

- Impact energy: 2.207 Joule (Nm)
- Measuring range: 10 - 120 N/mm² (MPa)
- Interface: USB
- Power source: 6 rechargeable batteries AA NiMh 2400mA/hour
- Battery life: 60 hours with automatic shut down
- Operating temperature: -10°C +60°C

Supplied complete with data transfer software, data transfer USB cable, battery charger, abrasive stone, carrying case.

Dimensions with case: 330x180x120 mm
Weight: 3 kg

Note: The calibration anvil is the same (mod. C390) of the standard hammers.

The digital Matest test hammer is suitable to be connected to the Ultrasonic Tester high performance mod. C372M (see p. 372) for combined ultrasonic and rebound tests with automatic data acquisition, processing and store of the results.

C386M + C372M

C393
RESONANCE FREQUENCY METER - DETERMINATION OF THE CONCRETE RESONANT FREQUENCY

STANDARDS: ASTM C215, C666 | BS 1881:209 | NF P18-414 | UNI 9771

The unit measures the resonant frequencies of the three different modes of vibration:
- Longitudinal, transverse (flexural) and torsional.

From these, the following material characteristics, non destructively, can be calculated:
- young's modulus of elasticity,
- modulus of rigidity,
- poisson's ratio.

Available for specimen sizes up to 150 mm cross section dimension, and from 45 mm to 700 mm in length.
Automatic identification of the resonance frequency. Large easy to view display for data analysis of time domain and frequency spectrum signals.
Data can be stored and uploaded to a PC for further analysis and inclusion in report.
Fast and easy to use system.
The principle used in this meter is based upon the determination of the fundamental resonant frequency of vibration of a specimen generated by an impact and sensed by an accelerometer. The frequency spectrum is computed and displayed by the meter.

Durability of concrete:
The determination of flexural resonance is very important when studying the degradation of concrete under accelerated freezing and thawing cycles and aggressive environments on concrete specimens.

The advantages of resonance methods are:
- Test can be repeated over a very long period on the same specimen; the number of test specimens required is therefore greatly reduced.
- The results obtained with the resonance method on the same specimen are more reproducible than those obtained with non destructive tests and groups of specimens.

Specifications:
- Frequency range: 10 Hz to 20 kHz
- Sampling rate: 20 kHz or 40 kHz
- Accelerometer sensitivity: 9.60 mV/g (0.979 mV/ms^2)
- Battery 12V, 4-10 hours continuous use.
- Display: 320 by 240; backlit for daylight use.
- Storage: 200 plus readings.
- Software: Windows compatible 9x/me 32 MB Ram.
- Impactors: set of 6 hardened steel balls.

The standard supply includes:
- electronic main unit.
- standard bench with its accessories.
- accelerometer with cable.
- hardened steel balls set.

Weight: 30 kg approx.

C393

C369N
ULTRASONIC PULSE VELOCITY TESTER HIGH TECHNOLOGY

STANDARDS: EN 12504 part. 4 | ASTM C597 | BS 1881:203 | NF P18-418

The instrument gives data concerning the homogeneity of the concrete, by generating pulses of sound into the concrete and measuring the time the sound to travel from the transmitter probe to the receiver probe through the material. Furthermore it is possible to have indicative data of the strength of the concrete.

MAIN FEATURES

- Non-destructive test to determine cracks, voids, faults presence in concrete structures.
- LCD display 128x60 pixel.
- Battery operated rechargeable.
- Portable with anti-shock case.
- Supplied complete with calibrating cylinder and contact paste.

- Measuring range: 0 - 3000 µs - accuracy ± 0.1 µs
- Selection of the ultrasonic pulse amplitude adjustable from 250 to 1000 V
- Measurement of the required time by the ultrasonic pulse to go through the tested material.
- Single or continuous acquisition mode with automatic or manual saving.
- Zero calibration with depuration of the time for the pulse to go through the probes.
- Calibration of a defined time value.
- Capacity of data acquisition, processing and filing of the test data up to 30.000 samples.
- Interface mini USB for PC connection.
- Two outlets for connection to the oscilloscope.
- Languages: English, French, German, Spanish, Italian.
- The use of the instrument is made easy because it is based on the user-friendly system.

The standard appliance includes:
- The instrument in basic configuration in a practical palmer container.
- Two 55kHz probes with connection cables.
- **Battery rechargeable pack** NiMh 4.8V > 2000m/A with low battery condition alarm.
- External feeder 230V and battery charger 12V 500m/A.

Case dimensions: 400x340x110mm
Weight: 2 kg approx.

C369N


C369N with case

ACCESSORIES

C370-08 EXPONENTIAL TRANSMITTING/RECEIVING PROBES (couple), 55 kHz Nominal Frequency.

C372-10 TRANSMITTING/RECEIVING PROBES (couple), 150 kHz Nominal Frequency, indicated for homogeneous, compact, high density concrete.

C372-11 TRANSMITTING/RECEIVING PROBES (couple), 24 kHz Nominal Frequency, indicated for heterogeneous, low density concrete.

C370-10 COUPLE OF CABLES (each 10 m long) to connect the probes to the tester. Used to test voluminous/large structures.

SPARES

C370-02 Transmitting/receiving probes (couple), 55 kHz

C370-06 Couple of cables (each 3.5 m long) to connect the probes to the tester.

C370-07 Tube of grease to better coupling the probes to the material under test.

C372M
ULTRASONIC PULSE VELOCITY TESTER, HIGH PERFORMANCE
WITH MICROPROCESSOR FOR COMBINED ULTRASONIC AND REBOUND HAMMER DATA ACQUISITION AND PROCESSING
STANDARDS: EN 12504: part 4 | BS 1881:203 | ASTM C597 | NF P18-418

MAIN FEATURES

- Touch screen LCD display 800x480 pixel.
- Windows operating system like a standard PC.
- Flash memory 128Mb, expandable with SD card to illimited memory.
- Time measuring from 0 to 9999,9 µS resolution.
- Possibility to combine the ultrasonic measurement with rebound index (SonRed method).

This is an instrument using the most modern technologies; it has a 7" WVGA colour touch screen, 128 MB, SD card, USB, working system Windows CE.

Ultrasonic tests:

The appliance allows measuring the ultrasonic impulse **speed** inside the material (by knowing the distance between the probes).
It measures the **distance between the probes** (by knowing the speed of the ultrasonic impulse to go through the tested material).
It measures the required **time** by the ultrasonic impulse to go through the tested material.
Young's modulus for soils is also measured (by knowing the distance between the probes, the density of the tested material and the shear-speed).
Young's modulus for concrete is measured by knowing the distance between the probes, the density of the tested material and the poisson ratio.
Calculation of the **crack depth**.
Zero calibration with depuration of the time for the impulse to go through the probes.
Calibration of a defined time value.

C372M

Infinite filing capacity of the test dates and the graph tracing of the tests on SD card or extractable and expandable.
Possibility to use the instrument with two exponential probes, or with one standard probe and one exponential probe.
Possibility to connect the instrument to internet for consultations or extractions, like a common PC.
Visualization of the shape of the transmitting wave while it goes through the material checked, by transforming the instrument into a real oscilloscope.

Combined ultrasonic and rebound hammer determination (sonreb method):

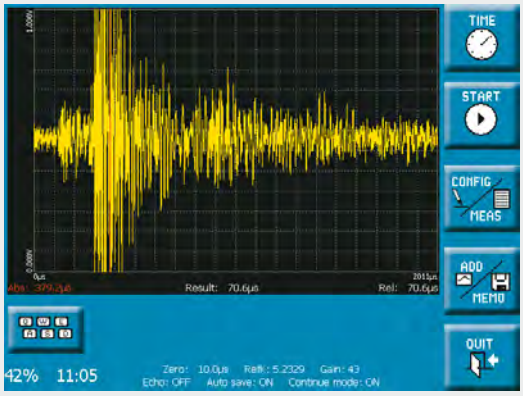
The C372M ultrasonic tester houses an integral data logger for data acquisition, processing and store of rebound hammer values.
The acquisition of the rebound values is performed with manual or automatic mode.
a) Manual mode:
Rebound values measured with a standard concrete hammer are manually input into the ultrasonic Tester.
b) Automatic mode:
The digital Matest test hammer mod C386N is directly connected to the ultrasonic tester through a cable. The measured rebound values are automatically transmitted to the C372M tester.
The measures of the velocity of ultrasonic pulses and the rebound values, gives estimates of dynamic modulus of elasticity and Poisson's Ratio, and provides informations on possible voids, cracks and strength of the structure.
It is possible to evaluate the compressive strength of the concrete, useful to estimate formwork striking times.
The combined test allow to rectify different inaccuracies that are typical of the simple rebound hammer test, and obtaining estimates on the compressive strength of the concrete, that cannot be obtained with the ultrasonic test, granting high accuracy and reliability of the results.

The standard appliance includes:

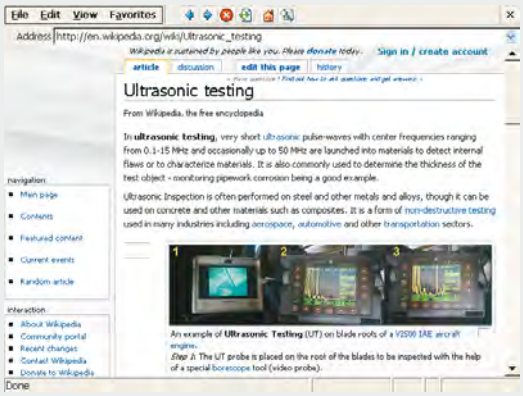
- Instrument in basic configuration (ARM Cortex-AS 400MHz, 128 MB Flash Memory, 128 MB Ram) in a practical and elegant palmer container.
- Two 55 kHz probes with connecting cables.
- Calibrating cylinder and contact paste
- Strong anti shock case holding the instrument and the accessories.
- Battery pack Li-Ion 11.1V 3000mA.h
- External feeder 230V/24V and battery charger

Dimensions: 400x300x180 mm
Weight: 3 kg approx.

C372M + C386N



Display of graphic function



Display of internet function

Electronic card: detail

C372M with case

ACCESSORIES

C370-08 EXPONENTIAL TRANSMITTING/RECEIVING PROBES (couple), **55 kHz** Nominal Frequency.

C372-10 TRANSMITTING/RECEIVING PROBES (couple), **150 kHz** Nominal Frequency, indicated for homogeneous, compact, high density concrete.

C372-11 TRANSMITTING/RECEIVING PROBES (couple), **24 kHz** Nominal Frequency, indicated for heterogeneous, low density concrete.

C370-09M COUPLE OF CABLES (each 10 m long) to connect the probes to the tester.
Used to test voluminous/large structures.

C372-10

SPARES

C370-02 Transmitting/receiving probes (couple), 55 kHz

C370-04M Couple of cables (each 3.5 m long) to connect the probes to the tester.

C370-07 Tube of grease to better coupling the probes to the material under test.

C370-02

C370-08

COVER TO REINFORCEMENT

For determining the presence, position, direction, depth and diameter of steel reinforcement bars in concrete structures.
STANDARDS: BS 1881:204 | DIN 1045

C403-01
PROFOSCOPE

Versatile, fully-integrated rebar detector and cover meter with a unique real-time rebar display allowing the user to actually **SEE** the location of the rebar beneath the concrete surface to a maximum deep of 180 mm.

This is coupled with rebar-proximity indicators and optical and acoustical locating aids. Rebar diameter can also be estimated within the specified testing range.
The Profoscope combines these unique features in a compact, light device that allows the user to operate this rebar detector with one hand making the task of locating rebars a simple and efficient process.

An intuitive user interface makes rebar detection easy.

MAIN FEATURES

- Visual indication of rebars in close proximity.
- Ability to identify the mid-point between rebars as well as the orientation of rebars.
- Optical and acoustical indication of rebar location and minimum cover alert.
- Neighboring bar correction.
- Cordless and single handed operation.
- Icon-based language independent menus.
- Start-up test kit allows user to familiarize with all functions in a comfortable environment, wasting no time on site.

C403-01

C403-02
PROFOSCOPE+ (PLUS)

Same features of mod. C403-01, but additionally offers the innovative memory function for automatic data acquisition, by eliminating the manual measurements of a test series, saving time and unnecessary source of errors.

C403-02

C396N
PROFOMETER PM-600

This new generation Profometer Touchscreen unit offers real time control over the measurement procedure for the precise and non-destructive detection of rebar locations and measurement of the concrete cover and rebar diameters directly on site.
The instrument comes along with the Universal Probe with integrated spot probe for measurements in corners, limited spaces and congested rebar arrangements.
Deep measuring range: up to 175 mm
Measurement accuracy: from ± 1 to ± 4 mm
Screen: 7" color, 800x480 pixel.
Diameter accuracy measurement: ± 1 mm
Diameter measuring range: up to 63 mm

Weight: 1600 g

C396N

Note: Possibility to upgrade the Profometer C396N to Profometer Corrosion C411N for both corrosion and cover meter functions with the KIT below:

C411-01N
UPGRADE KIT TO PROFOMETER CORROSION C411N

Interface box, rod electrode, cable coil l=25 m with clamp, DVD with software, documentation and carrying case.
Technical details: see C411N.

C411-01N

C411N
PROFOMETER CORROSION

STANDARDS: ASTM C876, RILEM TC 154-EMC, DGZFP B3, SIA 2006, UNI 10174, JGJ/T 152, JSCE E 601

This instrument is the direct successor to the Canin and it is the most advanced corrosion detection device in the market. Consists in a non-destructive method to determine the corrosion of the reinforcement bars.
Same as C396N model, but with the accessories to detect corrosion and without the accessories to measure concrete cover and rebar location.
Supplied complete with rod electrode.

Memory:	internal 8 GB flash memory
Regional settings:	metric and imperial units and multi-language and timezone supported
Power input:	12 V ± 25 % / 1.5 A
Battery:	3.6 V, 14 Ah
Battery lifetime:	> 8h (in standard operating mode)
Humidity:	< 95 % RH, non condensing
Operating temperature:	-10 °C to +50 °C
IP classification:	touchscreen IP54, universal probe IP67
Voltage measuring range:	-1000 to + 1000 mV
Voltage resolution:	1 mV
Impedance:	100 MΩ
Sampling rate:	900 Hz
Dimensions:	250x162x62 mm
Weight:	1600 g approx

C411N

Note: Possibility to upgrade the Profometer Corrosion C411N to Profometer PM-600 C396N for both corrosion and cover meter functions with the KIT below.

C396-01N
UPGRADE KIT TO PROFOMETER CORROSION

Universal probe with ruggedized cart, probe cable 1.5 m, software upgrade to cover meter.
Technical details: see C396N.

C396-01N

C412-01
DIGITAL RESISTIVITY 2-PROBE ARRAY METER

Used for assessing the probable rate of corrosion in reinforcing bars with the electric resistivity measurement method.
A highly permeable concrete has a high conductivity with reduced electrical resistance. The knowledge of the electrical resistance of a concrete allows to measure the possible rate of corrosion of steel reinforced bars.
The test is simple to perform and requires only two 6.5 mm diameter holes drilled to a depth of 8 mm. Inject a small amount of conductive gel into each hole and insert the probes. The resistivity value is immediately displayed.
- Measuring range: 0.5 to 20 kΩ cm, with 0.1 kΩ resolution.
- 2-probe array spacing: 5 cm
- Display: LCD 4 ¼ digit
- Battery operated with 100 hours operating time

The instrument is supplied complete with drill bit, gel, template, accessories, carrying case.

Dimensions: 400x270x130 mm
Total weight: 4 kg

C412-01

C414
COR MAP-HALF CELL METHOD

STANDARDS: ASTM C876 | BS 1881:201 | UNI 9535

A simple method for identifying areas of probable rebar corrosion in concrete structures.
Detachable electrode extension pieces (41 cm long), facilitate measurements in hard to reach locations.
High impedance digital meter is designed for tough field conditions.
Reference electrode, including copper sulphate reservoir.
Easy to use, supplied complete.

C414 complete set

C410
WINDSOR HP PROBE DIGITAL SYSTEM

STANDARDS: ASTM C803 | BS 1881:207 | ACI 347

To evaluate the compressive strength of concrete in place with the penetration method. Non destructive test. It is fast, accurate and simple to perform. The five-minute test does not weaken the structure. Comparison between test results using this method and destructive tests shows a variance normally within 3% from each other. The method requires a pistol-like device which is loaded with a small explosive charge and metal probe.The charge is precisely measured to give a consistent firing force. By pulling the trigger the probe is fired into the concrete.

C410

Standard equipment consist of:
- driven unit
- digital measuring unit with memory for data storage to PC unloading
- accessories and carrying case.

Probes and power charges **are not included** and must be ordered separately.

Dimensions:
500x400x200 mm
Weight: 16 kg approx.

C410 with case and accessories

ACCESSORIES

C410-01 SILVER PROBES used for high performance concrete with strength up to 17000 PSI (110 MPa). Complete with probes and power loads. Pack of 75 probe Kit.

C410-02 GOLDEN PROBES recommended for light weight concrete. Complete with probes and power loads. Pack of 75 probe kit.

C410-10N
PENETRATION PIN RESISTANCE DETECTOR

PENETRATION RESISTANCE

STANDARD: ASTM C803

This portable instrument is used to measure the resistance of materials in situ for new or existing constructions. The operating principle which the instrument is based is the capacity to nail a pin into the surface of the material, since the penetration depth is inversely proportional to compressive strength is easy to determine the material resistence. The unit measures compression strength of concrete and mortar in situ with accuracy and speed. It is a safe tool that uses a mechanism equipped with a calibrated spring to insert a steel nail into the material to be investigated. The depth of penetration of the nail is measured and correlated with specific curves to the compression strength of the test material. The removable small section nail facilitates the use of the instrument and the correct execution of the test.

Penetration resistance: 800 ± 8 N
Shot power: 20 ± 1 mm
Digital measuring gauge: 20 ± 0.01 mm
Nail dimensions: 3.5 mm diameter, 40 mm long

Supplied complete with 20 penetration nails, a little pump, a tightening key, a load lever, a carrying case.

Dimensions: 420x310x150 mm
Weight: 8 kg approx.

SPARE

C410-11 Penetration nails (pack of 20pcs).

C410-10N

C403-10
DEEP SCANNING METAL DETECTOR UP TO 150 MM

This locator finds and scans, through solid concrete, steel rebars and metallic materials like pipes, electric cables, junction boxes, metal studs and frames up to 150mm deep.
It scans and differentiates steel rebars from other metallic materials like copper pipes.
It differentiates magnetic metals from non magnetic ones.
This detector is an essential device for building contractors, remodelers, electricians, plumbers.
Accuracy: rebars or pipes 14mm dia. with minimum grid space of 152mm are scanned within 13mm tolerance.
Depth: 152 ± 25mm
N° 1 alkaline battery 9V (not included) for one year use.

Dimensions: 250x110x62 mm
Weight: 300 g approx.

C403-10

Example of use

C405-10N
DEFLECTOMETER WITH TELESCOPIC TUBULAR DISPLACEMENT TRANSDUCER

Used to determine the deflection under known loads of bridges, ceilings or any suspended structure.
This instrument grants very accurate and reliable test results with data acquisition through Cyber-Plus 8 Evolution mod. C405-15M.
One telescopic deflectometer consists of:
- Aluminium telescopic tubular anodized frame having 1700 mm mimimum height and 6000 mm maximum extension.
- Linear potentiometric displacement transducer with spring system, fixed on the base of the telescopic tubular frame, with measurements in compression 50 mm stroke and 0.01 mm resolution.
- Tripod supporting the telescopic tubular displacement transducer.
- 10 m extension cable.
- Carrying case.

Weight: 6 kg approx.

Note: Three deflectometers are recomended to correctly perform a test.

C405-15M
CYBER-PLUS 8 PROGRESS

8 Channels acquisition and processing data system, 24 bit resolution.
Electronic advanced technology, **display** LCD, TFT, 800x480 pixels, 7", **touch screen**, high graphic performances, the unit automatically performs test and data processing. A certificate can be printed through an external USB printer (optional).
The Cyber-Plus is equipped with LAN port for connection to PC and with USB port for an unlimited memory storage.
Contained in a practical and sturdy watertight carrying case, can be powered from an electrical network 90-270 V or use the internal battery and charger granting one full day on-site use.
Hardware technical details: see p. 18

S337-51 CALIBRATION process of one deflectometer with the data acquisition unit C405-15M.

CISTERNS FOR LOAD TESTS

Made with flexible polystyrene covered in PVC, they are used to load the structure so to measure its deflection.
Supplied with connector, flexible pipe and spherical valve.

Available in different capacities:

Model	Capacity litres	Dimensions cm	Weight kg
C405-24	1000	240 x 145	10
C405-25	2500	280 x 240	16
C405-26	5000	400 x 240	25
C405-27	10000	490 x 340	40

C405-24

C405-30
LITRE-COUNTER, ELECTRONIC, FOR CISTERNS

It measures and displays the quantity of water.
Accuracy: ± 1%
Feeding. AAA standard batteries

Weight: 2 kg

C405-30

SPARE

C405-20 Chain, 10 m long, stainless steel, for measurements over 13 m.

DEFLECTOMETERS - SWING-ARM MODEL

Used to determine the deflection on bridges, ceilings or any suspended structure. Possibility to use the deflectometer in pressure or traction, and direct reading on the dial gauge.
Available in **one** or **three** sets, to be completed with dial gauges stroke from 10 to 50 mm.
One deflectometer set comprises:
Swing-arm with clamp for complete orientation in any position, inextensible wire coil 20 metres long, plumb weight, carrying case.
Supplied **without** dial gauge to be ordered separately (see accessories).

MODELS

C405N N° 1 SET OF DEFLECTOMETER (without dial gauge)
C406N N° 3 SETS OF DEFLECTOMETERS (without dial gauges)

ACCESSORIES

S376 DIAL GAUGE 10 mm stroke x 0.01 mm sens.
S377 DIAL GAUGE 25 mm stroke x 0.01 mm sens.
S378 DIAL GAUGE 30 mm stroke x 0.01 mm sens.
S379 DIAL GAUGE 50 mm stroke x 0.01 mm sens.
S383 DIGITAL GAUGE 25.4 mm x 0.001 mm sens.

ACCESSORY for S383

S382-13 CABLE to connect S382-01 and S383 to PC through USB port for direct visualization and recording of the measurement.

SPARE

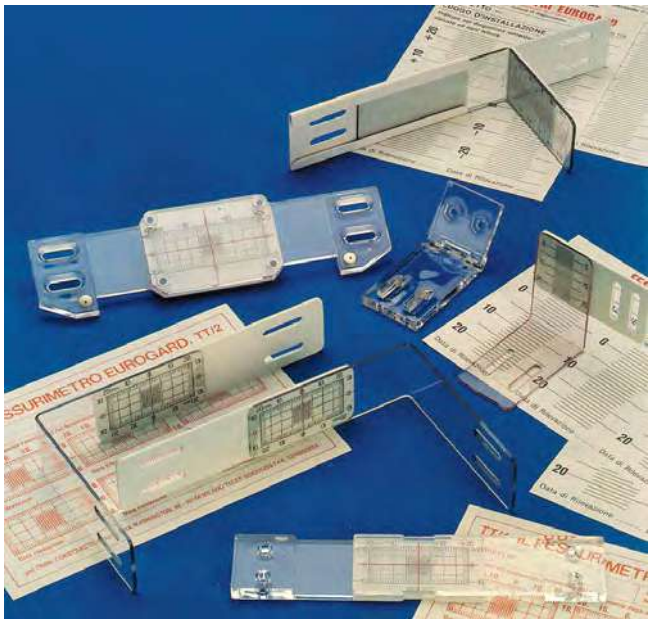
C407-02 Inextensible wire coil, 20 metres long

C406N + S376

C405N + S377

CRACK WIDTH GAUGES

Used for monitoring, measuring and recording the crack width of a building structure.
Internal or external use, manufactured in vandal resistant polycarbonate, complete with crack record card each gauge to semplify monitoring, they are suitable for vertical and horizontal movement measurements.



C408...C408-03

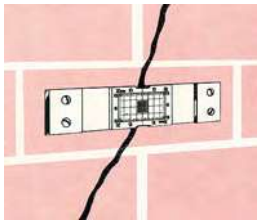
MODELS

C408 CRACK WIDTH GAUGE FOR WALLS, to monitor vertical and horizontal movements, also simultaneous, on a plane surface. Pack of 5 pieces.

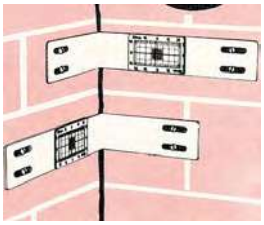
C408-01 CRACK WIDTH GAUGE FOR CORNERS, to monitor corner cracks with bidirectional movements, also simultaneous. Pack of 5 pieces.

C408-02 CRACK WIDTH GAUGE FOR FLOORS, to monitor floor settlements to a wall, column etc.
Pack of 5 pieces.

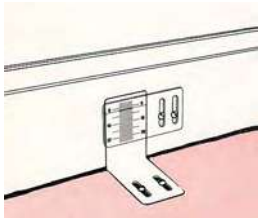
C408-03 CRACK WIDTH GAUGE FOR DIFFERENCE IN LEVELS, to monitor the loss of levelness of any cracked surface.
Pack of 5 pieces.



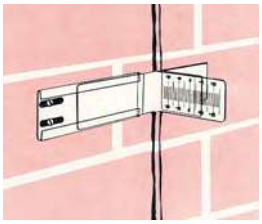
C408



C408-01



C408-02



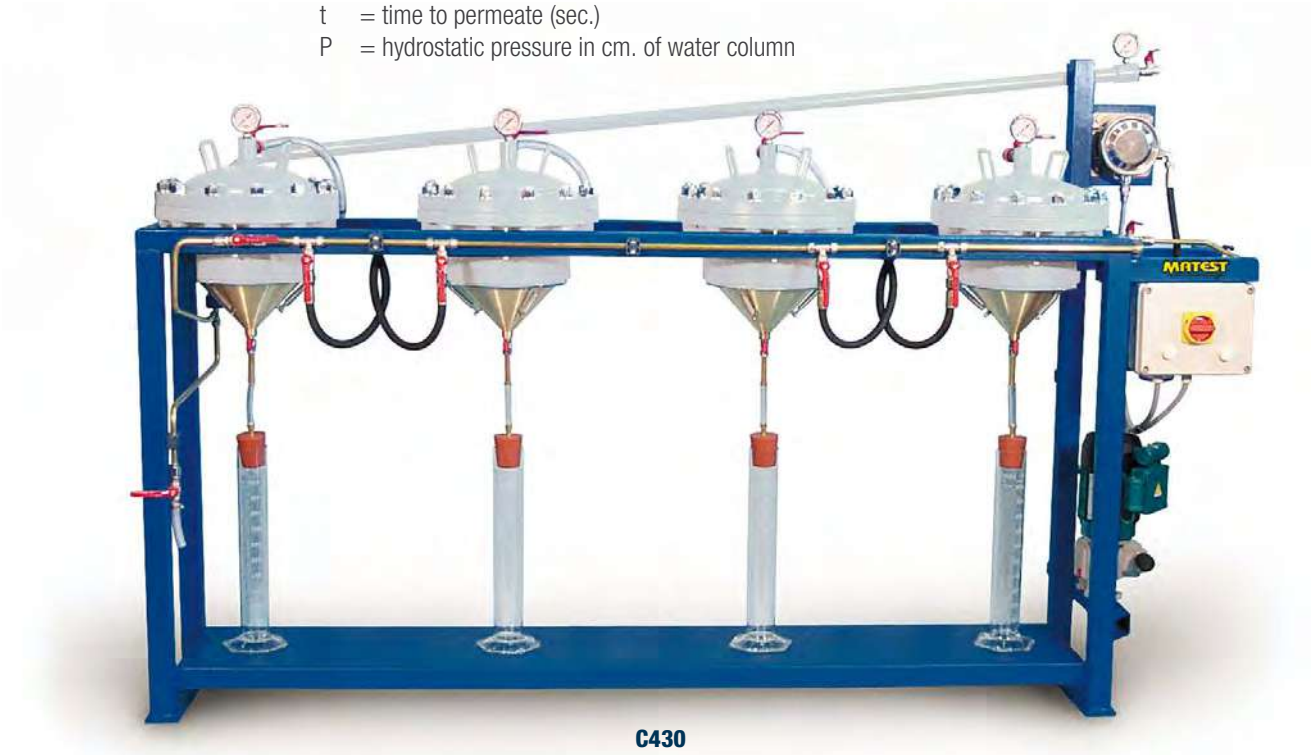
C408-03

C430
AUTOMATIC CONCRETE WATER PERMEABILITY APPARATUS AT FOUR CELLS

This fully automatic apparatus is designed to perform water permeability tests on cubic concrete specimens max 150 mm side and cylinder specimens max 160 mm diameter. The specimens are submitted to hydrostatic stress for a pre-set period. The water permeated through the test specimen is directly collected and measured into a graduated cylinder.
It is therefore possible to determine the permeability coefficient in cm/sec. (Darcy coefficient) by the following formula:

$$K = \frac{c\,c \times h}{A \times t \times P}$$

where: cc = permeated water in cm^3
h = height of the specimen (cm)
A = surface area of the specimen (sq. cm.)
t = time to permeate (sec.)
P = hydrostatic pressure in cm. of water column



C430

The equipment consists of a strong metallic frame holding four cells which are hot-galvanized for anti-corrosion protection.
Each cell includes a pressure control manometer.
A re-chargeable compensation plenum chamber is included as part of the test.
The pressure is adjustable from 0 to 30 bar and it is supplied by an automatic pump of variable supply, to achieve the most suitable installation for the specimen under test.
Water feed is direct from water inlet.
Seal pressure obtained through special and practical seal devices which maintain and simplify the use of the machine.
It is possible to use one or more cells together, and specimens also of different size (cubes/cylinders).
The specimen's sealing system is achieved through a practical and speedy, user-friendly device.
Supplied complete with four cells, four graduated cylinders, epoxy resin and accessories. The **sealing devices are not included** in the standard package and must be ordered separately.

Power supply: 230V 1ph 50Hz
Dimensions: 2500x500x1300 mm
Weight: 240 kg approx.

NEEDED ACCESSORIES

SEALING DEVICE, complete with rubber latex packing which is between the two hot-galvanized steel collars. Complete with bolts.

MODELS

C432-01 SEALING DEVICE FOR CUBES 100 mm side
C432-02 SEALING DEVICE FOR CUBES 150 mm side
C432-04 SEALING DEVICE FOR CYLINDERS Ø 100 mm
C432-05 SEALING DEVICE FOR CYLINDERS Ø 150 mm
C432-06 SEALING DEVICE FOR CYLINDERS Ø 160 mm

C432-02

C432-05

SPARE

C433 Epoxy resin, to isolate the lateral surfaces of the concrete specimen. Can of 5 kg

WATER IMPERMEABILITY TESTER

DETERMINATION OF PENETRATION'S DEPTH OF WATER UNDER PRESSURE.

STANDARDS: EN 12390-8 | DIN 1048

This apparatus is used to determine the depth of penetration of the water into the concrete (impermeability) under known time and pressure.
The unit accepts concrete cubic, cylindrical or prismatic specimens having **max. dimensions** of 200x200x200 mm.
The specimen is put into the test chamber, clamped with **suitable flanges with central screw** and round gaskets.
A known water pressure is applied on the specimen's surface for a known time, as requested by Standard, using a suitable air compressor (see accessory) having at least 5 bar pressure.
A manometer checks constantly the applied water pressure.
The apparatus is supplied **complete with graduated burettes** fixed on the front panel.
The water penetrated is measured by breaking the specimen, or by reading the water permeated through the graduated burette.
Two models available: three place and six place version. The places can be used all-together at the same time, or one by one independently.

C435-01

C435

MODELS

C435
CONCRETE WATER IMPERMEABILITY APPARATUS, THREE PLACE, with water measurement burettes.
Dimensions: 1400x750x1700 mm
Weight: 280 kg approx.

C435SP
CONCRETE WATER IMPERMEABILITY APPARATUS, THREE PLACE, same as mod. C435, but having three separate pressure lines

C435-01
CONCRETE WATER IMPERMEABILITY APPARATUS, SIX PLACE, with water measurement burettes.
Dimensions: 1400x750x1850 mm
Weight: 430 kg approx.

C435-11
DUAL PRESSURE LINE to upgrade the apparatus mod. C435-01

ACCESSORIES

V206 AIR COMPRESSOR, 70 litres capacity. 230V 50Hz 1ph.

E138-11 TUBING and accessories to connect the impermeability apparatus to the air compressor.

OUR CLIENTS ARE OUR BEST ADVERTISEMENT.


MATEST
CYBER PLUS EVOLUTION
SERVO PLUS
EVOLUTION

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, Lime reactivity and Slaking, 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.

E009 KIT
BLAINE AIR PERMEABILITY APPARATUS
TO DETERMINE THE FINENESS OF CEMENT

STANDARDS: EN 196-6, comparable to:
ASTM C204 | AASHTO T153 | BS 4359:2

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, vaseline grease for better coupling tube/cell, funnel, brush.

Dimensions: 220x180x470 mm
Weight: 12 kg approx.

E009 KIT + E055-08

ACCESSORIES

E010-02 STANDARD REFERENCE CEMENT 114q. to calibrate the Blaine.

Alternative:

E010-02N STANDARD REFERENCE CEMENT SN2c. Portland (CEM I 52,2N) turbinometric and fineness. Bottle of 5 g

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 discs, porosity: 2 micron (pack of 1000 pieces)
E010-08 Test cell, complete (three pieces)
E010-05 Cell body, stainless steel
E010-06 Cell plunger, stainless steel
E010-07 Cell perforated disk, stainless steel

E011
ELECTRONIC BLAINE AIR PERMEABILITY APPARATUS, SEMI-AUTOMATIC

Electronic Blaine air permeability apparatus with semi-automatic test-cycle, electric suction pump, time registration and measuring section with photoelectric barrier. After the test, automatic display of the time measured. Precision of time displayed: 0.01 second. The apparatus is delivered complete with filter papers (1000 pcs.), oil, light grease, plug, thermometer, brush and funnel.

Power supply: 110-230V 50-60Hz
Dimensions: 170x300x410 mm
Weight: 4.6 kg

E011

E011-01N
BLAINE AIR PERMEABILITY APPARATUS, PC-CONTROLLED

This automatic electronic apparatus is designed for the fully automatic test procedure and evaluation, software automatically acquires all test data and performs average calculations. Complete with filter papers (1000 pcs.), oil, light grease, plug, internal sensor, brush and funnel. Provided with software but without PC (standard PC required).

Power supply: 110-230V 50-60Hz
Dimensions: 170x280x410 mm
Weight: 4.7 kg

E011-01N

E014
LE CHATELIER FLASK

STANDARDS: EN 196-6 | ASTM C188
AASHTO T133

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

V192-08

ACCESSORY

V192-08
CHATTAWAY SPATULA, 120 mm long.

E014

E016
WATER FLOWING SIEVES DEVICE

STANDARD: D.M. 3/6/68

Used to determine the fineness of cement. It consists of a sprying unit with feed cock and gauge; brass sieve body 85 mm Ø 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 sprying 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

E016

E017
FINENESS OF FLY ASH BY WET SIEVING

STANDARDS: EN 451-2 | ASTM D430

The set, brass made, consists of: sieve Ø 50 mm. with stainless steel mesh opening 0.045 mm, spray nozzle 17.5 mm ID with 17 holes Ø 0.5 mm, pressure gauge Ø 80 mm range 0-160 kPa, div. 5 kPa, fittings and connectors.

Weight: 3 kg

E017

E029
MEASURER 400 ML CAPACITY

STANDARDS: ASTM C185 | AASHTO T137

To determine the air content of freshly mixed mortars by the density method.
Steel made, internal diameter 76.2x88.1 mm height.

ACCESSORIES

E087-06
HARD WOOD TAMPER

E055-07
GLASS PLATE, nominally 120 mm diameter

V192-08
CHATTAWAY spatula

E020
BULK CEMENT SAMPLER

STANDARDS: EN 196-7 | ASTM C183 | AASHTO T127
Used to sample cement in bulk storages or shipment.
Brass made, it consists of two concentric tubes with slots.
Inside tube volume is 3 litres approx.

Dimensions: Ø 40x1500 mm. **Weight:** 5 kg

E021
PACKAGED CEMENT TUBE SAMPLER

STANDARDS: EN 196-7 | ASTM C183 | AASHTO T127
Used to sample cement homogeneously from cement bags.

Dimensions: Ø 32x1050 mm. **Weight:** 3 kg

E021

E020

E025
BULK DENSITY OF CEMENT

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.
The discharge hole of the funnel has 8 mm diameter.

Dimensions: Ø 350x520 mm
Weight: 6 kg approx.

E025

E027
AIR CONTENT METER 1 LITRE CAPACITY
STANDARD: EN 459-2 | EN 1015-7

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: Ø 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 50-60Hz

E028-02
AIR CONTENT METER 0.75 LITRE, ELECTRIC
STANDARD: EN 413-2

Identical to mod. E028, but with vessel having 0.75 litre capacity, conforming to EN 413-2 Specification.

ACCESSORY

E028-01 FILLING HOPPER (Ring) for the meters E027, E027-01, E028, E028-02

E027

E028

E034
LIME TESTING REACTIVITY APPARATUS
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 50-60Hz
Dimensions: 400 x 250 x 750 mm
Weight: 10 kg approx.

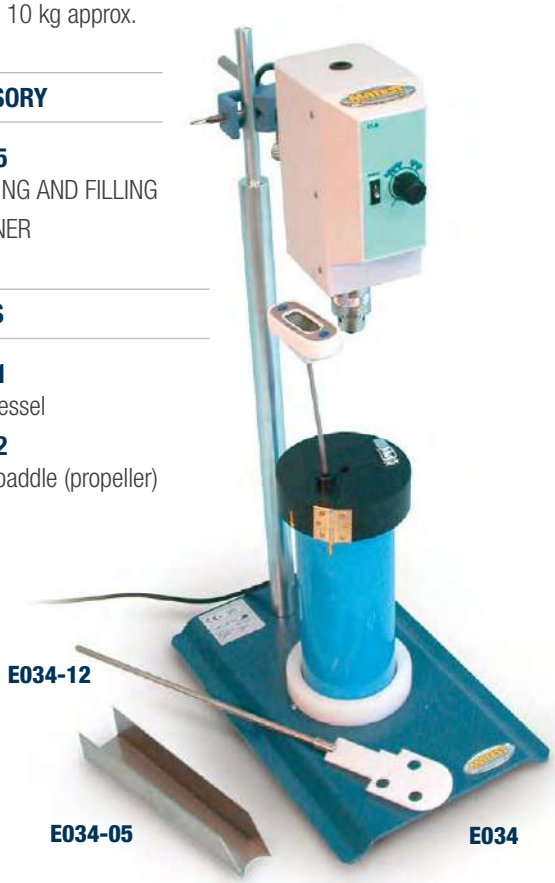
ACCESSORY

E034-05
WEIGHTING AND FILLING CONTAINER

SPARES

E034-11
Dewar vessel

E034-12
Stirring paddle (propeller)



E034-12
E034-05
E034

E035
SLAKING VESSEL
YIELD OF LIME-BUILDING LIME
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
Ø 113 by 140 mm deep. Supplied complete with cover.
Weight: 4 kg approx.

E035

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 approx.

E091

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 Ø 100x25 mm
The base of the stand is machined. Chromed finishing.

Weight: 8 kg approx.

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 approx.

E031 **E031-01**

E039-01
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, vacuum regulator, vacuum gauge three-way stopcock, metal perforated dish, glass funnel, pack of filter paper, accessories; the whole assembled on stand. The vacuum pump with accessories are not included in the supply and have to be ordered separately.

Dimensions: 400x300x600 mm
Weight: 8 kg approx.

E039-01

ACCESSORIES

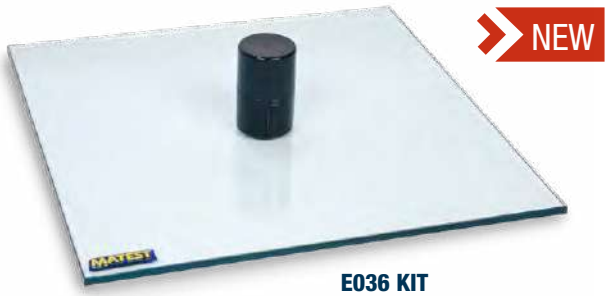
V205 + V230-03
Vacuum pump with hoses. **Power supply:** 230V 1ph 50Hz
See p. 597

E036 KIT
FLUIDITY TEST OF GROUTS FOR PRE-STRESSING TENDONS: GROUT SPREAD METHOD

STANDARD: EN 445 (2007)
The grout spread test measures the fluidity of thixotropic grouts. The fluidity is measured by the diameter of the circle of grout spread on a smooth plate after a fixed period.

E036-01 STIFF PLASTIC MOULD with internal diameter of 39 mm and a height of 60 mm
Weight: 70 g approx.

E036-02 GLASS PLATE, dimensions 305x305 mm



E036 KIT

E038
FLOW CONE APPARATUS

STANDARDS: EN 445 | NF P18-507

Used for viscosity and fluidity determinations of mortars, muds, grouts, pre-stressing tendons, fluid materials, etc. Cone top diameter 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 Ø 8 - 9 -10 -11 mm, stand adjustable in heigh, plastic graduated cup.

Weight: 10 kg approx.

E038

ACCESSORY

E038-01
INTERCHANGEABLE NOZZLE Ø 13 mm

E038-01

E038-02
SIEVE

STANDARDS: EN 445 | NF P18-507

Sieve with Ø 150 mm, 1.5 mm mesh opening.

E037
MARSH FUNNEL MUD VISCOMETER

STANDARDS: ISO 2431

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 approx.

E037

E037-10
SAND CONTENT OF DRILLING MUDS KIT

The Sand Content Kit is a simple, accurate and inexpensive sieve analysis apparatus for determining the sand content of drilling muds. The kit consists of a special 200-mesh sieve 2.5" in diameter, fastened inside a collar upon which a small funnel is fitted on either end. This is used with a 10ml glass measuring tube, graduated to read from 0 to 20% the percentage sand by volume. The collar and funnel are made of polyethylene and the screen is made of brass.
A 500 ml wash bottle and carrying case are included.

Weight: 1500 g

E037-01
BAROID MUD DENSITY BALANCE

It provieds a simple method for the accurate determination of mud density.
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 graduate arm and the counter-weight on the opposite end.

Weight: 3 kg approx.

E037-01

E037-05
FILTER PRESS FOR MUDS

STANDARD: API (American Petroleum Institute), recommended practice 13B-1 and 2

This filter press is the most effective means for determining the filtration properties of drilling muds, fluids and cement slurries.
The filter press consists of a mud reservoir mounted in a frame, a pressure source, a filtering medium, and a graduated cylinder for receiving the measuring filtrate, pack of 100 filter paper, CO^2 pressurized cartridges.

Dimensions:
210x240x500 mm approx.
Weight: 10 kg approx.

E037-05

E037-10

E055N
VICAT APPARATUS
SETTING TIME AND CONSISTENCY OF CEMENT

STANDARDS: EN 196-3 | EN 480-2 | EN 13279-2 (gypsum)
ASTM C191 | AASHTO T131 | NF P15-414, P15-431

The instrument consists of a metallic frame, graduated scale with index, sliding probe of 300 g, consistency plunger Ø 10 mm, glass base plate.
The needle and conical mould are not included and have to be ordered separately according to the selected Standard (see accessories).

Dimensions: 160x200x300 mm
Weight: 5 kg approx.

E055-06

E055N with accessories

NEEDED ACCESSORIES

E046N NEEDLE, hardened Ø 1.13 mm EN 196-3
E046-01N NEEDLE, hardened Ø 1 mm ASTM - AASHTO

E055-10 CONICAL PLASTIC MOULD Ø 70/80 h 40 mm (EN - NF)
E055-05 CONICAL PLASTIC MOULD Ø 60/70 h 40 mm (ASTM - AASHTO)

CONICAL MOULDS TO BS, DIN, UNI SPECIFICATIONS:

E055-04 CONICAL PLASTIC MOULD Ø 80/90 h 40 mm (UNI)
E055-13 CONICAL PLASTIC MOULD Ø 65/75 h 40 mm (DIN)
E055-11 CONICAL BRASS MOULD Ø 80/90 h 40 mm (BS)

ACCESSORIES

E055-06 ADDITIONAL WEIGHT 700 g to the sliding probe (EN - NF)
E042N FINAL NEEDLE Ø 1.13 mm (EN - NF - BS)
E042-01N FINAL NEEDLE Ø 1 mm (Standards: ASTM - AASHTO)
E055-08 GLASS THERMOMETER -10 to +50 °C.
E044-40N CONICAL PENETRATION NEEDLE Ø 8 mm by 50 mm long for gypsum tests. Standards: EN 13279-2 | DIN 1168
E055-15 PROBE, total weight of 100 g for tests on gypsum, EN 13279-2 | DIN 1168

Accessories and Spare Parts for **E055N**

SPARES

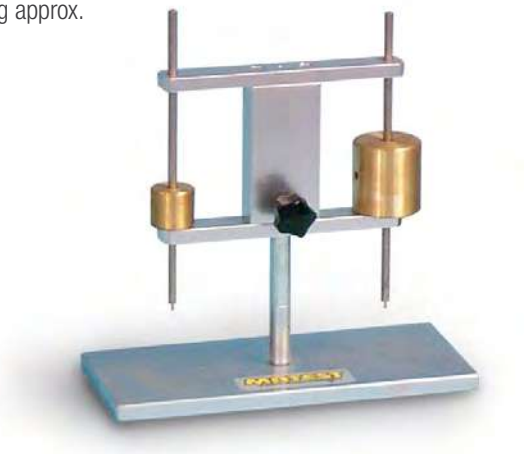
E055-07 Glass base plate Ø 120 mm
E044-48N Tang to fix the needle to the probe
E042-02N Consistency plunger Ø 10x50 mm

E058
GILLMORE APPARATUS

STANDARDS: ASTM C91, C141, C266, C1398 | 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 a diameter of 2.12 mm and a weight of 113 g, while the final setting needle has a diameter of 1.06 mm and a weight of 453.6 g.

Weight: 3 kg approx.



E058

E044N

VICATRONIC - THE WORLD'S MOST POPULAR AUTOMATIC VICAT APPARATUS

AUTOMATIC COMPUTERISED TROPICALIZED VICAT RECORDING APPARATUS

STANDARDS: EN 196-3 | EN 480-2 | EN 13279-2 (gypsum) | ASTM C187, C191 | DIN 1168, 1196 | NF P15-414, P15-431 | AASHTO T131

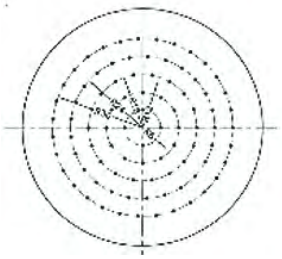
The Vicatronic apparatus, that is designed and manufactured using the most recent and sophisticated technology, is used for the initial and final setting time determination of cements or mortar pastes.
The unit is manufactured with **anticorrosion and tropicalised** components to be used in places with humidity not below 90% and 20°C. controlled temperature as required by EN Specifications.
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 english, french, spanish, german, polish, italian language.
The Vicatronic is supplied with the standard programs to make automatically, all the tests according to the following Standards:
EN 196-3 | EN 13279-2 gypsum | EN 480-2 | ASTM C191 | DIN 1164 | DIN 1168 gypsum | NF P15/431 | BS 4550 | AASHTO T131

MAIN FEATURES

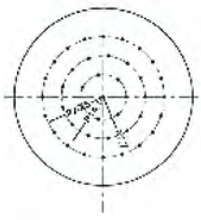
- Large high contrast and high resolution LCD screen.
- Real time graphic display of the test.
- Fully automatic test performance.
- Customizable programs for research tests.
- Suitable to operate through the embedded control unit or a separate PC.

E044N

90 penetrations program



ASTM



EN

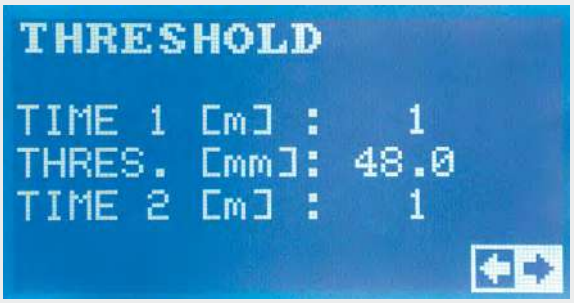
PROBES

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

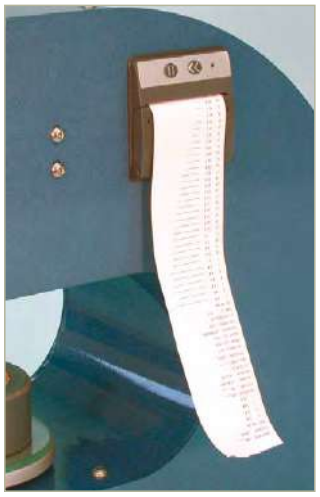
The firmware allows activating a delay on the appliance to the beginning of the test. This program is particularly useful when the approximate setting time of the mortar is known and the operator wants to start the working of the Vicatronic after a certain time in order to concentrate the penetrations 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 data concerning the last test made including a graph tracing each single penetration with its values of time and penetration number (see example printed).



TEST NUMBER : 0996_____
KIND OF TEST : BS4550
POINTS MOVE [mm]
17 0.00
11 10.00
5 10.00
1 10.00
OPERATOR CODE : F_____
CUSTOMER CODE : 2343_____
DATE OF TEST : 15/02/2011
SPECIMEN TIME : 14:36:16
START DELAY[mi: 1
1ST PEN TIME : --:--:--
SPECIMEN TYPE : K5_____
WATER CONT.[%]: 89.0
TEMPERATURE[°C]: 22.3
HUMIDITY[%] : 69.1
FALL TYPE : DRIVEN
TIME TYPE : FIXED
FINAL SETTING : NO
TIME [m] : 1/2

ID	PEN.[mm]	P [m.s]	I [m.s]
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.

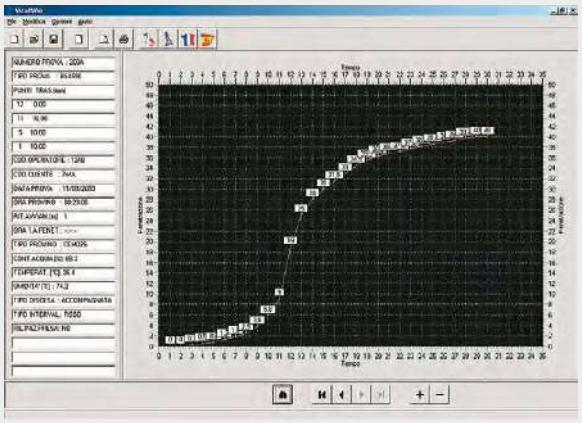
The Vicatronic is supplied complete with the incorporated printer, two hardened needles (one with 1 mm diameter and one with 1.13 mm diameter), two conical moulds EN and ASTM, a glass plate to hold the conical mould.

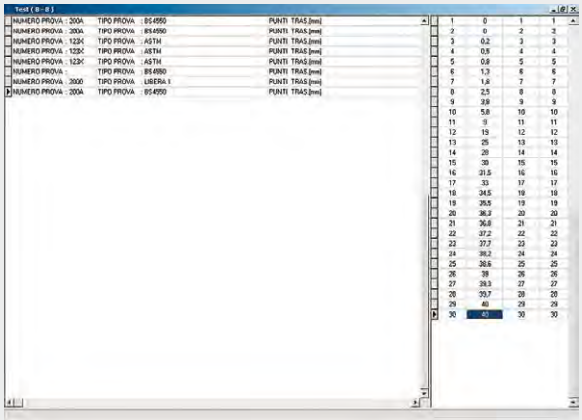
Power supply: 230V 1Ph 50-60Hz 50W
Dimensions: 400x200x470 mm
Weight: 13 kg approx.

E044-03 N
VICATRONIC, identical to mod. E044 N, but with possibility of continuous penetrations each 15 seconds.

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 **VICAT-NET** KIT 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**. For net connection of additional Vicatronics (up to max. 20) see the below accessory mod. E044-13

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).

E044-06
THERMOSTATIC CONTROLLED HEATING/COOLING SYSTEM "TWO" VICATRONIC

NEW

The device produces water with suitable heating and cooling elements at controlled temperature of 20 °C ± 0.5 °C.
The water is forced into the tank E043 and then back to the bath allowing to perform the test at controlled temperature and humidity as requested by EN196-3 Standard. The system accepts ONE or TWO Vicatronic.

E044-06

Specifications:

Water capacity: 7.5 litres approx.
Optimized temperature range: 15 to 25 °C
Accuracy: ± 0.5 °C
Power supply: 230V 1ph 50-60Hz 350W
Dimensions: 415x300x420 mm approx.
Weight: 20 kg approx.

ACCESSORY

B059M-11 TEMPERATURE PROBE, PT100: Measurement of the water temperature in real time. It's connected with the monitor in order to show the temperature during each test

E043

E043
MOULD TANK to test the specimen immersed in water. The test must be performed in room having a controlled temperature of 20 °C ± 1 °C.
The saturated humidity is obtained by the immersion in water of the specimen as required by the standard EN196-3.

GYPSUM TEST

STANDARDS: EN 13279-2 | DIN 1168

E044-40 N
CONICAL PENETRATION NEEDLE, having 8 mm of diameter and 50 mm long, to make gypsum tests following EN, DIN Specifications.

E044-41 N
PROBE 100 g, to make test on gypsum following EN, DIN Specifications.

E044-40N

E044-30
NEEDLE CLEANING DEVICE
It removes the residual cement particles from the needle keeping it constantly lubricated.

E044-30

Accessories and Spare Parts for **E044N**

E042-02N CONSISTENCY PLUNGER Ø 10x50 mm
E042N NEEDLE for final setting Ø 1.13 mm, BS, EN 196-3
E042-01N NEEDLE for final setting ASTM 1 mm diameter.
E044-45 ADDITIONAL 700 g WEIGHT (EN, NF)
E055-04 PLASTIC MOULD Ø 80/90x40 mm high following UNI
E055-11 BRASS MOULD Ø 80/90x40 mm high following BS
E055-13 PLASTIC MOULD Ø 65/75x40 mm high following DIN

SPARES

E046N Ø 1.13 mm hardened needle (EN 196-3)
E046-01N Ø 1 mm hardened 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
E042-06N Probe 300 g to EN 196-3
E044-48N Tang to fix the needle to the probe
C127-11 Thermo-paper roll for printer (pack of 10 rolls)

WATER PERMEABILITY OF ONE-COAT RENDERING MORTARS WITH SUBSTRATES

E035-10
WATER PERMEABILITY DETERMINATION APPARATUS

NEW

STANDARD: EN 1015-21

This apparatus is used to determine the water permeability in one-coat rendering mortars with substrates.
It is composed by a metallic cone having base diameter of 200 mm and a reference mark at 100 mm.
A glass burette 1000 ml capacity with 1 ml graduations is fixed up the cone through a suitable base with rod and clamps.

Dimensions: 1400x300x300 mm approx.
Weight: 10 kg approx.

E035-10

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.
Technical details:
see mod. A024N, p. 25 section Aggregates.

A024N

WORKABILITY TEST DETERMINATION FOR GROUT OR MORTAR FLOW

E059
FUNNEL GROOVE

CONSISTENCY OF GROUTS

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. The apparatus consists of a metal groove with a funnel fixed on one end. Supplied complete with gratuated rule, spirit level and feet.

Dimensions: 960x210x400 mm
Weight: 10 kg approx.

E059

E060

E060-01

E060-03

DETERMINATION OF THE FREE EXPANSION IN PLASTIC PERIOD, and of the exudation quantity of the mixing water on expansion pre-mixed 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 Ø 99x120 mm with 3 hermetic covers.

E061N
CALORIMETER
HEAT OF HYDRATION OF CEMENT
STANDARDS: EN 196-8 / ASTM C186

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, and filler glass funnel.

The standard supply **does not include**:
- the thermometer (to be selected from digital models; see accessories)
- the propeller (selecting it from the specific Standard; see accessories)

which must be ordered separately.

Power supply: 230V 1ph 50Hz 150W
Dimensions: 350x250x680 mm
Weight: 12 kg approx.

E061N Open **+ E062-04**

NEEDED ACCESSORIES

E062-04 DIGITAL THERMOMETER. Resolution: 0.01 °C. Complete with probe, or:

E062-04N DIGITAL THERMOMETER. Resolution: 0.001 °C.
- Memory for 10000 readings
- Displays, stores and prints: min, max, mean values, delta T
- Alarm if limit values are exceeded
- Battery operated

E061-11 PROPELLER, conforming to ASTM C186 Specifications, or:

E061-12 PROPELLER, conforming to EN 196-8 Specifications.

E062-04N

E061-12

E061-11

ACCESSORY

V300-19 PARAFFIN WAX with melting point 55 °C to coat the glass parts which are in contact with the hydrofluoric acid. Pack of 5000 g.

SPARES

E062-01 Dewar flask

E062-03 Filler glass funnel

E062-10
LANGAVANT CALORIMETER
STANDARD: EN 196-9

Used to determine the heat of hydration of cements by means of semi-adiabatic method.
The equipment consists of:
1 testing calorimeter and 1 reference calorimeter, each one with official calibration certificate; 2 Pt100 temperature probes;
1 electronic module with 6 channels and USB cable for PC connection; PC software; 50 mortar boxes; 20 sand bags (1080 g each); calibration cylinder.
To perform a test a PC is required.

E062-10

E070
AUTOCLAVE
SOUNDNESS (EXPANSION) OF PORTLAND CEMENT

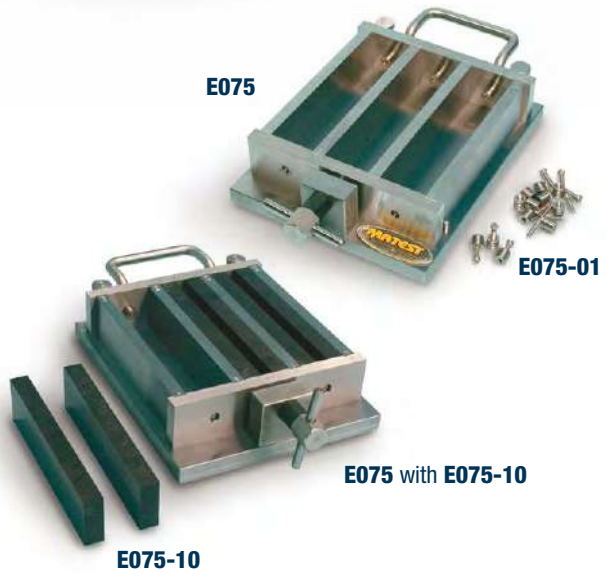
STANDARDS: Comparable to ASTM C151 | AASHTO T107

It consists of a high pressure boiler made from special alloy steel, inside Ø 154x430 mm high, receiving a holding rack for 10 cement specimens. The heating system is achieved by electric resistances. The separate control panel encloses a **digital thermometer** to visualize the boiler temperature, pressure gauge scale 0 - 600 psi with built in pressure regulator and power switches.
Supplied complete with rack for holding the specimens and safety valve with PED Cat. certificate according to the 97/23/CE Standard. Not seleable on CE market.

Power supply: 230V 1ph 50Hz 3500W 295psi
Dimensions: 490x490x980 mm
Weight: 150 kg approx.

Rack for specimens

E070



E075

E075-01

E075 with **E075-10**

E075-10

MOULDS FOR SOUNDNESS (EXPANSION) AND SHRINKAGE TESTS (with length comparators, see next page)

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 approx.

E073
STANDARD: BS 1881, 6073
TWO GANG PRISM MOULD to produce 75x75x254 mm specimens.
Complete with 4 steel inserts. **Weight:** 9 kg approx.

E072-01
CONTACT POINTS stainless steel, spare for E072 and E073 moulds.
Pack of 10 pieces.

E073

E072

E072-01

E075
THREE GANG PRISM MOULD
FOR 40.1x40x160 MM MORTAR SPECIMENS

STANDARD: EN 12617-4
Comparable to: ASTM C438, NF P15-433

Used for the determination of linear shrinkage of cement mortar.
Manufactured from steel with hardness over 200 HV.
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.

Weight: 8.6 kg approx.

SPARE

E075-01 Contact points, stainless steel, complete with fixing screw. Pack of 12

ACCESSORIES

E075-10 STANDARD: EN 12808-4
SPACER, teflon made, dimensions 15x40x160 mm to put into the chamber of the E075 mould, to produce 10x40x160 mm specimens for shrinkage tests as per EN 12808-4 Standard.
Pack of 6 spacers.

E075-11 INSERTS, for the 10x40x160 mm specimen.
Standard: EN 12808-4
Pack of 12 inserts.

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 approx.

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 approx.

E107-01 CONTACT POINTS, spare for E107 and E113 moulds. Pack of 12 pieces.

E113 **E107** **E107-01**

LENGTH COMPARATOR

STANDARDS: EN 12617-4, 1367-4, 12808-4 | ASTM C151, C490 | NF P15-433, P18-427 | BS 1881:5, 6073 | DIN 1164

Used to measure the length variations of mortar specimens after autoclave soundness tests. The top beam is adjustable to suit the specimen's length.

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

40x40x160 mm	EN 12617-4, EN 12808-4, ASTM C348, UNI 6687, NF P15-433, DIN 1164
25x25x250 mm	ASTM C490
70x70x280 mm	NF P18-427
75x75x254 mm	BS 1881, 6073
50x50x200 mm	EN 1367-04

Supplied **without reference rod** (see accessories)

Dimensions: Ø 180x450 mm
Weight: 10 kg approx.

E077 KIT + E078-01

E078 KIT + E078-04

MODELS

E077 KIT

LENGTH COMPARATOR with Analogic Dial Indicator, 5 mm travel by 0.001 mm divisions, mod. S375

as an alternative:

E078 KIT

LENGTH COMPARATOR with Digital Gauge 12.7 mm travel by 0.001 mm divisions mod. S382-01, complete with battery and RS232 connection to PC.

ACCESSORY for mod. E078 KIT

S382-13 CABLE to connect S382-01 and S383 to PC through USB port for direct visualization and recording of the measurement.

ACCESSORIES for E077 KIT and E078 KIT

E078-04 REFERENCE ROD, Invar, for 40x40x160 mm specimens. Standards: EN 12617-4, EN 12808-4, NF P15-433

E078-01 REFERENCE ROD, Invar, for 25x25x250 mm and 75x75x254 mm specimens.
Standards: ASTM C490, BS 1881, UNI 8520

E078-03 REFERENCE ROD, Invar, for 70x70x280 mm specimens. Standard: NF P18-427

E078-06 REFERENCE ROD, Invar, for 50x50x200 mm specimens. Standard: EN 1367-04

E078-05 REFERENCE ROD, Invar, 280 mm long.

SOUNDNESS OF CEMENT AND LIME

STANDARDS: EN 196-3 | EN ISO 9597 | BS 6463 | NF P15-432
UNE 80102

E064N
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, supplied with the bath. 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.
The bath is equipped with security device which cuts the power out in case of overheating of the resistance due to lack of water.

Power supply: 230V 1ph 50-60Hz 1800W
Dimensions: 405x265x205 mm
Weight: 7 kg approx.

NEW

E064N

Rack detail with **E065**

E066
LE CHATELIER MOULD

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

Weight: 30 g

E065

E066

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.
Chromed finishing.
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.

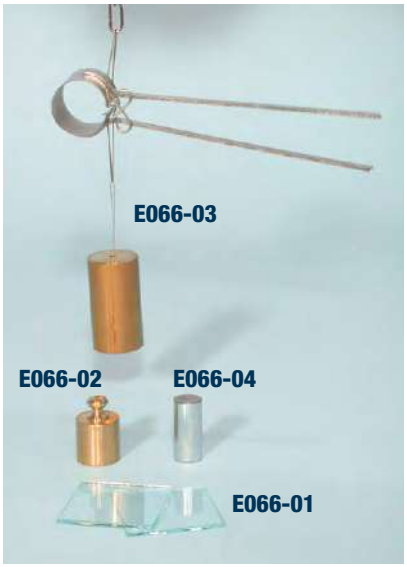
ACCESSORIES

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.

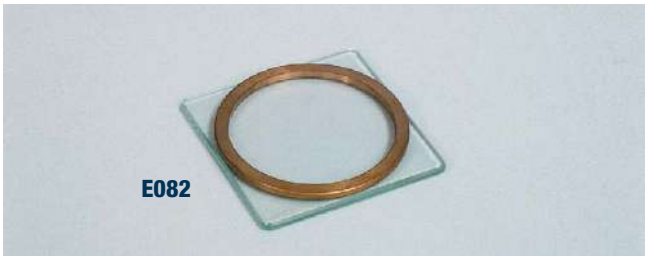
E066-04 TAMPING ROD 17 mm diameter.
Weight: 70 g



E082
PAT TEST
SOUNDNESS OF HYDRATED LIME AND GYPSUM PLASTERS

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 perform one test, three moulds are required.



E082

E081-10
STEAM BATH
SOUNDNESS OF BUILDING LIME DETERMINATION

STANDARD: EN 459-2

This bath is used for the determination of the soundness of building limes subjected to steam action at atmospheric pressure for 180 minutes time.

The steam bath, all stainless steel made, holds up to 12 Le Chatelier moulds, approx. 50 mm over the water level.

Two heating elements of 1200W and 200W reach the water boiling point in 30 minutes; now a timer disconnects the 1200W element, and the water temperature is maintained by the second element, as requested by the Standard.

The cover has a device avoiding the condensed water to drop on the specimens.

Power supply: 230V 1ph 50-60Hz 1400W
External dimensions: 455x215x350 mm
Inner dimensions: 300x150x260 mm
Weight: 9 kg approx.

ACCESSORIES

E066 LE CHATELIER MOULD Technical details : see p. 398
E066-01 GLASS PLATE, 50x50 mm. Pack of 2 pieces.
E066-02 WEIGHT, 100 g.
E066-03 EXTENSIBILITY of mould apparatus.
E066-04 TAMPING ROD, Ø 17 mm x 70 g weight.

E081-10

E082-11N
WATER VAPOUR PERMEABILITY TEST CELL

STANDARD: EN 1015-19

Used to determine the water vapour permeability of hardened rendering and plastering mortars.

Manufactured from PVC material, resistant to corrosion, it has an opening of approx. 0.02 m^2, on which the test sample is sealed

Dimensions: Ø 150 mm by 55 mm
Weight: 600 g approx.

NEW

E082-11N

Disassembled Assembled

POTENTIAL ALKALI REACTIVITY OF CEMENT-AGGREGATE COMBINATIONS

E067-05
MORTAR BAR CONTAINER

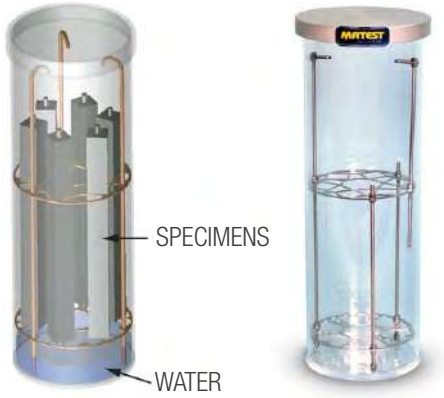
STANDARDS: ASTM C227, C1260, C1567 | UNI 8520-22

This test method covers the determination of the potential alkali reactivity of cement-aggregate combinations (mortar bar method).

The device is composd by an acrilic cylinder container with a stainless steel rack.

Dimensions: Ø 170 mm x 450 mm
Weight: 3 kg approx.

Note: Prism moulds, length comparator and accessories: see p. 397



Example **E067-05**

E081
MORTAR WORKABILITY APPARATUS

STANDARDS: EN 413-2 | NF P18-452

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 stats 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: 230V 1ph 50Hz 110W
Dimensions: 400x200x200 mm
Weight: 18 kg approx.

E081

WORKABLE LIFE AND CORRECTION TIME OF FRESH MORTAR

STANDARD: EN 1015-9 Method A

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 workable life and correction time of fresh mortar, and for the determination of stiffening time on products and systems for the protection and repair of concrete structures. Complete with container.

Dimensions: 380x300x500 mm
Weight: 12 kg approx.

E083-10

SPARE

E083-11 CONTAINER, rigid aluminium made, Ø 90 by height 60 mm, complete with cover.

ACCESSORY

V075-12SP DIGITAL BALANCE, 16 kg capacity and 0.1 g division, with hold of the breaking load and with tare.

E083-10

V075-12SP

E067
CRAKING 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

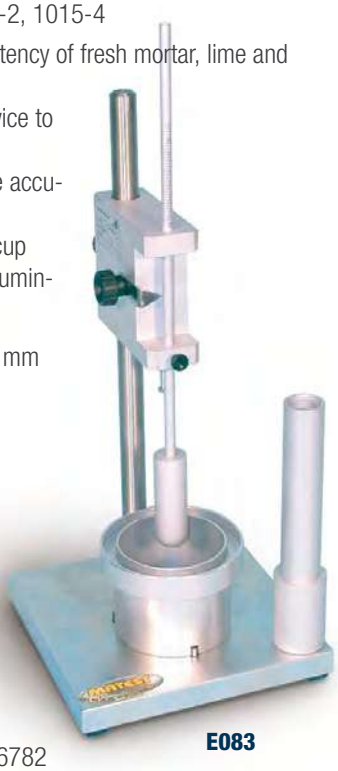
E083
PLUNGER PENETRATION APPARATUS

MASONRY CEMENT, BUILDING LIME CONSISTENCY

STANDARDS: EN 413-2, 459-2, 1015-4

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 approx.



E083

E080
PLASTER EXTENSOMETER

STANDARDS: BS 1191 | UNI 6782

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

A105
CALCIMETER CARBONATE CONTENT $CACO^3$ IN LIMESTONE AND LIME MARL

Specifications: see p. 60

E082-01N
WATER RETENTION

STANDARDS: EN 413-2

Used for determining the water retention of masonry cements.
Made from rigid plastic inside
Ø 100 ± 1 mm, inside height 25 ± 1 mm

Weight: 300 g approx.


E082-01N


A105

FLOW TABLES

FOR FLOW AND WORKABILITY TESTS OF MORTAR AND LIME

STANDARDS: EN 459-2, EN 1015-3, EN 13279-2 I ASTM C230 I *comparable to BS 4551-1

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, EN 1015-3 and EN 13279-2 Specifications.

Power supply (motorized models): 230V 1ph 50Hz 150W
Weight: 25...60 kg approx.

E090 KIT

E090-01 KIT

E086 KIT

ACCESSORIES

E087-01 FLOW CALLIPER to ASTM and BS Standards, for measuring the diameter of the sample. Brass made. Weight: 450 g.

E090-08 FLOW CALLIPER to EN 459-2 and EN 1015-3 Specifications.

E087-01

E090-08

E087 KIT

SPARE

E085-07 FILLING HOPPER to the mould. Standard: EN 459-2.

Model	Standard	Operated Hand	Operated Motorized	Table Ø mm	Drop height mm	Spare mould	Spare tamper
E086 KIT	ASTM C230 *(BS4551-1)	▼		254	12.7	**E087-05**	**E087-06**
E087 KIT	ASTM C230 *(BS4551-1)		▼	254	12.7	**E087-05**	**E087-06**
E090 KIT	EN 459-2 EN 1015-3 EN 13279-2	▼		300	10	**E085-05**	**E085-06**
E090-01KIT	EN 459-2 EN 1015-3 EN 13279-2		▼	300	10	**E085-05**	**E085-06**

E092M KIT
MIXMATIC
AUTOMATIC PROGRAMMABLE COMPUTERIZED MORTAR MIXER HIGH PERFORMANCE

STANDARDS: EN 196-1, EN 196-3, EN 413-2, EN 459-2, EN 480-1 | DIN 1164-5, DIN 1164-7 | ASTM C305M | AASHTO T162

Mixmatic has an extremely sturdy fabricated frame for an intensive laboratory use. Complete with stainless steel polished beater, mixing bowl and automatic sand dispensers 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).

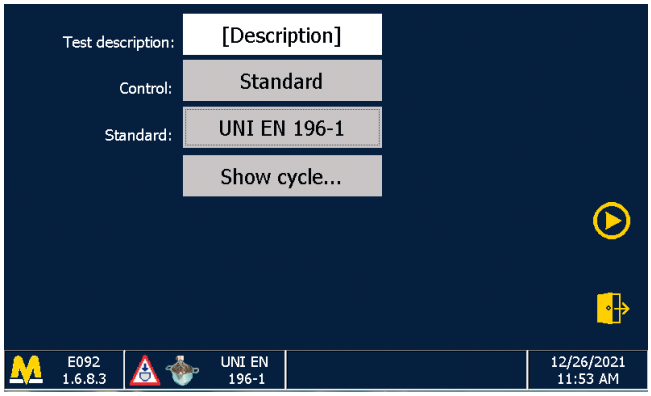
E092M KIT

Firmware:

- Different automatic programmable mixing cycles conforming to the a.m. Standards.
- The operator can also program up to 30 automatic personalized mixing cycles, easy to set through Touch Screen.
- Synchronised acoustic signals with cycle steps.
- Electronic control unit, that runs like a standard PC based on Windows operating system for the management and analysis of the data, test results, graphs. The touch-screen icon interface allows an easy set up of the parameters and immediate execution of the test.
  Unlimited memory storage through the USB port.
- 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 select different languages.
- 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.
- Graphic display TFT 7", 800x480 pixel, Touch Screen.

MAIN FEATURES

- Rugged design.
- Planetary transmission for silent and low maintenance operation.
- Transparent CE-conform protection of the mixing area, to allow the mixture looking during the test.
- Digitally controlled rotation speed.
- 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.
- Emergency stop button.

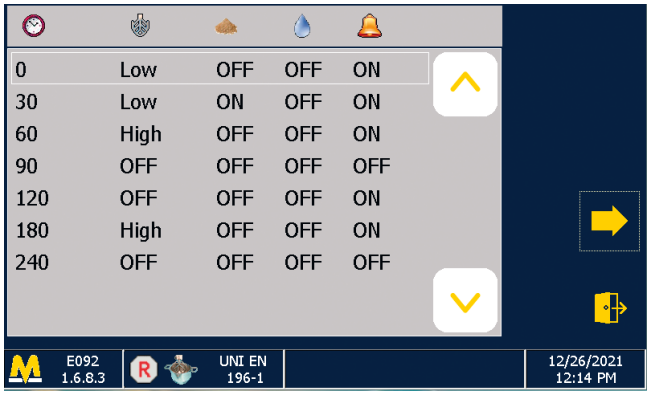


Selection of the Standard

Power supply: 230V 50-60Hz 1ph
Dimensions: 580x570x830 mm
Weight: 85 kg approx.

E092M KIT MIXMATIC

Test execution



Personalized cycle composition

E092-05 **E092-06**

ACCESSORIES and SPARES

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.

E092-10 SPARE stainless steel bowl.

E095-04 SPARE stainless steel beater, accurately polished.

E097-01N REFERENCE SAND, size from 0.08 to 2 mm to EN 196-1 Standard.
Bag of 1350 g. Pack of 16 bags for total of 21.6 kg

E097-01N **E095-04** **E092-10**

E097-02 GRADED NATURAL SILICA SAND, type Ottawa, to ASTM C109, C778 Standards. Bag of 25 kg

E097-02

Use examples

MORTAR MIXERS

STANDARDS: EN 196-1, EN 196-3, EN 413-2, EN 459-2, EN 480-1 | DIN 1164-5 | ASTM C305M | AASHTO T162

NEW

E093N + E095-03

MODELS

E093N
AUTOMATIC MORTAR MIXER

This very robust mixer is expressly designed for the efficient mixing of cement pastes and mortar, with **four** automatic sequences of mixing cycle, in compliance with:
EN 196-1, EN 196-3, EN 480-1, ASTM C305M 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 (EN 196-1 program). Complete with safety door conforming to CE Safety Directive; if opened it automatically stops the machine.
Supplied complete with stainless steel bowl, bajonet coupling between beater and shaft, but **without beater** which has to be ordered separately (see mod. E095-03 or E095-04).

Power supply: 230 V 1ph 50 Hz
Dimensions: 450x480x760 mm.
Weight: 55 kg approx.

E094N + E095-03

E094N
MORTAR MIXER

Basically similar to mod. E093N, 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 CE markets.

Dimensions: 450x480x680 mm
Weight: 45 kg approx.

E094NSP + E095-03

E094NSP
MORTAR MIXER

Same as mod. E094N but equiped also with sand dispenser.

E095N
MORTAR MIXER

Basically similar to mod. E094N, but complete with sand dispenser and safety door to CE Safety Directive.
Two speeds can be selected. Supplied complete with stainless steel bowl, but **without beater** which has to be ordered separately.

Dimensions: 450x480x760 mm
Weight: 45 kg approx.

E096-01

E095N + E095-03

ACCESSORIES FOR E093N, E094N, E095N MIXERS

E095-03 STAINLESS STEEL BEATER with bayonet fittings.

E095-04 STAINLESS STEEL BEATER with bayonet fittings. The beater is accurately polished to eliminate the porosities.

B028-03 WHISK BEATER, thin wire, stainless steel, for mixing admistured and other materials.

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. E093N and E095N mixers.

E097-01N REFERENCE SAND, size from 0.08 to 2 mm to EN 196-1 Standard.
Bag of 1350 g. Pack of 16 bags for total of 21.6 kg

E097-02 GRADED NATURAL SILICA SAND, type Ottawa, to ASTM C109, C778 Standards. Bag of 25 kg

B028-03

E097-02

SPARE PARTS FOR E093N, E094N, E095N MIXERS

E095-01 Stainless steel bowl

E095-05 Bajonet coupling between beater and shaft

E142
DIGITAL PULL-OFF (BOND) STRENGTH TESTER. CAPACITY: 16 KN

STANDARDS: EN 1542, EN 1348, EN 1015-12, EN 13687-2, EN 13963, EN 14496 / NF P18-858 / BS 1881:207

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.
The three feet of the unit can be fixed in the **large** position (overall dimensions 176 mm diameter, see drawing "A") with very stable bearing, or in the **compact** position (overall dimensions 92.5 mm diameter, see drawing "B"), to perform tests in narrow spaces, or for specimens close one to the other.

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.

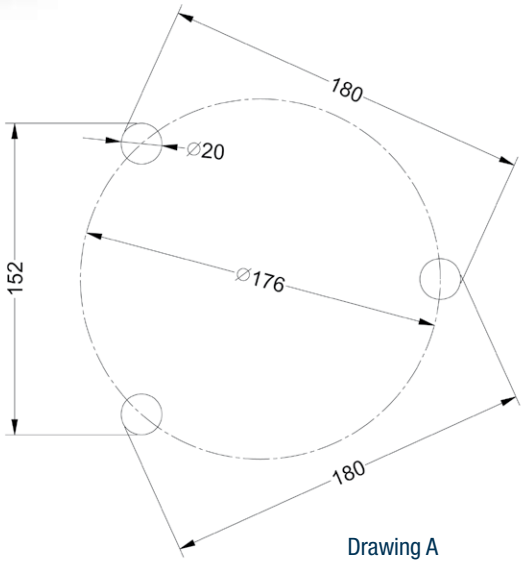
Dimensions: 410x210x270 mm
Weight: 5.5 kg approx.

E142
with feet
in large position

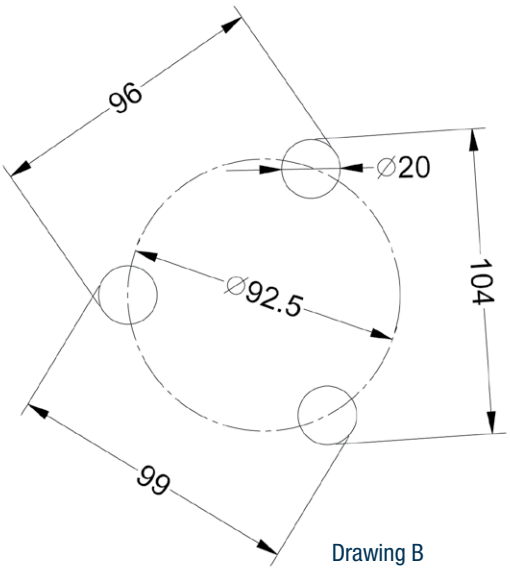
E142-01
DIGITAL PULL-OFF TESTER CAPACITY: 5 KN

Identical to mod. E142 but with load cell and digital display range 0-5 kN for more accurate measurements on low strength values

E142
in aluminium case



Drawing A



Drawing B

E142
with feet
in compact position

ACCESSORIES

E142-10 SOFTWARE complete with connection cable to download test results to the PC

E143 ADHESION TEST ALUMINIUM DISC 20 mm Ø by 21 mm thick (n° 10 pieces)

E143-01 ADHESION TEST ALUMINIUM DISC 50 mm Ø by 31 mm thick (n° 10 pieces)

E143-10 ADHESION TEST STAINLESS STEEL DISC 50 mm Ø by 21 mm thick (n° 10 pieces) It conforms to EN 1015-12 Specification.

E143-13 ADHESION TEST ALUMINIUM DISC, square, 50x50 mm, 21 mm thick (n° 10 pieces)
Standard: EN 1348

E143-11 CYLINDRICAL RING, having truncated cone shape, inside Ø 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.

E143-12 ACRYLIC ADHESIVE GLUE, 300 ml. cartridge, complete with small pump and nozzles.

SPARE

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

E143-13

E102
THREE GANG MOULD
FOR 40.1x40x160 MM PRISMS
STANDARDS: EN 196-1 I EN ISO 679

Steel manufactured with **hardness of inside walls over HV 200**, 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 40.1x40x160 MM PRISMS
STANDARDS: EN 196-1 I EN ISO 679

Identical in shape to mod. E102, but manufactured from heavy duty steel **with hardness of inside walls over HV 500** (EN196/1 Specifications recommend hardness HV 400). 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.

E105
THREE GANG MOULD
FOR PRISMS 40x40x160 MM
STANDARDS: NF P15-413 I ASTM C348 I DIN 1164, 1060

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

Weight: 8 kg approx.

ACCESSORIES

E106 FEED HOPPER, used to fill the mould E102, E103, E105 when it is mounted on the Jolting machine E130, E131 Made from cast aluminium. Weight: 1 kg

E102-02 LARGE AND SMALL SCRAPER to EN 196-1

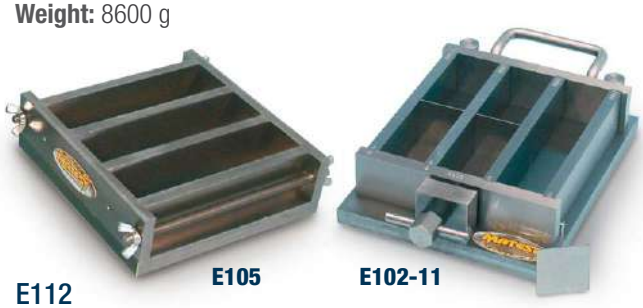
S200-11 STRAIGHT EDGE 300 mm long.

E102-03 GLASS PLATE 220x190x6 mm to cover the mould.

E102-11
SIX GANG MOULD FOR 40.1x40x80 MM
STANDARD: EN 12808-5

DETERMINATION OF WATER ABSORPTION on grouts for floor or wall installation of ceramic tiles.
Identical to mod. E102, but equipped with three stainless steel partitions, positioned in the middle of the gangs, to obtain six gangs having dimensions 40.1x40x80 mm approx.

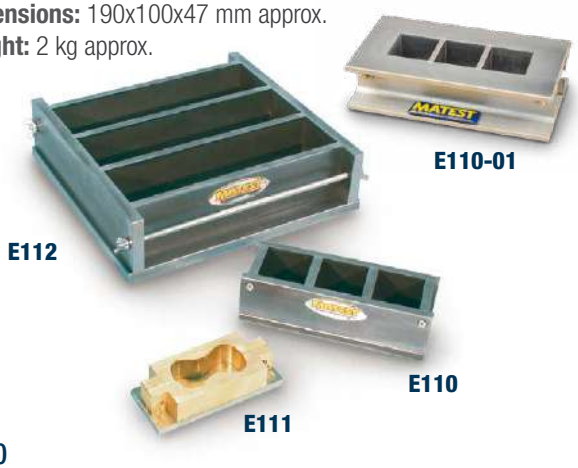
Weight: 8600 g



E112
THREE GANG MOULD FOR 70.7x70.7x282.8 MM
STANDARD: NF P18-401
Made from steel. **Weight:** 17 kg approx.

E111
BRIQUETTE MOULD
STANDARDS: ASTM C190, C307 I AASHTO T132
Accurately machined it conforms to the above Specifications and is easily collapsible. Complete with base. **Weight:** 3 kg

E110-01
THREE-GANG MOULD FOR CUBE 40 MM NEW
Ground steel mould for three cubes 40mm sides.
Dimensions: 190x100x47 mm approx.
Weight: 2 kg approx.



E110
50 MM THREE GANG CUBE MOULD
Made from steel, hardness 55 HRB, ti can be also used for soil and other materials. **Weight:** 6 kg approx.

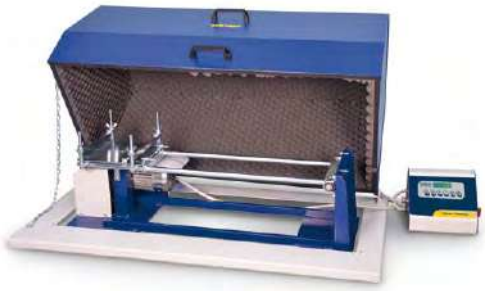
E130
JOLTING APPARATUS

STANDARDS: EN 196-1 | EN ISO 679

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 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.
The apparatus accepts moulds Matest made, and also of other manufacturers.

Power supply: 230V 1ph 50Hz 500W
Dimensions: 1000x380x420 mm
Weight: 65 kg approx.

E130



E130-11 + E130

E130-11
CABINET

Manufactured from sheet steel, internally lined with sound-proofing material for noise reduction, to be used with the Jolting apparatus E130, E131.
Front opening with rear hinges and jacks to facilitate the lifting.
Concrete base minimum 1350 x 670 mm is requested.

Dimensions: 1300x510x700 mm
Weight: 25 kg approx.

E131N
JOLTING APPARATUS HIGH PERFORMANCE

STANDARDS: EN 196-1 | EN ISO 679

Similar to model E130, but manufactured with oversized components, treatments and extremely accurate couplings for intensive use in heavy conditions.
Motor feeded by an inverter to grant the keeping of 60 revolutions per minute in any condition.

Power supply: 230V 1ph 50-60Hz 500W
Weight: 93 kg approx.

E131N with mould and hopper

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: 230V 1ph 50Hz 250W
Weight: 100 kg approx.

E132 with mould

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 approx.

E133

WATER BATHS FOR CEMENT CURING
AND FOR GENERAL LABORATORY PURPOSE

STANDARDS: EN 196-1, 196-8 / ISO 679 / ASTM C109, C511
Double walled all stainless steel made, with wool insulation and water circulation electric stirrer, the bath ensures an uniform and constant temperature.
Temperature range: from ambient to +60 °C with accuracy of ± 0.4 °C at 20 °C.
The bath is equipped with digital thermostat and a dual safety thermostat with higher thermic threshold ensuring safe working conditions.
A cooling coil device to be connected to the water net is used when room temperature exceeds the requested one, with possibility to reduce the bath temperature within the room and water net conditions.
The specimens are held by a perforated shelf spaced from the bottom.

MODELS

E136
WATER BATH, 40 LITRES CAPACITY

It can hold over 60 specimens 40.1x40x160 mm

Internal dimensions: 510x350x230 mm
Overall dimensions: 680x420x420 mm
Power supply: 230V 1ph 50-60Hz 1200W
Weight: 28 kg approx.

E136-01
WATER BATH, 200 LITRES CAPACITY

Internal dimensions: 900x600x360 mm
Overall dimensions: 1050x680x430 mm
Power supply: 230V 1ph 50-60Hz 4000W
Weight: 55 kg approx.

B052-02
WATER BATH WITH COOLING DEVICE

Similar to mod. E136, but with temperature range: +3 to +95 °C.
Accuracy of ± 0.4 °C at 20 °C.
The cooling unit is housed under the water bath.

Iside dimensions: 635x360x205 mm
Outside dimensions: 800x430x1000 mm
Power supply: 230V 1ph 50Hz 1650W
Weight: 60 kg approx.

B052-02

ACCESSORY

E136-10
CONTROL THERMOMETER range 0-50 °C div. 0.5 °C.

E136

E136-01

E139
CURING CABINET

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 60 °C, with digital thermostat.
Humidification achieved through water heating.
A dual safety/thermostat with higher thermic threshold ensures safe working conditions.

Power supply: 230V 1ph 50-60 Hz 1000 W
Inside dimensions: 620x440x400 mm
Overall dimensions: 900x700x800 mm
Weight: 60 kg approx.


E139

ACCESSORY

V165 THERMO-HYGROMETER for humidity and temperature control. Technical details: see p. 592

E138
LARGE CAPACITY CURING CABINET

STANDARDS: EN 196-1, 196-08 I ISO 679 I ASTM C109, C511

For curing large quantities of mortar, cement and concrete specimens, at controlled humidity and temperature.
Aluminium and policarbonate made, it is complete with precision digital thermostat and four robust 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 mod. E141)
Temperature range: from ambient to +30 °C, accuracy ± 1 °C.
The cabinet requires a compressed air source. (see accessory)

Inside dimensions: 1090x470x1200 mm
Overall dimensions: 1350x570x1600 mm
Power supply: 230V 1ph 50-60Hz 2000W
Weight: 100 kg approx.

E138

ACCESSORIES for mod. E138

V206-01 AIR COMPRESSOR, air displacement: 250 litres/min. Tank capacity : 100 litres (see p. 598) Recommended for standard use.

V206-02 AIR COMPRESSOR, air displacement: 400 litres/min. Tank capacity : 200 litres (see p. 598) Recommended for intensive or continuous use .

E138-11 TUBING AND ACCESSORIES to connect the E138 cabinet to the air compressor

E134-11 PAN, 240x300x70 mm, polythene made, it accepts up to six 40.1x40x160 mm prisms for curing in water.

E134-11

ACCESSORY for mod. E136, E136-01, E138

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.
Complete with tubing and accessories for bath connection.

Power supply: 230V 1ph 50Hz 750W
Dimensions: 550x500x880 mm
Weight: 55 kg approx.

E141

E140
CURING BENCH WITH COOLING HEATING SYSTEM

Suitable for curing large quantities of cement, mortar and concrete specimens at controlled temperature and humidity.
Temperature range: +18 °C to +30 °C with accuracy ± 1 °C
Humidity range: 95% to saturation
Useful capacity: 540 litres
Fully stainless steel made with insulation panels.
N. 4 access doors with 4 grids, 530x310 mm each, adjustable in height. Thermostatic group including refrigerating unit, compressor, condenser, evaporator, control and safety devices are installed laterally for easy inspections.
The upper side can be used as working bench.

Power supply: 230V 1ph 50-60Hz
Dimensions: 2250x1010x850 mm
Weight: 200 kg approx.

NEW

E140

COMPRESSION AND FLEXURAL TESTING MACHINES FOR MORTAR STRENGTH DETERMINATION

In the cement and mortar section we are in the position to supply the widest and most complete range of compression/flexural testing machines today available in the worldwide market, making Matest the leader manufacturer of strength testing machines.
The versatility and flexibility of Matest production range allows the enduser to select a cement compression/flexural frame to be combined with another frame (like for example concrete compression frame) in order to satisfy and to personalize any specific requirement.

The next pages describe:

- Measuring and control systems (p. 413...416)
- Unitronic 50 kN and Unitronic 200 kN universal multipurpose compression/flexural and tensile frames (p. 416)
- Two columns machines with only one measuring range for **compression tests only** and 250kN or 500kN capacity load (p. 418...421)
- Two columns machines with **double measuring range** with the same testing chamber, for **compression and flexural tests**. Ranges: 250kN or 500kN for compression tests, and 15kN for flexural tests (p. 422...425)
- Machines with **double testing chamber** and **two independent measuring ranges**, for **compression** tests in the chamber 250kN or 500kN capacity, and **flexural** test in the chamber 15kN capacity (p. 426)
- Combined groups for compression and flexural tests on mortars, compression/flexural tests on concrete, splitting, block tests; suitable to personalize and satisfy any specific requirement (p. 429)

C108N DIGITEC | C098N AUTOTEC

Two-channels computerised graphic display system to control and manage all sorts of automatic (Autotec C098N) and semi-automatic (Digitec C108N) testing machines, for acquisition, display, processing, printing and saving the test data and certificates, with software for remote control from PC.

SUITABLE TO UPGRADE OR COMPLETE YOUR CONCRETE OR MORTAR COMPRESSION AND FLEXURE TESTING MACHINE (also from other manufacturers).

Specifications Digitec / Autotec:

- **2 analogue-digital channels** accepting sensors, transducers or load cells at 2mV/V, allows the connection to two different compression/flexure frames.
- Simple and immediate parameters set up and test execution, menu driven interface.
- Rapid approaching, touching on and breaking of the specimen under direct pump control (Autotec C098N)
- Automatic control of the pace rate (Autotec C098N)
- Continue load display.
- Breaking load detection.
- Automatic elaboration of the specific resistance value.
- Permanent file up to 1000 tests and file of 100 different types of specimens.
- Graphic display with high resolution: 192x64 pixels.
- Selectable measuring force: kN, lb
- Languages: English, French, German, Spanish, Italian, Polish, Czech, Turkish.
- **Class:** 1 accuracy starting from 10% of maximum value, on request from 1% of maximum value.

Technical details and accessories: see p. 219

APPLICATIONS

Compression and Flexure on Mortars

Compression on concrete

Flexure on concrete

Splitting on concrete cubes and cylinders

C109N CYBER-PLUS | C104N SERVO-PLUS

An electronic evolution with 8 analog inputs for compression and flexural testing machines on concrete and mortar.

Designed with the latest technology, an innovative PC-like Touch Screen system, employed to control and manage all sorts of automatic (Servo-Plus Evolution C104N) and semi-automatic (Cyber-Plus Evolution C109N) testing machines.
To update or complete your compression and flexural testing machine on concrete and mortar (also on Non-Matest brands)

APPLICATIONS


Compression and Flexure on Mortars


Compression on concrete

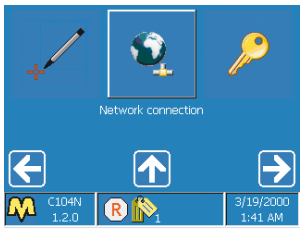

Flexure on concrete


Splitting on concrete cubes and cylinders


Tensile on steel

MAIN FEATURES

- The control unit Cyber/Servo-Plus Evolution runs like a standard PC based on Windows operating system.
- The touch-screen graphical user-friendly interface allows an easy set up of the parameters and an immediate execution of the test.
- High resolution color display, ¼ VGA, offers all the functions of a PC for the management and analysis of data, test results, and graphs.



Internet direct connection for remote assistance

Windows operating system

3 OPERATING MODES

1 Control from user friendly Touch-Screen display

2 Large directional arrow-keys for gloved use

3 Connection of a keyboard or mouse

Direct connection of the Cyber/Servo Plus Evolution to the Intranet (direct connection to a LAN network) and Internet to establish a remote communication and receive diagnostic analysis of potential problems, the ability to execute the test from distance and provide software updates. Matest technicians will check the unit located abroad to guarantee a prompt and professional assistance.

MAIN FUNCTIONS

- More intuitive interface which simplifies the use of the machine (test begins after a few simple inputs)
- Greater calculation ability and data display (on board charts and graphic print-outs)
- High management capacity for the multilingual framework and international settings (date and time, decimal units, unit of measure).
- Elastic software which allows the installation of new tests when desired.
- Profile configuration manager
- Configuration and calibration supervision of the analog channel
- Alarms manager
- Ethernet parameters configuration
- International settings configuration
- Hardware diagnosis functions
- Functions for the software updates and licenses
- Execution of tests through parameters set up customization
- Several levels of protection (passwords) to prevent the accessibility to the configuration menus by unauthorized staff.

Cyber-Plus Evolution C109N and **Servo-Plus Evolution** C104N are supplied complete with licenses for the execution of the following tests:

- COMPRESSION on mortar
- FLEXURAL on mortar
- COMPRESSION on concrete
- FLEXURAL on concrete
- SPLITTING TEST on cylinders and concrete cubes

In accordance to the following standards: EN, ASTM, BS, NF, DIN etc.

Technical details, features and accessories: see p. 224

S205N
UNITRONIC 50 KN
UNIVERSAL MULTIPURPOSE TOUCH-SCREEN FRAME

COMPRESSION/FLEXURAL AND TENSILE FRAME FOR:

- COMPRESSION / FLEXURAL TESTS, 50 kN MAX. CAPACITY LOAD
- TENSILE TESTS, 25 kN MAX. CAPACITY LOAD (see mod. S205-05N)

WITH AUTOMATIC LOAD OR DISPLACEMENT/DEFORMATION CONTROL, for testing:

Cement / Mortar

Concrete

Rock and stones

Clay blocks

Metal, plastic, wires, ropes, textiles, papers, adhesives for tiles

Asphalt

Soil

Unitronic technical details and aditional specific tests are described at p. 500

S205N
with load cell

SPECIFIC APPLICATIONS ON CEMENT AND MORTAR:

FLEXURAL TEST ON MORTAR PRISMS 40x40x160 MM

STANDARDS: EN 196-1 | ASTM C348

NEEDED ACCESSORIES

S337-32 Strain gauge load cell 10 kN capacity.
S212-05 Loading piston.
E172-01 Flexure EN device for 40x40x160 mm specimens. (available also to ASTM, see p. 428)
E164N Software for flexural tests.

COMPRESSION TEST ON MORTAR SPECIMENS

(50kN max. load)

STANDARDS: EN 196-1 | EN 1015-11 | ASTM C109, C349

NEEDED ACCESSORIES

S337-34 Strain gauge load cell 50 kN capacity.
S212-05 Loading piston.
E170 Compression device on portion of 40x40x160 mm specimens. (devices for different specimens described at p. 428)
E163N Software for compression tests.

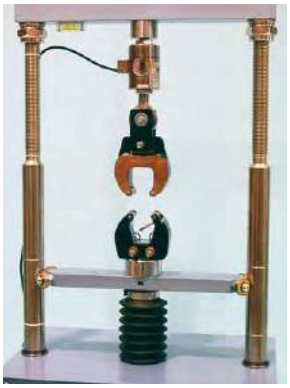
TENSILE TEST ON MORTAR BRIQUETTES “8” SHAPED

STANDARDS: ASTM C190, C307 | AASHTO T132

NEEDED ACCESSORIES

S205-05N Unitronic Compression / Tensile
S337-32 Tensile/Compression strain load cell 10 kN capacity
S205-07 Tensile jaws “8” shaped for mortar briquette
S205-08N Software for tensile test
E111 Briquette mould (see p. 408)

E111



S205-05N
UNITRONIC COMPRESSION 50 KN | TENSILE 25 KN

The Unitronic frame S205N is modified and improved to perform also tensile tests with max. capacity of 25 kN.

S206N
UNITRONIC 200KN
UNIVERSAL ELECTROMECHANICAL FRAME, 200KN CAPACITY

COMPRESSION / FLEXURE / TENSILE TESTS OF CONSTRUCTION MATERIALS WITH SERVO-CONTROLLED SYSTEM OF LOAD OR DISPLACEMENT/STRAIN.

Unitronic 200kN is the universal and versatile machine fully satisfying the needs of control, research and university laboratories to carry out tests on:
Cement, Roads (Marshall, Duriez, CBR etc.), Steel, Concrete, Wood, Plastic, etc.
The load is applied by a mechanical jack activated by a **brushless closed-loop motor with optical encoder** controlled by a microprocessor.
The two crossheads foresee couplings to fix the different test devices (see accessories).
The stress is measured by an electric load cell; the measurement and the displacement control of the crosshead is achieved by the electronic device incorporated into the machine.
Stroke electric end excursion switches of the upper mobile crosshead are foreseen to save the machine from accidental handlings.

Specifications of the Firmware: see p. 18

Specifications of the Frame: see p. 508

The Unitronic 200kN is **supplied complete with:**
Electric load cell 200kN capacity, crosshead displacement device, upper with seat ball and lower compression platens.
Are not included: accessories and software for specific tests that must be ordered separately (see accessories).

Note: The machine can be equipped with intermediate load cells to the max. capacity of the machine, to satisfy specific test requirements.

Power supply: 230V 1ph 50-60Hz 850W
Dimensions: 950x56x2400 mm
Weight: 820 kg approx.

S206N

NEEDED ACCESSORIES

COMPRESSION TEST ON MORTAR SPECIMENS

STANDARDS: EN 196-1 | EN 1015-11 | ASTM C109, C349

E170 Compression device on portions of 40x40x160 mm specimens (devices for different specimens described at p. 428)
E163N Software for the compression test (p. 18)

E170


E111

FLEXURAL TEST ON MORTAR PRISMS 40x40x160 MM

STANDARDS: EN 196-1 | ASTM C348

E172-01 Flexure device for 40x40x160mm specimens (available also ASTM, see p. 428)
S337-32 Strain gauge load cell 10 kN capacity
S206-32 Flange/connector of the load cell S337-32
S164N Software for the flexural test (p. 18)

E172-01

TENSILE TEST ON MORTAR BRIQUETTES "8" SHAPED

STANDARDS: ASTM C190, C307
AASHTO T132

S205-07 Tensile jaws "8" shaped for mortar briquette
E111 Briquette mould (p. 408)
S337-32 Strain gauge load cell Tensile/Compression 10kN capacity
S206-32 Flange/connector of the load cell S337-32
S205-08N Software for tensile tests


S337-32


S205-07

Additional specific accessories for tests on: Concrete, Asphalt, Soil, Steel, see p. 508

MACHINES FOR ONLY COMPRESSION TESTS

TO TEST CEMENT AND MORTAR SPECIMENS, BRICKS, ROCKS, REFRACTORIES ETC.

STANDARDS: EN 196-1 | EN 1015-11 | ISO 679 | ASTM C109, C349, C1194 | DIN 1164 | BS 4550 | GOST 26798-1

Designed to perform compression tests on portions of prism 40.1x40x160 mm, cubes side 40, 50, 70, 100 mm and 2"; cores with max. height of 180 mm, by using the suitable compression devices described in next pages (accessories mod. E170 - E171-01)

Equipped with an electric microswitch to stop the piston after the specimen breakage, in order to avoid damages to the compression or flexure device.

DIAL GAUGES MODELS

- Gauge Ø 200 mm, range 0-300kN, subdiv. 2.5kN

MAIN FEATURES FOR ALL MODELS

- Two columns high stiffness frame.
- Max. vertical daylight between platens: 185 mm
- Horizontal daylight between columns: 175 mm
- Platens diameter: 153 mm
- Ram travel: 45 mm approx.
- Accuracy: Grade 1 starting from 10% of the scale
- Supplied complete with lower compression platen and coupling piece to easily fix the compression device.
- Power supply (motorized models): 230V 1ph 50Hz 750W
- Weight: 300 - 330 kg

E159D + C127N + E170

E161A + C127N + E170

COMPRESSION				LOAD MEASURIG SYSTEM		
MODEL	Max load kN	Manual	Motorized	Gauge	Digitec mod. C108N (p. 219)	Autotec mod. C098N (p. 219)
E151	300	▼		▼		
E155	300		▼	▼		
E159D	500		▼		▼	
E159-01D	250		▼		▼	
E161A *	250		▼			▼
E161-02A *	500		▼			▼

MACHINES FOR ONLY COMPRESSION TESTS

TO TEST CEMENT AND MORTAR SPECIMENS, BRICKS, ROCKS, REFRACTORIES ETC.

STANDARDS: EN 196-1 | EN 1015-11 | ISO 679 | ASTM C109, C349, C1194 | DIN 1164 | BS 4550 | GOST 26798-1

CYBER-PLUS OR **SERVO-PLUS EVOLUTION** DIGITAL DISPLAY

INVERTER For a further improvement of energy efficiency and silent operation, (optional device code C099N). Technical details, p. 223 NEW

BARCODE Scanner for specimen file/identification, (optional device code C099-01). Details, p. 223 NEW

E159N + C127N + E170 | **E161N + C127 + E170**

COMPRESSION			LOAD MEASURIG SYSTEM	
MODEL	Max load kN	Motorized	Cyber-Plus Evolution mod. C109N (p. 224)	Servo-Plus Evolution mod. C104N (p. 224)
E159N	500	▼	▼	
E159-01N	250	▼	▼	
E161N *	250	▼		▼
E161-02N *	500	▼		▼

* Servo-Plus/Autotec models feature fully automatic power pack - electrovalve operated test start (no manual lever).

ACCESSORIES FOR COMPRESSION MACHINES

E170 COMPRESSION DEVICE for portions of prism 40.1x40x160 mm broken in flexure.
EN 196, EN/ISO 679, ASTM C349. See p. 428

E170-01 COMPRESSION DEVICE for portions of 40.1x40x160mm prism broken in flexure.
DIN 1164. See p. 428

E170

E170-01

E171 COMPRESSION DEVICE for cubes 50 mm and 2" side.
ASTM C109, C1194. See p. 428

E170-01GO COMPRESSION DEVICE for portions of 20x20x100 mm prism broken in flexure
GOST 26798.1. See p. 428

E171

E170-01GO

E171-01 COMPRESSION DEVICE for cubes 70.7 mm side.
BS 4550. See p. 428

E171-01

E161-05 DISTANCE PIECE, 50 mm high

E161-06 DISTANCE PIECE, 25 mm high

Note: the compression devices do not require any distance piece.

C127N GRAPHIC PRINTER on thermo-paper on board

C127-11 THERMO-PAPER roll for printer (pack of 10 rolls)

E161-12 SAFETY GUARDS, polycarbonate made, to CE Safety Directive, complete with hinges and lock

C121-51 STOP SWITCH on safety guards. See p. 317

C097-05 CLASS 1, starting from 1% of the full range. With a special calibration procedure it is possible to grant Class 1 practically on the full range of the compression machine.

E161-11 BENCH, to hold the compression frame.

E161-11

C115-01 TWO WAY HYDRAULIC VALVE, to activate a second frame. Technical details: see p. 318

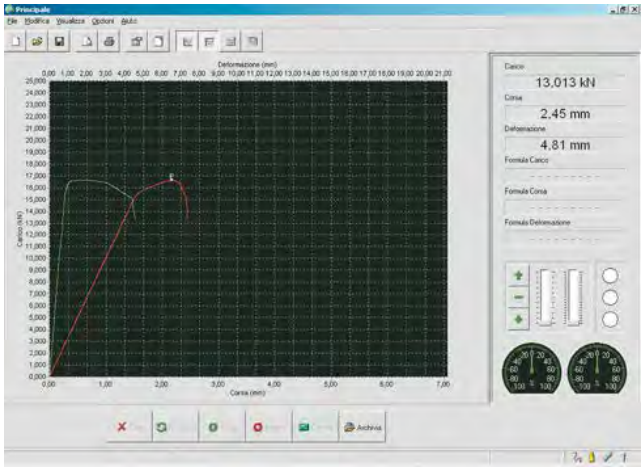
C115-01

C106-10 FLEXURAL DEVICE FOR CONCRETE BEAMS 100x100x400 mm and 150x150x600 mm

C106-10

H009-01 PERSONAL COMPUTER, LCD 22" monitor, keyboard, mouse, cables. The supply of the PC includes the installation of the software

E163N



C123N

C104-04 CONSOLE HOUSING THE SERVO-PLUS EVOLUTION
The pump assembly "lined" with sound proofing material for noise reduction and the digital system are encased to enhance the design and look of the machine. Technical details: see p. 312

C104-04

C099N NEW INVERTER DEVICE granting a lot of improvements. Applicable only on Cyber-Plus and Servo-Plus Evolution machines.
Technical details: see p. 223

C099N

SOFTWARE for DIGITEC / AUTOTEC or CYBER / SERVO PLUS models	
C123 (N)*	SOFTWARE **Servonet** for remote control through PC
E163 (N)*	SOFTWARE for compression tests

Technical detail: see p. 18
(N)* for Cyber - Servo Plus models.

COMPRESSION/FLEXURAL TESTING MACHINES WITH DUAL MEASURING RANGE

TO TEST CEMENT AND MORTAR SPECIMENS, BRICKS, ROCKS, REFRACTORIES ETC.

STANDARDS: EN 196-1, EN 13286-41, EN 933-5, EN 1015-11 | ISO 679 | ASTM C109, C348, C349, C1194 | DIN 1164 | BS 4550 | GOST 26798-1

These testing machines foresee **a dual measuring range in the same testing chamber**. The two ranges can be used alternatively and are suitable to perform:

- Flexural tests on cement prisms 40.1x40x160 mm (selecting the low capacity range)
- Compression tests on portions of prism 40.1x40x160 mm broken in flexure, cubes side 40, 50, 70, 100 mm 2", cores with max. height of 180 mm (selecting the nominal range).

The measuring range 0 - 15kN can be also used for compression tests on specimens with expected low strength values.

Equipped with an electric microswitch to stop the piston after the specimen breakage, in order to avoid damages to the compression or flexure device.

MAIN FEATURES FOR ALL MODELS

- Two columns high stiffness frame.
- Max. vertical daylight between platens: 185 mm
- Horizontal daylight between columns: 175 mm
- Platens diameter: 153 mm
- Ram travel: 45 mm approx.
- Two pressure transducers granting the Class 1 starting from 10% of the scale for both the ranges.
- Supplied complete with lower compression platen and coupling piece to easily fix the compression devices.
- Power supply (motorized models): 230V 1ph 50Hz 750W
- Weight: 310 - 340 kg

E160D + E170

E161-01A + E172-01

COMPRESSION | FLEXURAL

MODEL	Dual range kN	Manual	Motorized	LOAD MEASURIG SYSTEM Gauge	Digitec mod. C108N (p. 219)	Autotec mod. C098N (p. 219)
E152	300/50	▼		▼		
E156	300/50		▼	▼		
E160D	500/15		▼		▼	
E160-01D	250/15		▼		▼	
E161-01A ★	250/15		▼			▼
E161-03A ★	500/15		▼			▼

COMPRESSION/FLEXURAL TESTING MACHINES WITH DUAL MEASURING RANGE

TO TEST CEMENT AND MORTAR SPECIMENS, BRICKS, ROCKS, REFRACTORIES ETC.

STANDARDS: EN 196-1, EN 13286-41, EN 933-5, EN 1015-11 I ISO 679 I ASTM C109, C348, C349, C1194 I DIN 1164 I BS 4550 I GOST 26798-1

CYBER-PLUS OR **SERVO-PLUS EVOLUTION** DIGITAL DISPLAY

INVERTER For a further improvement of energy efficiency and silent operation, (optional device code C099N). Technical details, p. 223 NEW

BARCODE Scanner for specimen file/identification, (optional device code C099-01). Details, p. 223 NEW

E160N + E170 E161-01N + C104-04 + C127N + E172-01

COMPRESSION I FLEXURAL			LOAD MEASURIG SYSTEM	
MODEL	Dual range kN	Motorized	Cyber-Plus Evolution mod. C109N (p. 224)	Servo-Plus Evolution mod. C104N (p. 224)
E160N	500/15	▼	▼	
E160-01N	250/15	▼	▼	
E161-01N *	250/15	▼		▼
E161-03N *	500/15	▼		▼

* Servo-Plus/Autotec models feature fully automatic power pack - electrovalve operated test start (no manual lever).

ACCESSORIES FOR FLEXURE | COMPRESSION MACHINES

E172-01 FLEXURE DEVICE for 40.1x40x160 mm mortar specimens. EN 1015-11, EN 196-1, EN/ISO 679 See p. 428

E172-01

E172-02 FLEXURE DEVICE for 40x40x160 mm mortar specimens. ASTM C348. See p. 428

E170 COMPRESSION DEVICE for portions of prism 40.1x40x160 mm broken in flexure. EN 196, EN/ISO 679, ASTM C349. See p. 428

E170

E171

E171 COMPRESSION DEVICE for cubes 50 mm and 2" side. ASTM C109, C1194. See p. 428

E171-01 COMPRESSION DEVICE for cubes 70.7 mm side. BS 4550. See p. 428

E171-01

Note: other models of flexure and compression devices with accessories are listed at p. 428

E161-05 DISTANCE PIECE, 50 mm high

E161-06 DISTANCE PIECE, 25 mm high

Note: the compression devices do not require any distance piece.

C127N GRAPHIC PRINTER on thermo-paper on board

C127-11 THERMO-PAPER roll for printer (pack of 10 rolls)

E161-12 SAFETY GUARDS, polycarbonate made, to CE Safety Directive, complete with hinges and lock

C121-51 STOP SWITCH on safety guards. See p. 317

C097-05 CLASS 1, starting from 1% of the full range. With a special calibration procedure it is possible to grant Class 1 practically on the full range of the compression machine.

E161-11 BENCH, to hold the compression frame.

E161-11

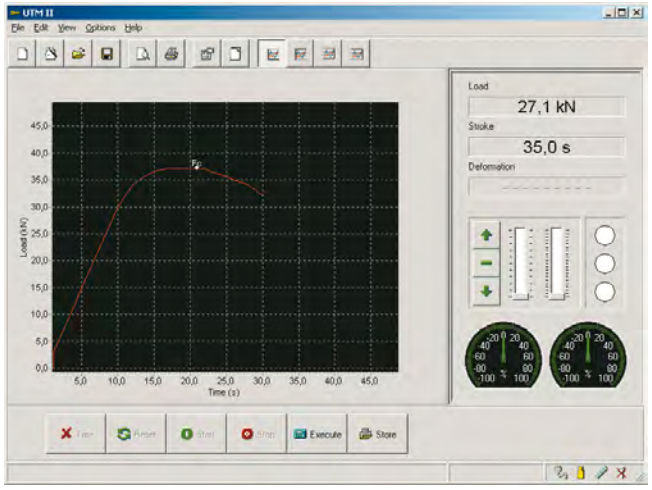
C115-01 TWO WAY HYDRAULIC VALVE, to activate a second frame. Technical details: see p. 318

C115-01

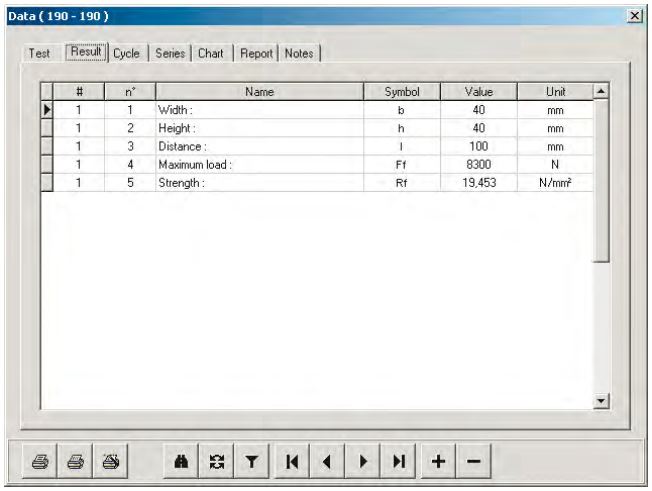
C106-10 FLEXURAL DEVICE FOR CONCRETE BEAMS 100x100x400 mm and 150x150x600 mm

C106-10

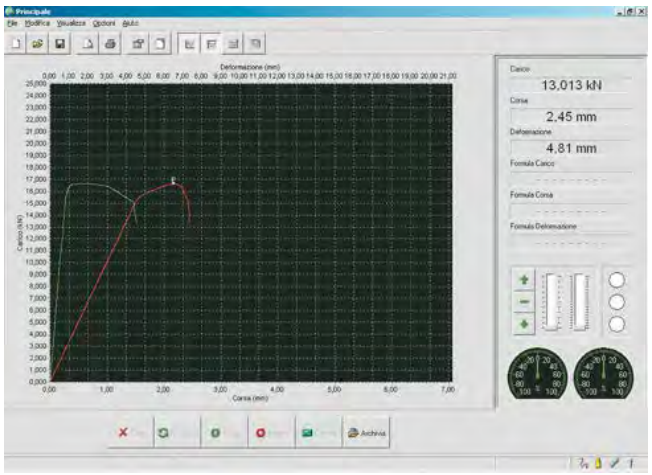
H009-01 PERSONAL COMPUTER, LCD 22" monitor, keyboard, mouse, cables. The supply of the PC includes the installation of the software



E163



E164



C123N

C104-04 CONSOLE HOUSING THE SERVO-PLUS EVOLUTION
The pump assembly "lined" with sound proofing material for noise reduction and the digital system are encased to enhance the design and look of the machine. Technical details: see p. 312

C104-04

C099N NEW
INVERTER DEVICE granting a lot of improvements. Applicable only on Cyber-Plus and Servo-Plus Evolution machines.
Technical details: see p. 223

C099N

SOFTWARE for DIGITEC / AUTOTEC or CYBER / SERVO PLUS models	
C123 (N)*	SOFTWARE **Servonet** for remote control through PC
E163 (N)*	SOFTWARE for compression tests
E164 (N)*	SOFTWARE for flexural tests

Technical detail: see p. 18
(N)* for Cyber - Servo Plus models.

COMPRESSION AND FLEXURAL TESTING MACHINE HIGH PERFORMANCE WITH DUAL TESTING CHAMBER AND TWO INDEPENDENT MEASURING RANGES 300 KN AND 15 KN WITH LOAD CELLS

STANDARDS: EN 196-1, EN 13286-41, EN 933-5, EN 1015-11 | ISO 679 | ASTM C109, C348, C349, C1194 | DIN 1164 | BS 4550 | GOST 26798-1

INVERTER For a further improvement of energy efficiency and silent operation, (optional device code C099N). NEW
Technical details, p. 223

This testing machine of high performance, advanced solutions and top quality components is equipped with two load chambers with two independent measuring ranges. It is suitable to perform:

- Flexural tests on cement prisms 40.1x40x160 mm (with the range 0 - 15 kN)
- Compression tests on portions of prism 40.1x40x160 mm broken in flexure, cubes side 40, 50, 70, 100 mm 2", cores with max. height of 180 mm (with the range 0 - 300 kN) by using the suitable compression devices described in next pages (accessories E170 - E172-02)

The applied load is measured by two strain gage load cells (15kN and 300 kN) at high accuracy.
This solution eliminates the weights of the piston and lower compression platen, packing set frictions etc., granting very high accuracy (max. error within ± 0,5%). The load chamber 0 - 15 kN permits very accurate tests on specimens having low strength (both in compression and in flexure).

Equipped with an electric microswitch to stop the piston after the specimen breakage, in order to avoid damages to the compression or flexure device.

MAIN FEATURES FOR ALL MODELS

- Max. vertical daylight between platens: 189 mm
- Horizontal daylight between columns: 210 mm
- Platens diameter: 165 mm
- Ram travel: 35 mm approx.
- Accuracy: Class 1 starting from 10% of the scale for both the ranges.
- Safety guards to CE Directive, polycarbonate made, with hinges.
- Supplied complete with lower compression platens and coupling pieces to easily fix the compression devices (see accessories).
- Dimensions of the frame: 1300x400xh1500 mm approx.
- Power supply: 230V 1ph 50Hz 750W
- Weight: 400 kg

Note: range 0-15 kN can be increased on request up to 25 kN.

E183N + C127N with compression devices

BARCODE NEW Scanner for specimen file/identification, (optional device code C099-01).
Details, p. 223

COMPRESSION / FLEXURAL		LOAD MEASURIG SYSTEM	
MODEL	Dual range kN	Cyber-Plus Evolution mod. C109N (p. 224)	Servo-Plus Evolution mod. C104N (p. 224)
E181N	300/15	▼	
E183N	300/15		▼

ACCESSORIES FOR DUAL CHAMBER MACHINES

E172-01 FLEXURE DEVICE for 40.1x40x160 mm mortar specimens. EN 1015-11, EN 196-1, EN/ISO 679 See p. 428

E172-01

E172-02 FLEXURE DEVICE for 40x40x160 mm mortar specimens. ASTM C348. See p. 428

E170 COMPRESSION DEVICE for portions of prism 40.1x 40x160 mm broken in flexure. EN 196, EN/ISO 679, ASTM C349. See p. 428

E170

E171 COMPRESSION DEVICE for cubes 50 mm and 2" side. ASTM C109, C1194. See p. 428

E171

E171-01 COMPRESSION DEVICE for cubes 70.7 mm side. BS 4550. See p. 428

E171-01

Note: other models of flexure and compression devices with accessories are listed at p. 428

E161-05 DISTANCE PIECE, 50 mm high

E161-06 DISTANCE PIECE, 25 mm high

Note: the compression devices do not require any distance piece.

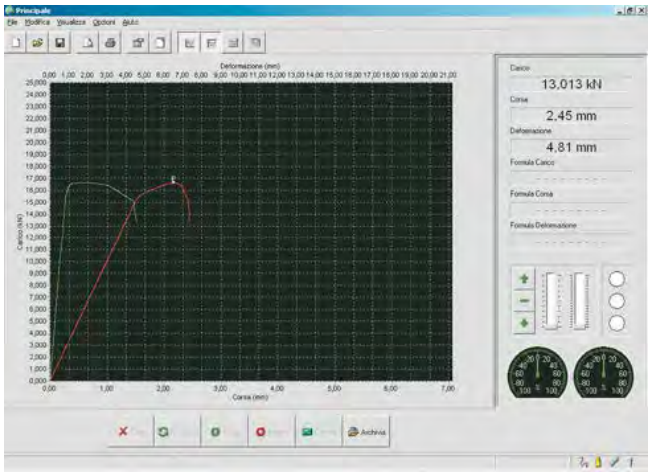
C127N GRAPHIC PRINTER on thermo-paper on board.

C127-11 THERMO-PAPER roll for printer (pack of 10 rolls)

E183-10 SAFETY GUARDS complete with stop switch.

C097-05 CLASS 1, starting from 1% of the full range. With a special calibration procedure it is possible to grant Class 1 practically on the full range of the machine.

H009-01 PERSONAL COMPUTER, LCD 22" monitor, keyboard, mouse, cables. The supply of the PC includes the installation of the software



C123N

C099N INVERTER DEVICE granting a lot of improvements. Applicable only on Cyber-Plus and Servo-Plus Evolution machines. Technical details: see p. 223

NEW

C099N

SOFTWARE	
C123N	SOFTWARE **Servonet** for remote control through PC only for Servo-Plus
E163N	SOFTWARE for compression tests
E164N	SOFTWARE for flexural tests

Technical detail: see p. 18

COMPRESSION DEVICES

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

Dimensions: 153x153x185 mm

MODELS

E170
COMPRESSION DEVICE FOR PORTIONS OF 40.1x40x160 MM PRISM BROKEN IN FLEXURE

STANDARDS: EN 196-1 | ASTM C349 | ISO 679

The compression platens have hardness 60 HRC and upper platen is seat ball assembled. The centering plug is distant 10 mm from the compression platen, as requested by the EN 196-1 Specification. Cadmium plated for rust protection.

Weight: 12 kg approx.

E170

ACCESSORY FOR MOD. E170

E170-11 CENTERING PLUG
STANDARD: EN 1015-11

Fixed on the E170 device in replacement of the standard centering plug, it modifies the distance from the compression platen to 16 mm, as requested by EN 1015-11 Specification.

E170-01
COMPRESSION DEVICE FOR PORTIONS OF 40.1x40x160 MM 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 approx.

E170-01

E170-01GO
COMPRESSION DEVICE FOR PORTIONS OF 20x20x100 MM PRISM BROKEN IN FLEXURE

STANDARD: GOST 26798.1

Identical to mod. E170 but with compression platens as requested by Russian Standard.

E172-01GO **E170-01GO**

E171
COMPRESSION DEVICE FOR CUBE 50 MM AND 2" SIDE

STANDARD: ASTM C109, C1194

Platens diameter: 72 mm and upper platen is seat ball assembled. This device can be used also to test cores max. 50 mm height.

Dimensions: 153x153x185 mm
Weight: 12 kg approx.

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

Dimensions: 150x130x185
Weight: 9 kg approx.

E171-01

E172-01
FLEXURE DEVICE FOR 40.1x40x160 MM PRISMS

STANDARDS: EN 196-1 | EN 1015-11 | DIN 1164 | 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.

Dimensions: 160x153x185 mm
Weight: 11 kg approx.

E172-01

E172-01GO
FLEXURE DEVICE FOR 20x20x100 MM PRISMS

STANDARD: GOST 26798.1

Identical to mod. E172-01 but with bearers as requested by Russian Standard.

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: 11 kg approx.

COMBINED TWO FRAMES GROUP

UPGRADING OPTION:

- COMPRESSION AND FLEXURAL TEST ON MORTAR SPECIMENS
- COMPRESSION TESTS ON CONCRETE CUBE, CYLINDER AND BLOCKS SPECIMENS, BY CHOOSING THE STANDARD COMPRESSION MACHINE AMONG OUR DIFFERENT AVAILABLE MODELS FROM 1300 kN TO 5000 kN CAPACITY
  (see section Concrete from p. 230...280)

The composition of the combined group is obtained by:

C092-05
COMPRESSION FRAME ON MORTAR SPECIMENS

250 kN or 500 kN capacity, (mod. E159D, E159-01D, E159N, E159-01N, E161A, E161-02A, E161N, E161-02N; technical details and specific accessories at p. 418...421) complete with pressure transducer used in conjunction with a concrete digital compression machine (Digitec, Autotec, Cyber-Plus / Servo-Plus Evolution, see p. 230...280).

C055 example

C092-05

C092-06
COMPRESSION/FLEXURAL FRAME ON MORTAR SPECIMENS, DUAL RANGE:

0-250 kN (or 500 kN) for compression tests 0-15 kN for flexure tests (mod. E160N, E160-01N, E161-01N, E161-03N; technical details and specific accessories at p. 422...425) complete with two pressure transducers used in conjunction with a concrete digital compression machine (Cyber-Plus / Servo-Plus Evolution model only, see p. 230...280).

C056 example

C092-06

C092-07
DUAL TESTING CHAMBER FRAME

(E181N, E183N technical details at p. 426) 300 kN and 15 kN, complete with load cells, used in conjunction with a concrete digital compression machine / Cyber and Servo-Plus Evolution models only. See p. 230...280

C055 example

C092-07

In addition to the proposed groups, it is possible to compose many other alternative testing groups, with digital display measuring system; like for ex:

- Group formed by one concrete flexural frame and one mortar compression frame.

Group example

E190N
DETERMINATION OF MODULUS OF ELASTICITY IN COMPRESSION OF PRODUCTS AND SYSTEMS FOR THE PROTECTION AND REPAIR OF CONCRETE STRUCTURES (MORTARS).

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 Servo-Plus Evolution models (ref. C104N, see p. 224).

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 than 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 8 high resolution channels for the control of load cells or transducers with strain gages bridge.
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 following the most updated International Standards for this application.

C125-13

C134

DATA ACQUISITION AND PROCESSING SOFTWARE UTM2 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 RJ (Network Connection) 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. The Software includes the license "Servonet" mod. C123N while the extensometers (two models are proposed: A and B) are not included in the standard supply, and must be ordered separately (see accessories).

Note: The Elastic Modulus on Mortars mod. E190N can be used together with:

A) EXTENSOMETERS (STRAIN GAGES), SINGLE USE, ELECTRIC, available in different sizes, mod. C125-10 to C125-13 (see accessories).

or:

B) EXTENSOMETERS /COMPRESSOMETERS, electronic, universal, mechanical frame, mod. C134 (see accessories)

ACCESSORIES

A) EXTENSOMETERS (STRAIN GAGES), SINGLE USE, ELECTRIC
Pack of 10 pieces

Available models:

C125-10 Base length 10 mm
C125-11 Base length 20 mm
C125-12 Base length 30 mm
C125-13 Base length 60 mm
C125-14 Base length 120 mm

C125-15

KIT for the application of single use extensometers composed by: glue, welder, solder, cleaning liquid, accessories, the whole in carrying case.

C125-09

INTERFACE MODULE, **needed accessory** to connect up to 4 electric single use extensometers. This module allows also the automatic calibration of the zero and of the measuring range after a special thermal compensation. This grants a five times better accuracy than the one requested by the Standards.

C125-09

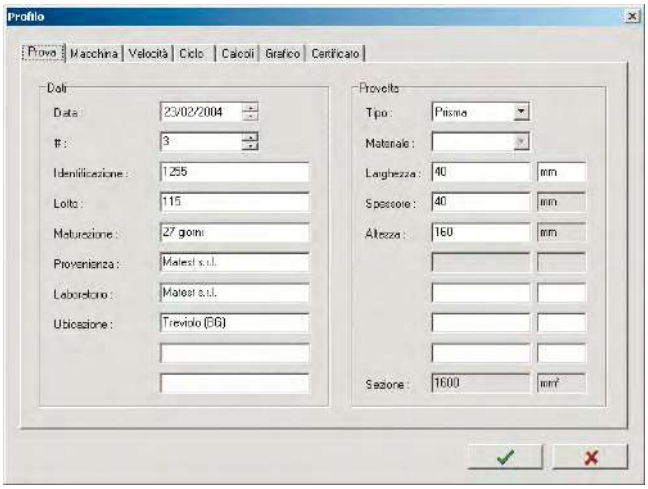
AS AN ALTERNATIVE:

B) **C134**
EXTENSOMETER / COMPRESSOMETER, ELECTRONIC, UNIVERSAL, MECHANICAL FRAME.
It can be used only with samples having minimum height of 130 mm
Technical details: see p. 286

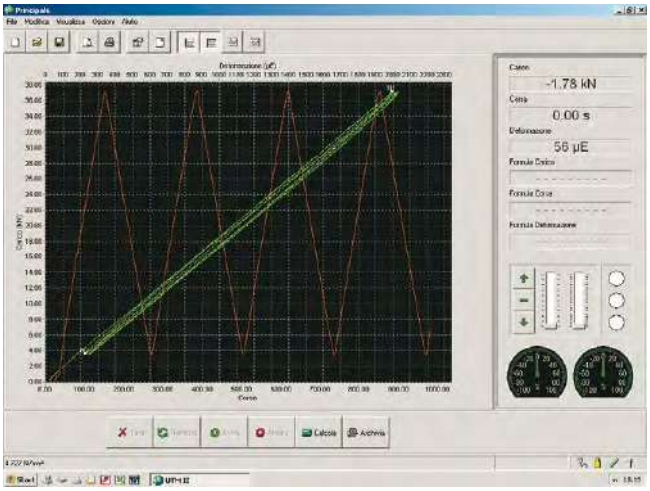
C134

C134-10

TEMPLATE, to regulate and calibrate the base length of the C134 extensometer.



Personalisation of the test certificate.



Screen during a test and marker indicating any change.


MATEST
INNOVATIVE. GLOBAL. MANUFACTURER.

SECTION H
STEEL

In this section Matest proposes a wide range of universal electromechanical and hydraulic machines to perform tensile, elongation, flexural, bending, resilience tests on metallic materials, with the possibility to extend these test applications on plastics, rubber, composed materials, wires, ropes, paper, textiles etc.
This range of machines satisfies both control tests on steel bars for reinforced concrete, and quality tests in the iron metallurgy, metals, plastics etc.

UNIVERSAL AUTOMATIC TENSILE TESTING MACHINES: 600 KN, 1000 KN, 1500 KN, 2000 KN CAPACITY

STANDARDS: EN ISO 6892-1, EN 7500-1 I EN 10002, EN 10080, EN 50081-1, EN 15630-1, EN 15630-3 I ASTM A370, ASTM E8
UNI 7676 (Wire Strands)

NEW

The machine is designed to meet requirements of works, laboratories and universities for quality control and research purposes. This system is suitable to test metallic round and flat rebars, to determine tension, compression, bending shear strength and to determine compression and flexure strength on concrete.

LOAD FRAME FEATURES

- Models: **600 kN, 1000 kN, 1500 kN, 2000 kN Capacity. Other load capacities (700 kN and 1200 kN) available on request.** (see next pages)
- Hydraulic servo-controlled system regulating the load rate
- Four thick columns and two lead screws grant high structural stiffness
- Two different work spaces, the upper one for tension and the lower one for compression, bending and shearing, for a comfortable test execution
- High precision load cell, class 1 according to ISO 376 standard, grants accurate force measurement
- Hydraulic jaws, for stronger clamping of specimens
- Possibility to fit accessories for tensile tests on nut bolts, headed and shouldered specimens, wire ropes
- Integrated displacement photoelectric encoder
- Movable lower crosshead with button panel for an easy machine operation and specimens positioning
- Compression platens included for an easy machine calibration
- Machine CLASS: 1

Load frame H001BS (1000 kN) is specially designed (improved tension space and power pack) to also perform tensile tests on wire strands (UNI 7676).

A **second frame** (accessory) can be easily connected to perform a compression test on concrete specimens, including configurations for Elastic Modulus and Poisson ratio determination.
The most common combination is with C092-09, 2000 kN compression frame useful for testing cubes up to 150 mm side and cylinders up to 160x320 mm also with **capping retainers** (ASTM C1231).

HYDRAULIC JAWS CLOSURE NEEDED FOR SAFETY REASONS

H001BS with accessories

FIRMWARE

- Fully automatic test cycle with closed-loop digital feedback
- Electronic control unit “Servo-plus Evolution” with Touch-Screen colour display, that runs like a standard PC based on Windows operating system for management and analysis of data, test results, graphs.
- The Touch-Screen icon interface allows an easy set-up of parameters and an immediate test execution.
- The machine can also be connected to a PC for a remote test execution through suitable Software.
- Direct connection to Intranet (connection to a LAN network) and Internet to establish a remote communication and receive an immediate diagnostic analysis from Matest technicians, or for any software updates.
- Unlimited memory storage with: 2 USB ports, 1 SD card slot, 1 RS232/485 serial port.
- Possibility to select different languages.
- Hardware technical details: see p. 18

The machine is supplied complete with loading frame, control unit, compression platens and hydraulic power pack for jaws closing, while PC, software, grips, printer and extensometers (see next pages) **are optional and must be ordered separately** according to the user needs.

DIFFERENT FRAMES, DIFFERENT NEEDS

H001BS H001B H001A

CONTROL SYSTEM

Button panel, to control the lower crosshead movement for specimen positioning before testing.

HYDRAULIC JAWS POWER PACKS

Standard model, low clamping pressure only (3 buttons)

Strands model, possibility to switch between high (strands) and low (round and flat rebars) clamping pressure (4 buttons)

TECHNICAL SPECIFICATIONS

MODEL	H001A	H001B	H001BS*	H001C	H001D
Load capacity (kN) both tension and compression	**600**	**1000**	**1000**	**1500**	**2000**
Load accuracy (%)	± 1	± 1	± 1	± 1	± 1
Test speed (mm/min):					
Max	85	35	35	17	17
Min	0.5	0.5	0.5	0.5	0.5
Deformation accuracy (%)	± 1	± 1	± 1	± 1	± 1
Max crosshead moving speed (mm/min)	200	200	200	200	200
Piston stroke (mm)	250	250	250	250	250
Horizontal columns distance	480	580	590	700	840
Max tension space (mm)	750	750	1000	1000	1000
Columns diameter	75	80	100	110	110
Length of the grips for standard samples	90	110	110	160	160
Length of the insert for strands and special samples			225		250
Max compression space (mm)	590	570	680	750	780
Dimension of platens** (mm)	Ø128x30	Ø148x40	Ø148x40	Ø200x60	Ø200x60
Span of bending attachment (mm)	30-500	50-500	50-500	50-500	50-720
Roller length (mm)	120	160	160	160	160
Roller diameter (mm)	30	50	50	50	50
Bending depth (mm)	100	180	180	180	180
Load frame dimensions (mm) Height (including piston stroke)	2450	2665	3115	3500	3500
Width	770	900	980	1120	1340
Depth	600	650	670	850	1000
Frame weight (kg)	2700	3100	3900	5000	9000
Power supply			380V, 3ph, 50-60Hz		
Absorbed power (kW)	3.5	3.5	3.5	3.5	6.2

* Wire Strands can be tested with this model only. Other models for wire strands testing are available on request.
** Compression platens are already included in the supplied machine

ACCESSORIES FOR

MACHINE MODEL (load capacity*)	H001A 600 kN	H001B 1000 kN	H001BS 1000 kN	H001C 1500 kN	H001D 2000 kN
Grips for round specimens Ø 6…14 mm	**H001A-11**	**H001B-11**	**H001B-11**		
Grips for round specimens Ø 13...27 mm	**H001A-12**				
Grips for round specimens Ø 28...40 mm	**H001A-13**				
Grips for round specimens Ø 9...21 mm		**H001B-12**	**H001B-12**		
Grips for round specimens Ø 22...41 mm		**H001B-13**	**H001B-13**		
Grips for round specimens Ø 42...60 mm		**H001B-14**	**H001B-14**		
Grips for round specimens Ø 8...20 mm					**H001D-11**
Grips for round specimens Ø 16...32 mm					**H001D-12**
Grips for round specimens Ø 33...47 mm					**H001D-13**
Grips for round specimens Ø 48...61 mm					**H001D-14**
Grips for round specimens Ø 62...80 mm					**H001D-15**
Grips for round specimens Ø 13...31 mm				**H001C-11**	
Grips for round specimens Ø 32...60 mm				**H001C-12**	
Grips for flat specimens 0...16 mm	**H001A-21**				
Grips for flat specimens 17...30 mm	**H001A-22**				
Grips for flat specimens 0...30 mm		**H001B-21**	**H001B-21**		
Grips for flat specimens 10...41 mm		**H001B-22**	**H001B-22**	**H001C-21**	**H001D-21**
Grips for flat specimens 42...70 mm				**H001C-22**	**H001D-22**
Grips for strands Ø 9.5 mm			**H001BS-31**		
Grips for strands Ø 12.7 mm			**H001BS-32**		
Grips for strands Ø 15.2 mm			**H001BS-33**		
Aluminium and carborundum insert, 4 pieces			**H001-30**		
Bending accessory (ISO 5173)	**H001A-40**	**H001B-40**	**H001B-40**	**H001C-40**	**H001D-40**
Bend-Rebend device (ISO 15630-1 and ISO 15630-3) Mandrels (Needed Accessories) When ordering specify diameter and strength.	**H001B-41** **H001B-42**	**H001B-41** **H001B-42**	**H001B-41** **H001B-42**	**H001D-41** **H001D-42**	**H001D-41** **H001D-42**
Shearing accessory for specimens Ø 10 mm	**H001-45**	**H001-45**	**H001-45**	**H001-45**	**H001-45**
Accessories for threaded and shouldered head samples from M3 to M39 (or more on request), composed by: NEW					
Grips	**H001B-43**	**H001B-43**	**H001B-43**	**H001D-43**	**H001D-43**
Tensile bowl and ring. When ordering specify diameter and thread type.	**H001B-44**	**H001B-44**	**H001B-44**	**H001D-44**	**H001D-44**
OR tensile bowl and ring with self-alignment. When ordering specify diameter and thread type.	**H001B-45**	**H001B-45**	**H001B-45**	**H001D-45**	**H001D-45**

* Models with 700 kN and 1200 kN capacities available on request.

H001BS with accessories

C092-09

ADDITIONAL ACCESSORIES

C092-09
COMPRESSION FRAME, 2000 kN capacity, connected to the same control unit. Vertical daylight: 376 mm with a distance piece of 40 mm high. Useful to test concrete cubes up to 150 mm side and cylinders up to 160x320 mm also with capping retainers. Technical details: see p. 238

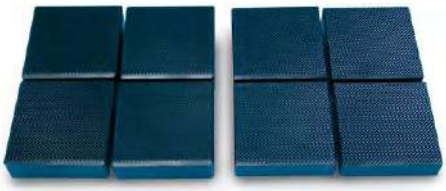
Note:
It is possible to connect different types of compression frames and other frames (up to 2) for many other tests:
flexure, splitting, cement, etc.
Ask our technicians for more details.

Note:
Electronic extensometers and software are listed at p. 439, 449.

H009-01
PERSONAL COMPUTER for remote test execution with a pre-installed software. Complete with LCD, monitor 22", keyboard, mouse, connection cable.

Note:
The PC is recommended, but not necessary: the machine can in any case perform tests without any external PC.

H009N
SOFTWARE for tensile tests on steel (Load/Deformation, graphic, test certificate etc.)

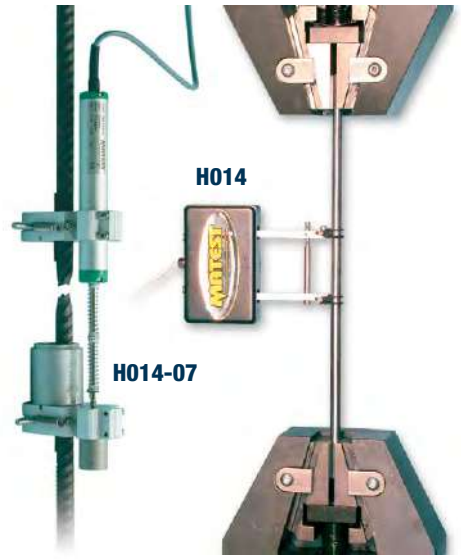


Grips for flat specimens

Grips for round specimens

H014
ELECTRONIC EXTENSOMETER

Measuring base 50 mm, Deformation range +1 mm / -0.2 mm
Maximum percent measurable deformation: +2%
It gives the possibility to take the longitudinal deformations of the specimen during the tensile test. A graph load/deformation is obtained and from this graph the coefficient of elasticity together with the loads RP0.1 - RP0.2 - Rt1 can be identified even on materials that are not presenting a yield point that can be clearly identified. The appliance is delivered complete with connection cables.



ELECTRONIC EXTENSOMETER FOR TENSILE DEFORMATION STRENGTH TESTS UNTIL BREAKAGE

MODELS

H014-06 Extensometer for round specimens from 4.5 to 11 mm diameter. Transducer stroke: 25 mm

H014-07 Extensometer for round specimens from 10 to 19 mm diameter. Transducer stroke: 50 mm

H014-08 Extensometer for round specimens from 18 to 25 mm diameter. Transducer stroke: 50 mm

H014-09 Extensometer for round specimens from 26 to 36 mm diameter. Transducer stroke: 50 mm

H014-10 Extensometer for flat specimens, width max. 25 mm; thickness max. 10 mm. Transducer stroke: 50 mm
Measuring base: 25 – 50 – 60 – 70 mm

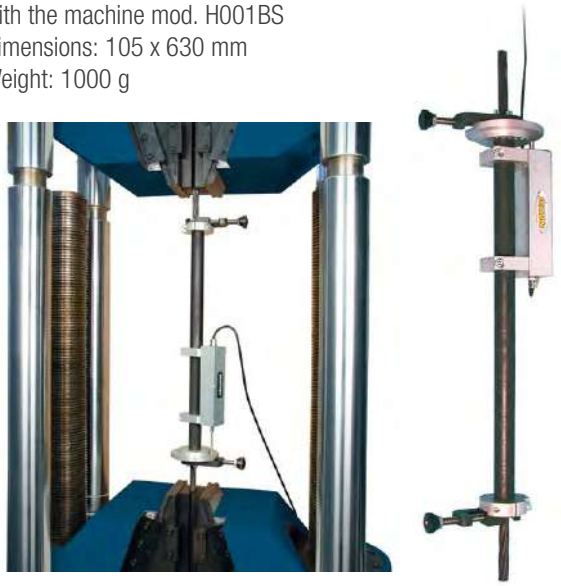
H014-11 Extensometer for round specimens from 35 to 49 mm diameter. Transducer stroke: 50 mm

H014-12 Extensometer for round specimens from 48 to 61 mm diameter. Transducer stroke: 50 mm

H003-18
WIRE STRANDS EXTENSOMETER

STANDARD: UNI 7676

The instrument is directly applied on the sample through two coaxial telescopic hardened tubes by measuring the deformation/elongation of the strand up to failure.
Supplied complete with electronic precision transducer 50 mm stroke by 0,005 mm sensitivity.
Measuring base: 600 mm
The H003-18 extensometer can be utilized only with the machine mod. H001BS
Dimensions: 105 x 630 mm
Weight: 1000 g



H003-18 Detail of the wire strands extensometer

Alternative compression platens, complete with upper seat ball.

H001C-50 Detail of the standard compression platens

MACHINE MODEL	Model	Ø mm	Max specimen dimensions
H001A	**H001A-50**	165X30	Cubes up to 100 mm side and cylinders up to Ø 110x220 mm
H001B and **H001BS**	**H001B-50**	216X30	Cubes up to 150 mm side and cylinders up to Ø 160x320 mm
H001C and **H001D**	**H001C-50**	287x51	Cubes up to 200 mm side and cylinders up to Ø 160x320 mm

UNIVERSAL TENSILE/COMPRESSION MACHINE

NEW

TENSILE TESTS ON STEEL REINFORCED BARS, UP TO 500 KN MAX. CAPACITY LOAD.
COMPRESSION TESTS ON CONCRETE CUBES / CYLINDERS 1500 KN MAX. CAPACITY LOAD.

STANDARDS: EN 10002 | EN ISO 6892-1, 7500-1, 15630-1 | ASTM C39, E4 | BS 1610 | NF P18-411 | DIN 51220 | AASHTO T22

This machine of compact design, is utilized to carry out tensile tests on steel reinforced bars from diameter 4 to 26 mm and flat max. 25x15 mm. Horizontal and vertical daylights are now increased for easier specimen handling. It can also carry out compression tests on concrete cube specimens max. side 150 mm and cylinders max. diameter 160x320 mm.
The new and sturdier four columns loading frame is overdimensioned to assure high rigidity and stability. The loading piston, double action, is rectified and lapped. The piston is foreseen of an hydraulic maximum and minimum piston stroke's security device, by avoiding any damage risk due to wrong manipulations of the unit. An hydraulic selector allows to select the tensile or the compression test. The heads holding the jaws are obtained from only one block of high resistance steel. The "V" autoclamping form allows a quick and practical churking of the specimen and the grips locking system ensures safe bar handling after failure. The machine is supplied complete with pair of jaw-holders, but **without** hardened jaws and accessories for tensile and compression tests , which must be ordered separately (see accessories). Hardware technical details see page 18.

TECHNICAL SPECIFICATIONS

- Maximum tensile load: 500 kN
- Maximum compression load: 1500 kN
- Distance between the jaws: min. 345 mm - max. 445 mm
- Distance between the compression platens: 337 mm
- Distance between the columns: 310 mm
- Piston's stroke: 120 mm
- Precision and repeatability: ± 1% of read value
- Power supply: 230V 1ph 50Hz 750W
- Dimensions: 830x530x2000 mm
- Weight: 1150...1200 kg

H010-01N with accessories

H010-02N with accessories

MODEL	Motorized	Gauge	Cyber-Plus Evolution mod. C109N (p. 224)	Servo-Plus Evolution mod. C104N (p. 224)
H010N	▼	▼		
H010-01N	▼		▼	
H010-02N	▼			▼

H010-02N with accessories and **C092-09**

C092-09
COMPRESSION FRAME, 2000 kN capacity, connected to the same control unit.
Vertical daylight: 376 mm with a distance piece of 40 mm high, useful to test concrete cubes up to 150 mm side and cylinders up to 160x320 mm with capping retainers.
Technical details: see p. 239

Note:
It is possible to connect different types of compression frames and other frames (up to 2) for many other tests: flexure, splitting, cement, etc.
Ask our technicians for more details.

SERVO STRAIN FOR PISTON CONTROL

C104-10N
SERVO-STRAIN allowing piston travel control.

H010-31SP
SUPPORTING DEVICE with displacement transducer, able to grant precise piston travel control.

H010-31SP

H009-01
PERSONAL COMPUTER for remote test execution with a pre-installed software. Complete with LCD, monitor 22", keyboard, mouse, connection cable.

Note:
The PC is recommended, but not necessary: the machine can in any case perform tests without any external PC.

ACCESSORIES FOR TENSILE TESTS ON ROUND AND FLAT STEEL SPECIMENS

H010-10N SET OF 4 JAWS, upper and lower, for round steel specimens from Ø 4 to 15 mm, and flat specimens from 6 to 15 mm thickness (max. width 25 mm).

H010-11N SET OF 4 JAWS upper and lower for round specimens from Ø 15 to 26 mm

H010-10N H010-11N

FOR COMPRESSION TESTS ON CONCRETE CUBE AND CYLINDER SPECIMENS

H010-13N UPPER COMPRESSION PLATEN foreseen of seat ball, fixing device, lower compression platen and distance pieces test cylinders max diameter 160x320 mm and cubes 150 mm max side.
The platens have Ø 216 mm and are hardened and rectified as requested by Standards.

H010-15N SAFETY GUARDS to CE Directive, polycarbonate made, complete with hinges and lock.

ACCESSORIES (only for mod. H011N and H011-01N)

C127N GRAPHIC PRINTER on thermal paper

H009N SOFTWARE for tensile tests on steel (Load/Deformation, graphics, test certificate etc.).
Technical details: see p. 18

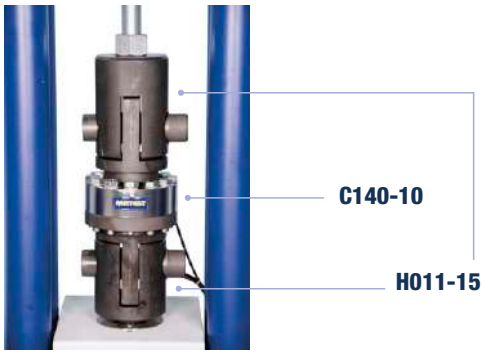
C109-10N SOFTWARE for compression tests on concrete for Cyber-Plus Evolution model H011N

C123-01N SOFTWARE "Servonet" for tensile test on steel and compression tests on concrete for Servo-Plus Evolution model H011-01N

CALIBRATION EQUIPMENT

C140-10 LOAD CELL, 500kN Capacity, for tensile calibration test on the Universal Machines H010 to H011-01N
The load cell has to be connected to the digital tester mod. C138N.
Technical details: see p. 326

H011-15 DEVICE to be connected to the Load Cell for Tensile Calibration test.



H014
ELECTRONIC EXTENSOMETER

Measuring base 50 mm, Deformation range +1 mm / -0.2 mm
Maximum percent measurable deformation: +2%
It gives the possibility to take the longitudinal deformations of the specimen during the tensile test. A graph load/deformation is obtained and from this graph the coefficient of elasticity together with the loads RP0.1 - RP0.2 - Rt1 can be identified even on materials that are not presenting a yield point that can be clearly identified. The appliance is delivered complete with connection cables.

ELECTRONIC EXTENSOMETER FOR TENSILE DEFORMATION STRENGTH TESTS UNTIL BREAKAGE

This electronic coaxial extensometer is used to measure the deformation of a specimen under tensile test until breakage.
The extensometer is directly fixed to the test specimen and it remains connected until breakage, by measuring the deformation both in the elastic and in the plastic phases. Measuring base for round specimens: 5 x specimen diameter. Supplied complete with 4 spacers for the intermediate sample diameters of the specific measuring range, connection cable, accessories, carrying case.

MODELS

H014-06 Extensometer for round specimens from 4 to 11 mm diameter.
Transducer stroke: 25 mm

H014-07 Extensometer for round specimens from 10 to 19 mm diameter.
Transducer stroke: 50 mm

H014-08 Extensometer for round specimens from 18 to 27 mm diameter.
Transducer stroke: 50 mm

H014-10 Extensometer for flat specimens, width max. 25 mm; thickness max. 10 mm.
Transducer stroke: 50 mm
Measuring base: 25 – 50 – 60 – 70 mm

ACCESSORIES FOR MOD. H001A TO H001D, H003N, MOD. H004N TO H008N, MOD. H011N AND MOD. H011-01N

H009N
UTM2 SOFTWARE

STANDARDS: EN 10002-1 | ISO 527, 178, 604, 898-1, 3506-1, 10113, 12275 | ASTM A370

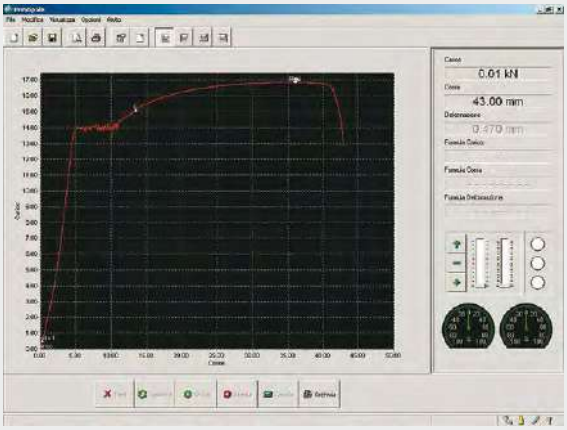
This Software has been developed on the base of Microsoft Windows operating system.
This interactive software is the ideal solution for an effective and complete management of the material testing.
It is composed by many test procedures in conformity with the International Standards for metal, plastic, cement, wood and composed materials.

This software supports a wide range of calculation and profiles for tensile, compression and flexural tests.
The user can create new personalised test profiles: definition of the test data such as test date, certificate number, lot of material delivered, specimen origin, test temperature, etc. and definition of the specific dates of the specimen as type, dimensions measuring unit, etc.

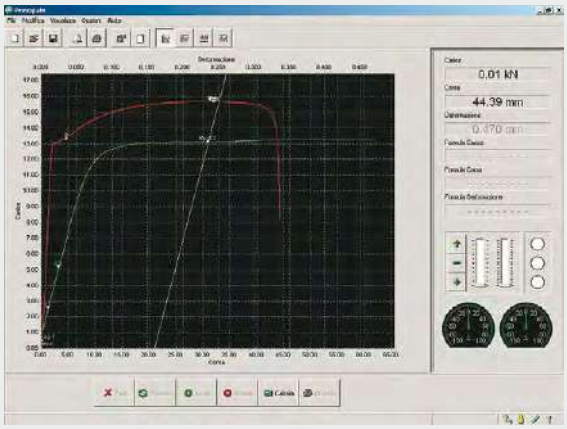
The user can select and set the calculation corresponding to the activated standard. As an example for the Standard EN 10002-1 he can select the initial length, the initial section of the specimen, the calculation of the maximum load, the unit load, the elastic limits (ReH, ReL, Rp%), the restriction, the Young's Modulus, etc.
For some calculations the end user may set test execution parameters for the corresponding calculation algorithms, for example the percentage (%) for the standard deviation of the Rp proportionality.

The software allows a speedy and easy management of all the machine parameters such as the management of the load acquisition by means of a load cell, the specimen deformations by means of an extensometer and the crossbar displacement. For each one of the analogical channels, the user can set the calibration and visualisation measuring unit, the limits of use: alarm, start limit of the test calculation, etc.
The test process is divided in different phases or speed charts, where the user can set the required type of control (pace rate, load/time, deformation/time), the tare and the zero option, the limits and the phase or speed changes.
The end of the test mode or the breaking limit can also be selected.
The software allows user to personalise and set the displayed parameters of the test graph as the colour, the title of the Cartesian axis, the colours of the load/deformation limits and the certificate parameters such as titles, margins etc.

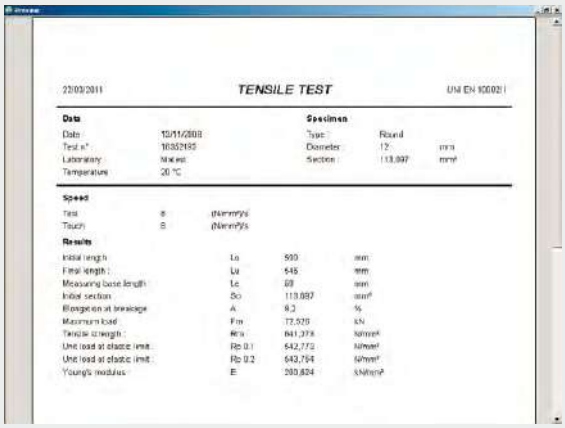
At the end of the test, the user can decide if the selected calculations must be performed or filed. In any moment all the tests made are available to make an analysis of the results or to print their certificate.
Graphic analysis of the test can be made by means of the zoom function.



Tensile test on a steel specimen without extensometer; it displays the yield poind with the possibility of increasing the dimensions of the graph area by means of the zoom function.



Tensile test on a steel specimen using an extensometer; showing the symbols of the considered dimensions and the relative tracing in different colours selected by the user.



Example of the certificate

C128
LASER PRINTER, bench model, for graphics and certificates with direct connection via USB.

H017
UNIVERSAL EDUCATIONAL TESTING MACHINE CAPACITY 20 KN

NEW

The machine has been designed to measure strength of metallic materials and study the various reactions they undergo when subject to different stresses, verifying the same with the following tests:

- Tensile test
- Shear test
- Compression test
- Flexural test
- Brinell hardness

This machine is primarily for educational purposes and intended for the use in higher educational institutes or universities and allows students of material science to have a hands-on approach to applications so far studied at a theoretic level only.

Components of the machine:

- 30 kN (160 bar) manometer
- 50 mm full scale analog dial indicator
- 250 bar pressure transducer
- 50 mm travel displacement transducer
- 8-channel digital indicator

Power supply: 230V 1ph 50-60Hz 70W
Dimensions: 600x600x850 mm
Weight: 60 kg

H017

ACCESSORIES THAT CAN BE USED IN THE UPPER CHAMBER OF THE MACHINE

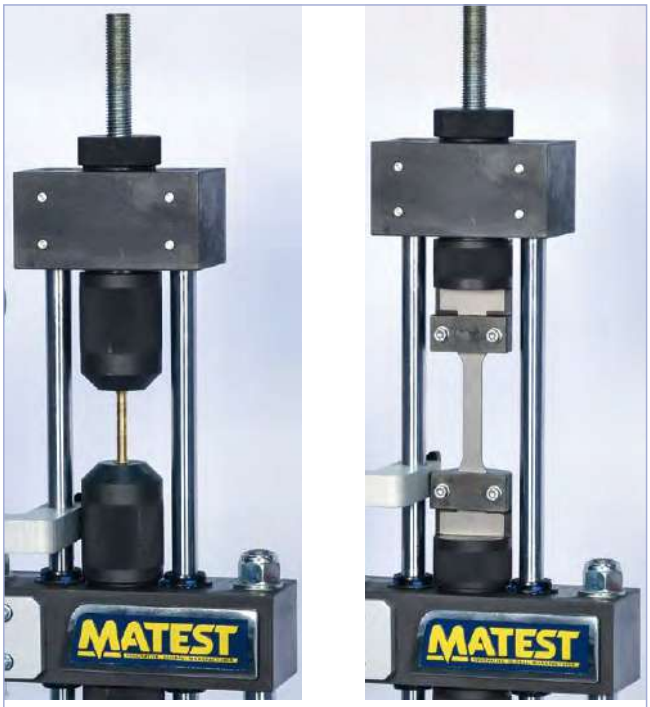
H017-05

TENSILE TEST

The equipment allows to perform tensile tests on steel samples up to failure and serves to evaluate stress-strain diagrams of the material comprising the sample and mainly to evaluate the following parameters:

- Yield strength
- Proportionality limit
- Failure strength
- Elastic modulus
- Ultimate strength

The accessory includes: tensile heads for round samples and tensile heads for flat samples.



H017-05

H017-10
SHEAR TEST
The equipment allows to perform shear tests on 6 mm diameter samples so as to determine strength:
T = F/S
F = value of measured force
S = value of sectional area
The shear strength of the sample may be compared to its tensile strength.
The accessory includes: shear heads and connecting rod.

H017-10

ACCESSORIES THAT CAN BE USED IN THE LOWER CHAMBER OF THE MACHINE

H017-15
COMPRESSION TEST
The equipment allows to determine the mechanical properties of various materials, using a spring as sample with the constant factor K, given by the ratio between the force applied and measured via the manometer and the displacement measured on the dial gauge, or using anisotropic material to define the compressive strength.
The accessory includes: two compression platens and a distance piece.

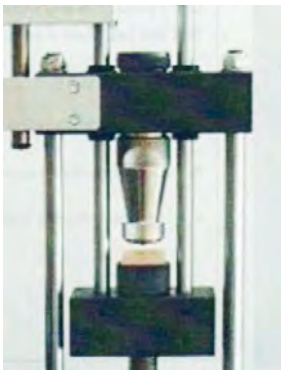
H017-15

H017-20
FLEXURE TEST
The equipment is used to determine material strength and maximum deflection.
- F = applied force
- L = the distance between supporting bearers

The accessory includes:
two lower rollers, one upper loading roller and lower transverse.

H017-20

H017-25
HARDNESS TEST
The equipment is used to determine the capacity of a material to resist when engraved, indented or impressed and is useful for studying materials subject to wear.
It is performed following the Brinell method: the diameter of the sphere used may be 10, 5, 2 or 1 mm.
The accessory includes: upper hardness head and lower compression platen.


H017-25

SAMPLE SPECIMENS FOR THE DIFFERENT TESTS

CODE	DESCRIPTION
	TENSILE TEST
H017-30	Round bar test specimens ø 6 mm made in stainless steel AISI 303, set of 14 pieces.
H017-31	Round bar test specimens ø 6 mm made in brass, set of 14 pieces.
H017-32	Round bar test specimens ø 6 mm made in bronze, set of 14 pieces.
H017-33	Round bar test specimens ø 6 mm made in copper, set of 14 pieces.
H017-34	Round bar test specimens ø 6 mm made in aluminium, set of 14 pieces.
H017-40	Flat bar test specimens, different materials, set of 14 pieces.
	SHEAR TEST
H017-50	Round copper bar specimens ø 6 mm, set of 14 pieces.
	FLEXURAL TEST
H017-60	Flat bar specimen, set of 14 pieces.

The machine is manually controlled, while readings are both analog, through the manometer and the dial indicator, and digital, through the pressure transducer and the displacement transducer connected to the digital indicator.

H009N
UTM2 SOFTWARE
The software allows to see graphs created in real time during the test, and to elaborate a test report.
For further details refer to p. 449

S205-05N
UNITRONIC 50 KN

UNIVERSAL MULTIPURPOSE TOUCH-SCREEN FRAME FOR:

- **TENSILE TESTS, 25 kN MAX. CAPACITY LOAD**
- **COMPRESSION/FLEXURAL TESTS, 50 kN MAX. CAPACITY LOAD**

WITH AUTOMATIC LOAD OR DISPLACEMENT/DEFORMATION CONTROL.

The load is applied by a mechanical jack that is driven by a motor **brushless with closed loop through optic encoder** and controlled by a microprocessor. Stroke electric end switches are applied to the load piston to save the machine from accidental handlings. The control panel is placed frontally and it is provided with a membrane having 6 multifunctional interactive pushbuttons driven by menu, a large graphic display and RS232 port for connection to PC.

S205-05N with load cell

TENSILE TESTS ON METALS, PLASTICS, WIRES, TEXTILES ETC.
Test development with load control

NEEDED ACCESSORIES for metal flat and round specimens

S337-36 TENSILE STRAIN load cell 25kN capacity
H005-11 TENSILE HEADS (upper and lower)
S205-09 DEVICES to fix the tensile heads to the frame
H005-21 FLAT SEIZING GRIPS for flat specimens 1 - 10 mm thickness by 25 mm max. width and round specimens Ø 1 - 5 mm
H005-31 "V" SHAPE SEIZING GRIPS for round specimens Ø 5 - 12 mm

OPTIONAL ACCESSORIES

H014-06 - **H014-10** EXTENSOMETER, electronic, for tensile deformation strength tests.

H009N SOFTWARE for visualisation in real time of load/deformation, graphic, test certificate etc.

S205-05N + accessories for tensile test

Various materials:
By using suitable devices, Unitronic tester, within the limits of its max. 50 kN capacity for compression/flexural performs compression, flexural, splitting tensile and direct tensile tests on: Concrete, Cement, Rocks, Bituminous Materials, Soil etc., with automatic load or displacement/deformation control.

Unitronic technical details and additional specific tests: see p. 500

S206N
UNITRONIC 200 KN

UNIVERSAL MULTIPURPOSE TOUCH-SCREEN FRAME FOR:

- **TENSILE TESTS, 50 kN MAX. CAPACITY LOAD**
- **COMPRESSION/FLEXURAL TESTS, 200 kN MAX. CAPACITY LOAD**

WITH AUTOMATIC LOAD OR DISPLACEMENT/DEFORMATION CONTROL.

S206N

Unitronic technical details and additional specific tests: see p. 508

H020
MARKING-OFF MACHINE
AUTOMATIC MOTORISED

STANDARD: UNI 556

Used to mark off specimens with round, square shape and with improved bond for the measurement of the percentage elongation after their breaking, in accordance with the Standards.
The machine can mark specimens as follows:
- Round from 4 mm up to 50 mm diameter.
- Flat from 4 mm up to 50 mm thickness.
- Square from 4 mm to 45 mm side.

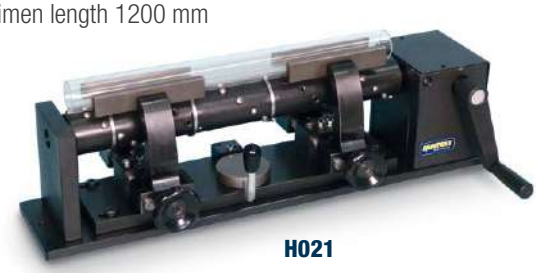
Useful marking length 500 mm
Max. specimen length 900 mm

Marking steps: 5 or 10 mm selectable with lateral graduation.
Marking speed: 60 marks per minute.

Power supply: 400V 3ph 50Hz
Dimensions: 530x480x445 mm
Weight: 58 kg approx.

H020

H021
MARKING-OFF MACHINE
Same as mod. H020, but hand operated by rotating the handle.
Max. specimen length 1200 mm


H021

H050
DRY-ICE MAKER
This device instantaneously produces the quantity of dry ice (solid CO2) required to reach temperatures down to -80 °C.
The dry-ice maker must be connected to a liquid CO2 bottle with connecting pipe and it produces 100 g dry-ice tablets, having mm 75 diameter and mm 25 thickness.

Weight: 3 kg


H050

H052
COOLING BATH FOR RESILIENCE TESTS
This apparatus is meant for Charpy tests to be carried out at low temperatures.
It is made from double chambered stainless steel with isolating cavity wall from foamed polyurethan, 65 mm thick.
Complete with double chambered cover and specimen rack.

Internal dimensions: 125x125x180 mm
Weight: 12 kg

H054
PLIERS
Special-shaped, to take cooled specimens from the bath and place them directly into the Charpy Pendulum.

H052

H054

H057N
BROACHING MACHINE, MOTORIZED
STANDARDS: ASTM A370 | ISO 148

Used to make notchings on impact test bars for resilience tests.
The notch on the specimen is obtained by only one tooling with very high dimensional accuracy.
Broach length: 350 mm
Speed notch: adjustable from 0.5 to 4 mm/sec
Drive: hydraulic, semi-automatic.
Suitable for KV, KU, KCU, DVM broach

Power supply: 400V 3ph 50-60Hz 400W
Dimensions: 460x610x1600 mm
Weight: 100 kg approx.

H057N

ACCESSORIES

H057-10N BROACH for “V” notchings on specimens with square section 10x10 mm

H057-11N BROACH for “U” notchings on specimens with square section 10x10 mm

C351
SPECIMEN CUTTING MACHINE
It accepts blades up to Ø 350 mm
Shear capacity: 120 mm
Complete with cutting blade for metals Ø 350 mm
Power supply: 230V 1F 50 Hz 2000W
Dimensions: 560x460x390 mm
Weight: 20 kg


C351

H065N
COLD BEND TESTING MACHINE

STANDARDS: EN ISO 7438, EN ISO 15630-1 I ASTM A615, ASTM A615M I D.M. 14/1/1988

This equipment has been studied and designed to perform bending tests on steel bars for reinforced concrete.

H065-01

H065N

SPECIFICATIONS:

- Max. piston load: 160 kN
- Max. piston stroke: 550 mm
- Piston speed adjustable from 0 to 6 mm/s
- Power supply: 230V 1ph 50 Hz 1500W
- Dimensions: 1540x800x1300 mm
- Weight: 350 kg approx.

The machine can perform two types of test:

- bending the specimen through 180° only with mandrels up to max. 96 mm included.
- bending the specimen through 90° and then straightening it again up to a minimum of 20° only with mandrels over 96 mm diameter.

This bending machine is composed of a rugged frame supporting a beam having a cylinder with relevant load piston fixed on it, being activated by an hydraulic cell complete with speed adjuster for the piston, direction control valve, max. pressure valve, control gauge. The whole is cased to protect every single component from the dust, and the operator from any possible danger. A small bowl has been fitted under the beam, where the steel bar is bent.
Two contrasting rollers are fitted on the beam. They may easily be adjusted in distance to be in accordance with the Standards concerning bars having diameter between 5 and 40 mm.
Fixing and changing the mandrels on top of the thrust cylinder is easy and practical and grants the operator a perfect interchangeability of the same. A device prevents the unlocking of the bar under test from the relevant rollers and the contrasting mandrel both during the bending and the straightening operation.
The machine accepts bars up to Ø 40 mm and is supplied complete with two series of rollers, having respectively Ø mm 50 and 100.
The mandrels, the mandrel-holders and the brackets are not included in the standard supply and have to be ordered separately. (see table).

ACCESSORY

H065-01 SAFETY GUARDS to CE Safety Directives.

H065N detail

TABLE OF THE AVAILABLE MANDRELS AND BRACKETS FROM Ø 5 TO Ø 40 ACCORDING TO: EN, ASTM, D.M.

Mandrel Model	Mandrel Ø mm	Rebar Ø mm EN ISO 15630-1	Rebar Ø mm ASTM A615-A615M	Rebar Ø mm D.M. 14-01-08	Mandrel-Holder Model	Bracket Model	Bracket Distances mm
H066-07	24	4 e 6	-	6	H067-03	H068-12	80, 170, 226
H066-10	32	7	9,5	8	H067-03	H068-17	98, 196
H066-12	40	8	-	10	H067-03	H068-17	98, 196
H066-14	44	-	12.7	-	H067-03	H068-13	85, 172, 298
H066-15	48	-	-	12	H067-03	H068-11	75, 160, 262
H066-18	56	10	15.9	-	H067-04	H068-20	110, 244
H066-19	60	-	-	12	H067-04	H068-13	85, 172, 298
H066-20	64	12	-	-	H067-04	H068-13	85, 172, 298
H066-61	70	-	-	14	H067-04	H068-19	106, 226
H066-62	80	-	-	16	H067-04	H068-20	110, 224
H066-24	96	14	19	-	H067-04	H068-12	80, 170, 226
H066-28	112	16	22.2	-	* No	H068-21	120, 254
H066-30	128	18	25.4	-	* No	H068-13	85, 172, 298
H066-31	132	20	-	-	* No	H068-01	200, 260, 412
H066-32	140	22	-	-	* No	H068-05	232, 342, 516
H066-33	144	-	-	18	* No	H068-13	85, 172, 298
H066-35	160	-	-	20	* No	H068-09	230, 320, 490
H066-36	176	-	-	22	* No	H068-05	232, 342, 516
H066-37	180	24 e 26	-	-	* No	H068-07	244, 364, 550
H066-49	192	-	-	24	* No	H068-07	244, 364, 550
H066-38	200	28	28.7	25	* No	H068-08	250, 375, 580
H066-40	224	30 e 32	32.2	-	* No	H068-05	232, 342, 516
H066-41	250	-	35.8	-	* No	H068-05	232, 342, 516
H066-53	260	-	-	26	* No	H068-03	220, 280, 438
H066-43	280	-	-	28	* No	H068-04	225, 292, 464
H066-45	320	34 e 38	-	32	* No	H068-22	122, 542, 594
H066-46	336	40	-	-	* No	H068-23	134, 568, 620
H066-58	340	-	-	34	* No	H068-22	122, 542, 594
H066-60	400	-	-	40	* No	H068-23	134, 568, 620

TABLE OF OTHER AVAILABLE MANDRELS AND BRACKETS

Mandrel Mod.	Ø mm Mandrel	Mandrel-Holder Mod.
H066-01	10	H067-01
H066-02	12	H067-01
H066-03	15	H067-02
H066-04	16	H067-02
H066-05	18	H067-02
H066-06	20	H067-02
H066-08	28	H067-03
H066-09	30	H067-03
H066-11	36	H067-03
H066-13	42	H067-03
H066-16	50	H067-03
H066-51	52	H067-04
H066-17	54	H067-04
H066-21	66	H067-04

Mandrel Mod.	Ø mm Mandrel	Mandrel-Holder Mod.
H066-48	72	H067-04
H066-22	75	H067-04
H066-52	78	H067-04
H066-23	84	H067-04
H066-55	90	H067-04
H066-26	108	* No
H066-63	114	* No
H066-39	220	* No
H066-50	240	* No
H066-56	300	* No
H066-54	312	* No
H066-57	360	* No
H066-59	380	* No
H066-47	384	* No

Bracket Model	Bracket Distances mm
H068-02	210, 268, 425
H068-06	240, 360, 520
H068-10	256, 386
H068-14	86, 180

Bracket Model	Bracket Distances mm
H068-15	90, 184
H068-16	92, 190
H068-18	100, 208

***Note:** From Ø 100 to 400 mm the mandrel is directly fitted to the piston without using a mandrel-holder.

All mandrels have been produced from quality steel and cadmium plated for rust protection, and from Ø 10 mm up to Ø 96 mm included have been hardened to make them wearproof.

PENDULUM IMPACT CHARPY TESTERS FOR RESILIENCE TESTS

STANDARDS: EN 10045-1 | EN ISO 148-1 | ASTM E23 | BS 131

AVAILABLE MODELS

H060N
PENDULUM IMPACT CHARPY TESTER
HAND OPERATED

The tester is equipped with a falling pendulum hammer, able to break, with a single blow, a sample carved in the middle and positioned on two supports.
The test is carried out on a CHARPY sample in order to check the energy absorbed during the impact, which is measured in JOULE.
The value stands for the impact strenght of the material (resilience).
- Cast iron frame
- Pendulum with hardened knife
- Brake device to stop the pendulum
- Impact energy 300J with 2J graduation
- Falling angle: 140°, Pendulum mass kg. 21.300
- Impact speed: 5.187 m/s

Supplied complete with knife-edge to perform the test as per ASTM Standard
It cannot be sold in CE markets
Dimensions: 500x1000x1820 mm **Weight:** 400 kg approx.

H060N

H062
PENDULUM IMPACT CHARPY TESTER, MOTORIZED

Semi-automatic working and high energy capacity.
Motorized pendulum with immediate arm repositioning.
Mechanical safety with automatic insertion to the arm hooking.
Simple and fast utilization, ideal for routine tests.
Supplied complete with protection cage to CE Safety Directive.
Impact energy: 300J with 0.25J resolution.
Supplied complete with knife-edge to perform the test as per ASTM Standard.
Power supply: 230V 1ph 50Hz 180W
Dimensions: 800x578x1400 mm **Weight:** 450 kg approx.

H062

H062-01
PENDULUM IMPACT CHARPY TESTER, MOTORIZED, DIGITAL, HIGH PERFORMANCE

Fully automatic working with immediate arm repositioning.
Machine for resilience tests with high impact energy.
Suitable for steels and alloys with high resilience values.
Data acquisition to PC through Software.
Safety cage aluminium and plexiglass made, with mechanical safety and microswitch blocking the door when the arm is inserted.
Impact energy: 500J with 0.1J resolution.
Supplied complete with knife-edge to perform the test as per ASTM Standard.
Power supply: 380V 3ph 50Hz 400W
Dimensions: 2200x800x2300 mm
Weight: 750 kg approx.


H062-01

ACCESSORY

KNIFE-EDGE to perform resilience tests according to EN 10045-1, EN ISO 148-1 and BS 131 Standards
H060-03 KNIFE-EDGE for H060N tester.
H062-03 KNIFE-EDGE for H062 and H062-01 testers.

OUR CLIENTS ARE OUR BEST ADVERTISEMENT.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ITOUCH

SECTION S
SOIL

For the implementation of civil engineering structures, the engineers must base their calculations according to the soil properties.
This section analyses a soil sample to evaluate its characteristics, by providing a complete range of testing equipment for: sampling, preparation, classification, consolidation, shear strength, triaxial, compaction, penetration, bearing capacity, permeability, density, geotechnical and chemical tests, in compliance with the EN, ASTM, BS and the most known International Standards.

TECNOTEST
MATERIAL TESTING EQUIPMENT

In early 2017 Matest has acquired Tecnotest.
The famous elephant has always been appreciated from the construction material industry for the quality and the stiffness of its products, with a special focus on the geotechnical range.
We are happy to have Tecnotest now part of our group.

S050
LIGHTWEIGHT DYNAMIC PENETROMETER

STANDARD: DIN 4094

Used to establish the thickness of different strata, when testing compaction works and to determine the relative density of fills and naturally deposited non-cohesive soils.
In general if the ground is not too compact, penetration tests can be carried of about 8 to 12 metres.
The penetrometer set, huosed in carrying case, consists of:
10 kg drop rammer, 500 mm fall and anvil,
11 sounding rod Ø 22 mm x 1 m lenght complete with threaded collar and guiding rod
Grooved rod to extract samples
2 drive point 90°, 5 cm^2 and 10 cm^2 surface
Lifting device for sounding rod, accessories

Dimensions: 1080x360x220 mm
Weight: 72 kg approx

S050

S051
DYNAMIC CONE PENETROMETER (DCP)

TRL = TRANSPORT RESEARCH LABORATORY, UK.
STANDARD: ASTM D 6951-03
This portable hand operated equipment is designed to obtain a direct and rapid in-situ evaluation of the structural strength of road pavement layers constructed with unbound materials.
The DPC Penetrometer results can be compared with CBR (California Bearing Ratio) as per sperimental Kleyn 1982 studies.
The test is performed with continuous penetrations at approx. 800 mm depth with max. depth of 2 m by using extension rods.
The equipment housed in carrying case, consists of:
- Drop sliding hammer 8 kg weight, falling height of 575 mm
- Impact anvil with driving rod
- Penetration rod with conical 60° point and Ø 20 mm
- Bar wrench, spanners, accessories.

Dimensions: 1210x340x190 mm
Weight: 29 kg approx

ACCESSORIES | SPARE

S051-10 Drop Sliding Hammer 4.6 kg weight.
S051-12 Extension rod, 400 mm long
S051-11 Spare Penetration conical point 60°

S057
FIELD INSPECTION POCKET VANE TESTER

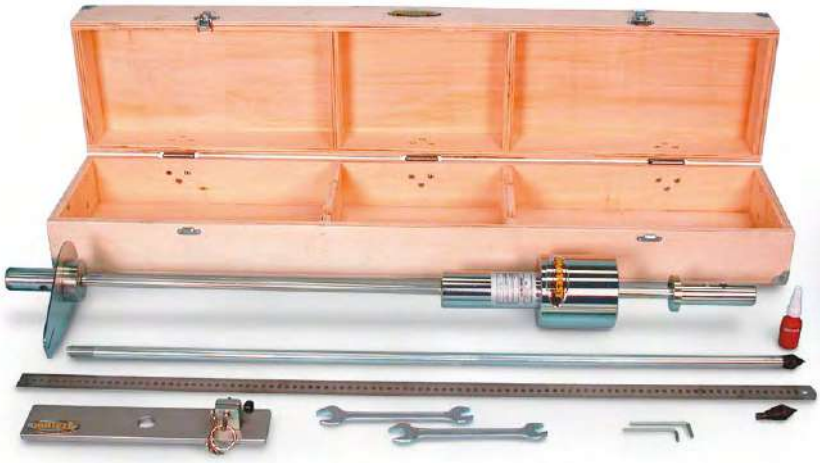
STANDARD: ASTM D 2573

Used to determine the shear strength of undrained (CU) cohesive soft soils, to firm non-fissured soils on site.
The instrument consists of a T-handle cylindrical body where a torsional spring is housed, and three interchangeable vanes of different sizes, used depending to the expected strength of the soil to be tested.
The vane is inserted into the soil for 60 mm approx., and the max. torque value is measured on a collar attached to the shaft.
Measuring range: 0 - 240 kPa
The unit, all stainless steel made, is supplied **calibrated with calibration certificate and conversion table** and complete with three vanes dimensions (diameter x height) 16x32, 20x40, 25.4x50.8 mm, extension rod 500 mm long, tools, carrying case.

Dimensions: 500x300x100 mm
Weight: 4 kg approx.

ACCESSORY | SPARE

S057-01 Extension rod, 500 mm long



S051

S057

S051-01

S052KIT
SOIL PROSPECTING KIT

STANDARDS: ASTM D420, D1452 | AASHTO T86

This equipment, manufactured by Matest, comprises different augers, sampler and tools for soil investigations; the whole housed in a wooden carrying case.

The kit consists of:

S092-01	Auger head Ø 80 mm
S093-01	Auger head Ø 100 mm
S094-01	Auger head Ø 150 mm
S052-01	Dutch soil auger head, Edelman type, Ø 150 mm
S052-02	Gravel auger head Ø 50 mm
S092ASTA	Extension rod 1 m long with "T" handle
S095	n° 5 extension rods, 1 m long
S053	Soil sampler Ø 38 mm complete with stainless steel sample tube Ø 38x230 mm, jarring link, "T" handle.
S053-04	n° 5 Stainless steel sample tubes Ø 38x230mm
S052-03	Plastic cap ends for sample tubes Ø 38x230mm (12 pieces)
S054	Hand extruder for sample tube Ø 38x230 mm
S052-04	Stillson wrenches (2 pieces)
S052-05	Wooden carrying case.

Dimensions: 1140x490x360 mm
Total weight: 50 kg approx.

S051-01
MACKINTOSH PROSPECTING KIT

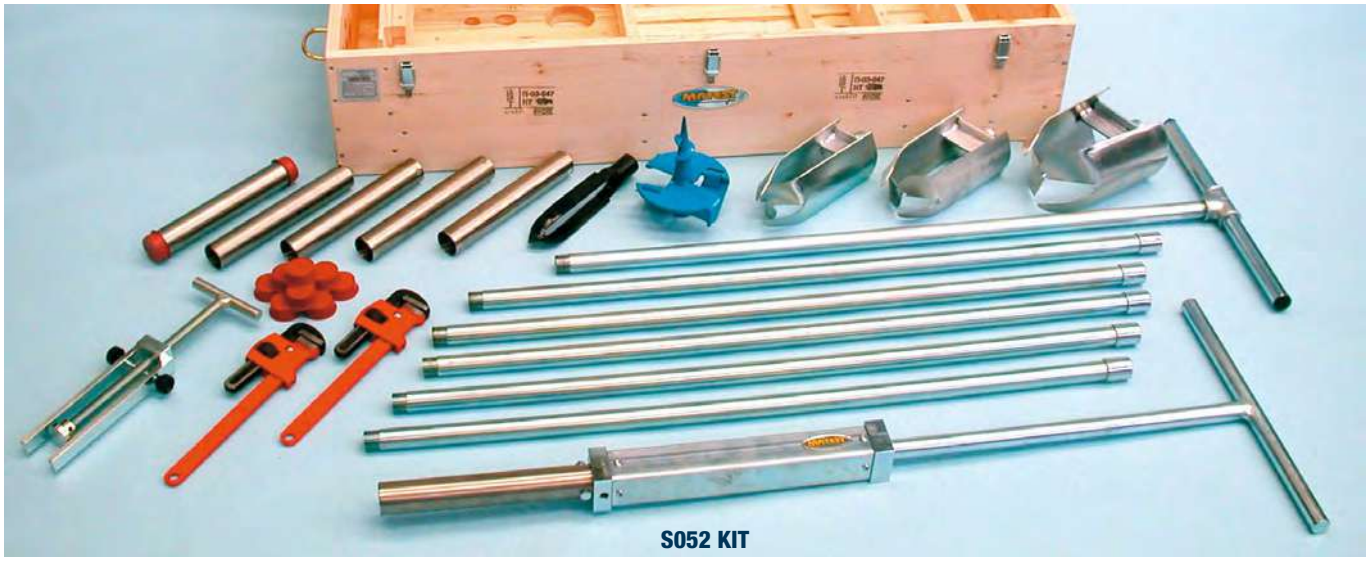
This equipment, manufactured by Matest, is particularly useful for initial site investigation work in remote areas. The kit is capable boring to a depth 10 - 12 mtrs depending on ground conditions. The use of specially designed extension rod couplers reduces bore-hole friction to a minimum, permitting easy operation to considera-ble depth.

Equipment consists of:

- 12 boring rods 1 mtr long with 12 couplers
- 2 pipe wrench and 1 tap wrench
- Core tube adaptor and clay core tube
- Driving head and clearing rod
- Long and short driving point
- Auger tool and standard core tube
- Lifting/driving tool and hammer
- Die nut and hand tap

All equipment supplied in a strong wooden box

Dimensions: 1050x260x120 mm
Weight: 35 kg approx.



S052 KIT

HAND AUGERS

STANDARDS: ASTM D 420, D 1452 | AASHTO T86, T202

Designed for soil investigations and explorations, and to obtain representative samples.
Complete with "T" handle, and rod 1 m long.
Made of special galvanized steel.

S095

S094 KIT

S093 KIT

S092 KIT

Models	Description	Weight kg
S092 KIT	Hand Auger, Ø 80 mm x 1 m long	4
S093 KIT	Hand Auger, Ø 100 mm x 1 m long	5
S094 KIT	Hand Auger, Ø 150 mm x 1 m long	6
S095	Extension rod for above 1 m long complete with coupling device	2

AUGER POWER HEAD TO OBTAIN DISTURBED SOIL SAMPLES.

Supplied **without** augers, to be ordered separately (see accessories).

MODELS

S096
AUGER POWER HEAD

Motor capacity 3 HP, two strokes, without speed inverter.
Fitted with two handwheels, to be used just by one operator.
Drilling holes up to Ø 200 mm and max. depth of 1000 mm
It does not accept extension rods.
Supplied without augers (see accessories)

Weight: 10 kg approx.

S096

ACCESSORIES

S096-03 AUGER Ø 100 mm x 1 m long
S096-04 AUGER Ø 150 mm x 1 m long
S096-05 AUGER Ø 200 mm x 1 m long
S096-06 EXTENSION ROD 1 m long

S097

S097
AUGER POWER HEAD

Motor capacity 6 HP, two strokes, equipped **with speed inverter** to facilitate the extraction of the augers.
Fitted with two handwheels, to be used by two operators.
Supplied without augers (see accessories)

Weight: 30 kg approx.

ACCESSORIES

S097-03 AUGER Ø 100 mm x 1 m long
S097-04 AUGER Ø 150 mm x 1 m long
S097-05 AUGER Ø 200 mm x 1 m long
S097-06 EXTENSION ROD 1 m long

SURFACE SOIL SAMPLERS

Used to take field standard core samples of compacted fill or undisturbed soils and to evaluate density of compaction samples as the ground surface.
The set consists of a drop hammer sliding on the drive rod and falling on the drive head where the sampling tube is hold.
Steel made, galvanized against corrosion.

MODELS

S084 KIT
SURFACE SOIL SAMPLER 73 MM ID
STANDARDS: ASTM D2937 I CNR no. 22

Sampling tube is 73 mm inside diameter by 66 mm high.
Drop hammer is 5 kg

Total weight: 10 kg approx.

SPARE

S084-01 Sampling tube 73 mm diameter by 66 mm high.

S083 KIT
SURFACE SOIL SAMPLER 100 MM ID
STANDARD: BS 1377:9

The sampling tube (core cutter) is driven into the soil by using the rammer dropping on the driving dolly.
The sampled specimen is trimmed weighed and dried; the density and the moisture content % is calculated.
Manufactured of plated steel.

The S083KIT includes:

S083-01 Driving rammer for Ø 100 mm core cutter. Weight 7.5 kg

S083-02 Driving dolly for Ø 100 mm core cutter. Weight 1 kg

S083-03 Core cutter (sampling tube) Ø 100 mm by 130 mm length. Weight: 1 kg

Total weight: 9.5 kg approx.

WATER LEVEL INDICATORS

Utilized to measure the water level in boreholes, wells and any open underground structures. A light and audible signal are activated when the probe touches water.
Battery operated, the cable is marked at cm. intervals, drum mounted and the stainless steel tip has diameter of 10 mm

Weight: 6 kg approx.

Models	Cable length
S061	50 m
S061-01	100 m
S061-02	200 m

S061

S053-04 S053 S054

S084 KIT

S083 KIT

S053
SOIL SAMPLER Ø 38 MM
Used to obtain indisturbed soil samples of Ø 1½" (38 mm)
The sampler is formed by:
T handle with extension rod, 900 mm long
Jarring link ¾"
Stainless sample tube Ø 1½" x 9" (38x230 mm).

Weight: 7 kg

ACCESSORY

S054 HAND EXTRUDER used to extrude the soil specimens Ø 1½" from the sample tube.

SPARE

S053-04 Stainless sample tube Ø 1½" x 9"

POCKET PENETROMETERS AND SHEAR VANE DEVICES

STANDARDS: ASTM D 2573-94 I AASHTO T202

MODELS

S065
DIAL POCKET PENETROMETER
For the classification of cohesive soft soils in terms of consistency, shear strength and approximate unconfined compression strength.
Direct value read in kgf/cm^2 on the graduated dial.
Range 0 - 6 kgf/cm^2 (0-588 kPa). Peak hold feature; zero setting by push button. Plunger Ø 6.35 mm

Weight: 300 g

S066
DIAL POCKET PENETROMETER
Identical to mod. S065 but with dial range 1-14 kg f/cm^2 (0-1373 kPa), suitable for medium and hard soil. Plunger Ø 6.35 mm

S068
GEOPOCKET DIAL PENETROMETER
Designed for a quick determination of the foundation soils, from clay to sandy soils.
It indicates:
- The angle of internal friction (sandy soils)
- The cohesion "c" (clay soils) and the approx. Unconfined Compressive Strength.

Peak hold feature; zero setting by push button.
Dual scale: 0-6 kgf/cm^2 (0-588 kPa)
0-11 kgf/cm^2 (0-1079 kPa)
Complete with 5 plungers Ø 6.4 - 10 - 15 - 20 - 25 mm

Weight: 400 g

S070
STANDARD POCKET PENETROMETER
Designed for the rapid determination of soil consistency, shear strength and approximate Unconfined Compression Strength. Scale range 0-4.5 kgf/cm^2 with direct reading strength values.
Plunger Ø 6.35 mm

Weight: 300 g

S071
POCKET PENETROMETER
Identical to mod. S070, but having a range of 0 - 16 kgf/cm^2. Suitable for very compacted soils.

Weight: 800 g.

S075
POCKET SHEAR VANE DEVICE RANGE: 0-1 KG/CM^2
Designed for the rapid determination in the field or in the laboratory of shear strength of cohesive soils. The dial indicates directly the shearing strength in kg/cm^2.
Complete with interchangeable stainless steel vane, 10x20 mm (Ø x height)

Weight: 300 g.

S076
POCKET SHEAR VANE DEVICE RANGE: 0-2 KG/CM^2
Identical to mod. S075 but dial range 0-2 kg/cm^2.

SPARE

S076-01 Stainless steel vane 10x20 mm (Ø by height) for S075 and S076 devices.

A106 MELTING POT, to melt wax and to cover soil samples keeping them to the original humidity.
See section "A" p. 28

A106

S086
LOAD RING PENETROMETER

Used to determine the bearing strength, compaction degree of subgrades, and also for determining the static penetration resistance of soil.
Supplied complete with "T" handle, proving ring 100 kgf (1 kN) with maximum load pointer and calibration chart, extension rod 500 mm long graduated every 100 mm, removable cone point 30° with 1 sq. in. top area.
Cadmium plated against corrosion.

Weight: 5 kg approx.

S086

S088
PROCTOR PENETROMETER

STANDARD: ASTM D 1558

Used to determine in field the moisture-penetration resistance relationship of fine grained soils.
Spring load scale 0-40 kg, subdiv. 1 kg, with direct max. value reading in kg on the sliding rod.
Complete with 9 interchangeable stainless steel needles diameter: 4.52 - 5.23 - 6.40 - 9.07 - 12.83 - 16.54 - 20.22 - 24.79 - 28.55 mm, accessories, carrying case.
Chromed finishing.

Weight: 5 kg approx.

S088

S088-10
MOISTURE CONDITION VALUE (MCV) AND CHALK CRUSHING VALUE (CCV)

STANDARDS: EN 13286-46 | BS 1377:4 (TRL approved)

This apparatus is used to measure the minimum comparative effort required to produce near full compaction of a soil, and the rate at which a sample of chalk lumps are crushed.
The unit can be used to classify chalk as a fill material with saturated moisture content.
The apparatus comprises a robust frame where a rammer falls, mould, scale, counter, accessories.

Weight: 60 kg approx.

S088-10

LABORATORY SAMPLE MIXERS

Suitable to mix granular materials like soils and bituminous mixtures, by using a whisk beater, as prescribed by EN, BS Spec.

MODELS

E095+B028-03 MIXER, 5 LITRE CAPACITY, complete with whisk beater

B027+B027-03 MIXER, 20 LITRE CAPACITY, complete with whisk beater

Technical details: see p. 90

E095 + B028-03

S058
NUCLEAR MOISTURE DENSITY GAUGE

STANDARDS: ASTM D6938, D2950, C1040 I AASHTO T310

This product is used to measure moisture density of the construction material from surface to 300 mm of depth. This device can measure and display wet density and dry density, percent moisture, moisture content and other necessary engineering parameters related to density and moisture content of materials.
Software features include self-test, special calibration, asphalt thinlayer mode and built in diagnostics tests to help users identify problems and solve them in the field.

Specifications:
- Density measurement range: 1120 to 2720 kg/m^3
- Moisture measurement range: 0 to 640 kg/m^3
- Precision at 2000 kg/m^3, 150 mm - Depth: ± 3.5 kg/m^3
- Moisture precision at 240 kg/m^3: ± 4.42 kg/m^3

Gauge dimensions: 580x310x220 mm
Weight: 14 kg approx.

S058

ACCESSORIES for S058

S058-11
NUCLEAR GAUGE VALIDATOR AND CALIBRATION DEVICE
STANDARDS: ASTM D6938, D2950 I AASHTO T310

This lightweight block may be used in the field to check the calibration accuracy of the gauge and re-calibrate all model gauges, if necessary. The software for determination of calibration constant is user friendly and communicates directly with the gauge for download of constants. The block is constructed for the rugged construction industry with 1/8" Aluminum exterior with powder coat paint and it is internally lined with shielding and composite compound in secured enclosure.
For calibration, the user requires a PC with Windows® operating system.

Dimensions: 480x460x300 mm
Weight: 38 kg approx.

S058-12 SOFTWARE to be used with the validator for calibrations.

S058-11

S060
NUCLEAR MOISTURE DENSITY GAUGE

STANDARDS: ASTM D6938, D2950, C1040 I AASHTO T310

It provides a rapid method of on-site determination of moisture density content of soils, aggregates and asphaltic concrete.
The microprocessor displays all functions directly.
Wet and dry density, moisture percent, moisture content, percent compaction for both soils and asphaltic concrete, void ratio and percent air voids.
Surce is 300 mm with index rods for direct transmission depths in 50 mm increments. Stores up to 320 field tests, transferable to PC or printer.

Gage dimensions: 400x220x140 mm
Shipping weight: 14 kg approx.

S060

S059-10
ELECTRICAL DENSITY GAUGE

NEW

STANDARD: ASTM D7698

This Electrical Density Moisture Gauge is a “nuclear-free” alternative for determining the moisture and density of compacted soils used in road beds and foundations. This portable, battery powered unit is capable of being used anywhere without the concerns and regulations associated with nuclear safety. Its user-friendly step-by-step menu guides the user through each step of the testing procedure to established curves for the material being tested.
Easy-to-use the Gauge can be used as a construction aid to monitor day-to-day compaction operations by providing performance and measurement results highly comparable to those achieved with traditional methods, including the nuclear gauge and/or sand-cone and oven moisture test combination.
When conducting a test, the instrument measures and displays the results for wet and dry density, gravimetric moisture content and percent compaction.

Advantages:

- It does not require a highly-trained technician.
- It does not require special handling for shipping or the regulatory compliance for hazardous materials.
- It is easy-to-learn and easy-to-use with its step-by-step menu.
- Lightweight and easily transportable.
- It is accurate and repeatable with results that mirror known testing methods.
- Dry density accuracy: within 3% of standard tests.
- Moisture density accuracy: within 2% of standard tests.

The Gauge includes: Console/Case, 4-tapered 6” darts, hammer, soil sensor and cables, dart template, temperature probe, battery charger, field verifier, safety glasses.

Dimensions: 533x432x203 mm
Shipping Weight: 16 kg approx.

S059-10

S059
GEOGAUGE-NON NUCLEAR GAUGE FOR SITE SOIL COMPACTION CONTROL

YOUNG MODULUS

STANDARD: ASTM D6758

Technical features:

Stiffness	3 to 70 MN/m
Young’s Modulus	26 to 610 Mpa
Measure Depth	from 230 to 310 mm.
Measure Duration	75 seconds
Power	Six D-Cell Batteries (500 to 1500 measurements)
Dimensions with case	470x420x330 mm
Weight	15 kg

S059

This is the only hand portable gauge available to provide the required simplicity, quickness and precision to directly measure and monitor the in-place engineering properties and do so at construction speed. The device applies a constant load vibrating force to the soil’s surface and measures the resulting displacement.
This dynamic technology simulates actual in-use conditions.
One instrument to link design specifications with compaction in 75 seconds for enhanced QC/QA.
Applications include subgrade, subbase, base monitoring the strength gain of lime, cement, fly-ash and polymer stabilised materials, monitoring the re-compacting of asphalt and cold in-place recycling to peak properties to prevent wasted effort and damaging over-compaction. The device compliments and provides alternative to resilient modulus, Falling Weight Deflectometer, field California Bearing Ratio, plate load test, dynamic cone penetrometer and other measures of strength, stiffness, modulus and deflection.

ACCESSORIES

S059-01 INFRARED INTERFACE AND SERIAL PORT ADAPTER with Software Template (PC only).

S059-02 VERIFIER MASS (verifies the non nuclear gauge operation).

S077N
EARTH RESISTIVITY METER

STANDARDS: ASTM G57 I BS 1377:3

NEW

Used for ground water researches even to great depths, gravel deposit evaluation, geological surveys for the construction of roads, pipelines etc., study and prevention of landslides.

The system consists of:

1 earth resistivity meter with software (requires external pc, not included)
2 cable reels with 300 m cable
2 cable reels with 100 m cable
2 stainless steel electrodes
2 copper electrodes
2 1.25 kg mallet

Dimensions: 270x246x123 mm
Weight: 2.9 kg approx.

S078-01N

S077N

ACCESSORY

S078-01N ENERGIZER, TWO PIECES
Energy source for geoelectrical surveys (in alternative to dry batteries or generators).

Dimensions: 27x24x10.5 cm (each piece)
Weight: 2.7 kg approx. (each piece)

S079N
SEISMOGRAPH, 24 CHANNELS

This new type of seismograph is a compact-sized and it has 24 channels, with a 24 bit data acquisition board and USB interface for external PC. Suitable for so many applications, this system is a really affordable solution for all professional uses.
Applications:
- Refraction
- Shallow reflection
- Surface waves (MASW, Re.Mi., Vs30, MAAM, ESAC, etc.)
- HVSR / Vibrations
- Downhole (with 3D borehole geophone)
- Crosshole (with 3D borehole geophone and cross-hole energizer for P/S waves Mod.CHE)

Dimensions: 24x19.5x11 cm
Weight: 2 kg approx.

MAIN FEATURES

- 24 channels + trigger (AUX) – 2 units can be serialized for a total of 48 chs.
- 24 real bits, Sigma-Delta ADC
- To be connected to any portable PC/tablet PC/ Toughbook (not included)
- Power supply from USB (no external battery!)
- Standard NK2721C seismic cable connectors
- Compatible with analog geophones of any resonance frequency
- Free upgrades of data acquisition software
- PELI Case (IP67 when closed)

S079N

S132N
COLOR STANDARD GLASS SCALE
ORGANIC IMPURITIES IN SOILS

STANDARDS: ASTM C40-11 method D | AASHTO T21

For the determination of the Organic impurities in soils and fine aggregates.
The chart has 5 glass reference scales.

S132-03 S132-01 S132-02 S132N

S132-01 GRADUATED IMPURITIES TEST BOTTLE, stoppered, pyrex glass, 500 ml - ASTM C40

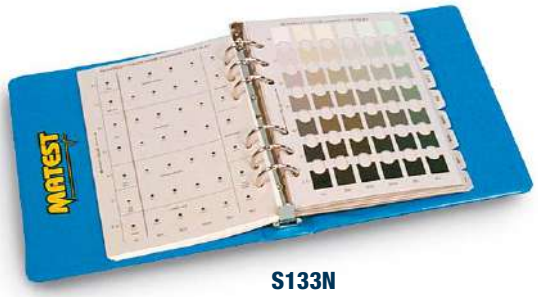
S132-02 GRADUATED IMPURITIES TEST BOTTLE, stoppered, pyrex glass, 500 ml, marked at 130 and 200 ml - UNI 8020-14

S132-03 GRADUATED IMPURITIES TEST BOTTLE, stoppered, pyrex glass, 1000 ml - ASTM C40

V300-24 SODIUM HYDROXIDE, pack of 1000 g

S133N
MUNSELL SOIL COLOUR CHART

Colour matching charts for soil identification.
The set consists of 7 constant hue charts with 196 colours, plus two tropical soil colour charts.



S133N

S135 ACIDITY TEST KIT OF WATER to evaluate the potential corrosive. The set comprises different graduated containers, reagents, syringe, pipette, instructions.

S136 CHLORIDE TEST KIT OF WATER. The set comprises different reagents, graduated containers, pipette, syringe, instructions.

S137 HARDNESS TEST KIT OF WATER, for calcium and magnesium percentage determination.
The set comprises different reagents and graduated containers, syringe, pipette, instructions.

S137-01 ALKALINITY TEST KIT to determine the total alkalinity of water.

S138 COMPACT LABORATORY FOR SOIL ANALYSIS
Compact laboratory for the determination of nitrate-, nitrite-, and ammonium-nitrogen as well as pH in soils. Formed by different bottles, reagents and accessories to perform about 50 tests for each soil factor.

NEW

S137-01

S138

S135 S136 S137

UNIVERSAL SAMPLE EXTRUDERS

STANDARDS: EN 13286-2, 13286-47 | ASTM D698, D1587, D1883 | BS 598, 1377:4, 1924:2

S111
MOTORISED HYDRAULIC EXTRUDER

Used for a smooth and rapid extrusion of soil samples from tubes also of thin walls with minimum disturbance. The unit extrudes samples from Ø 35 up to 150 mm (external diameter 160 mm) with max. stroke of 900 mm.
The hydraulic piston is equipped of speed adjuster and can be stopped in any excursion's position.
Max. load: 70 kN (7000 kg)
The extruded sample is held in place by a receiving table adjustable in height and easily lowered along side the machine to save space.
Complete with adaptors (ring + tamper) to extrude samples having diameter 38.1 (1½"), 83, 100 mm.

Power supply: 230V 1ph 50Hz 1300W
Dimensions (working position): 2741x635x1200 mm
Weight: 160 kg approx.

S111

S114
UNIVERSAL EXTRUDER

Used to extrude samples having diameter 4", 6", 100 mm, 150 mm. It can therefore extrude CBR, Marshall and Proctor specimens.
The extruder is actuated by a 50 kN hydraulic jack, having ram travel of 190 mm + 170 mm screw.
Supplied complete with adaptors

Dimensions: Ø 300x500 mm
Weight: 32 kg approx.

S114

S112
SCREW EXTRUDER - HAND OPERATED

The unit extrudes samples from Ø 35 to 101.6 mm with max. stroke of 650 mm. Supplied complete with adaptors to extrude samples having diameter 38.1 (1½"), 83, 100 mm, supporting bench, sample receiving table both adjustable in height and lowerable.

Dimensions: 1700x700x1200 mm
Weight: 90 kg approx.

S112

S114BT
HAND-OPERATED HYDRAULIC EXTRUDER

Hand-operated hydraulic jack, 3 t capacity. Suitable for the extrusion of 4" and 100 mm diameter specimens from the mould.

Dimensions: 200x200x400 (h) mm.
Weight: 20 kg approx.

S114BT

ADAPTORS (ring and tamper) for S111 and S112 Extruders:

Code	Diameter
S113-10	38.1 mm (1 ½") (spare)
S113-11	50.8 mm (2")
S113-12	76.2 mm (3")
S113-13	101.6 mm (4")
S113-14	83 mm (spare)
S113-15	100 mm (spare)
S113-16	35 mm
S113-17	150 mm (only for mod. S111)

S118
SOIL DIE CUTTER | SAMPLER

Used to compress loose soils to prepare samples, and to hollow punch (cut) and extrude soil specimens for consolidation, shear, triaxial, unconfined tests.
The sampler is used with the hollow punches S122 to S122-20 and tampers S123 to S123-16
Upper plate diameter is 120 mm and max. vertical daylight is 470 mm

Dimensions: 500x300x900 mm
Weight: 30 kg approx.

S118 with punches and tampers

HOLLOW PUNCHES AND TAMPERS

Used to prepare soil samples and to fit them into the relevant cells to perform triaxial, consolidation, shear, unconfined tests.
The punch has thin walls with cutting rim, and the tamper expels the specimen from the hollow punch by inserting it directly into the cell without disturbing the same.

Cell	Dimensions	Height	Hollow Punch	Tamper
Consolidation	Ø 50.47	20 mm	**S122**	**S123**
Consolidation	Ø 63.50	20 mm	**S122-19**	**S123-05**
Consolidation	Ø 71.40	20 mm	**S122-01**	**S123-01**
Consolidation	Ø 75.00	20 mm	**S122-17**	**S123-04**
Consolidation	Ø 79.80	20 mm	**S122-02**	**S123-02**
Consolidation	Ø 112.80	25 mm	**S122-03**	**S123-03**
Consolid. Permeab.	Ø 50.47	20 mm	**S122-04**	**S123**
Consolid. Permeab.	Ø 63.50	20 mm	**S122-20**	**S123-05**
Consolid. Permeab.	Ø 71.40	20 mm	**S122-05**	**S123-01**
Consolid. Permeab.	Ø 75.00	20 mm	**S122-18**	**S123-04**
Consolid. Permeab.	Ø 79.80	20 mm	**S122-06**	**S123-02**
Consolid. Permeab.	Ø 112.80	25 mm	**S122-07**	**S123-03**
Shear	Ø 50	23 mm	**S122-08**	**S123-08**
Shear	Ø 60	23 mm	**S122-09**	**S123-09**
Shear	Ø 63.5	23 mm	**S122-21**	**S123-17**
Shear	Ø 100	23 mm	**S122-10**	**S123-10**
Shear	⧄ 60x60	23 mm	**S122-11**	**S123-11**
Shear	⧄ 100x100	23 mm	**S122-12**	**S123-12**
Triaxial + Unconf.	Ø 38	76 mm	**S122-13**	**S123-13**
Triaxial	Ø 50	100 mm	**S122-14**	**S123-14**
Triaxial	Ø 70	140 mm	**S122-15**	**S123-15**
Triaxial	Ø 100	200 mm	**S122-16**	**S123-16**

V112-01

V113

S124

S125

V112-01 PORCELAIN MORTAR Ø 125 by 65 mm complete with porcelain pestle.
V113 PESTLE, rubber headed.
S124 WIRE SAW for trimming soil specimens. Complete with six blades.
S125 TRIMMING KNIFE to prepare samples.

S120
SOIL LATHE

Designed to reduce by trimming the diameter of a soil sample unitil reaching the desired diameter size by using a wire saw. The lathe is hand-operated, the height is adjustable up to 230 mm, and it accepts samples from Ø 38 to 110 mm.
Supplied complete with three sets of platens for samples Ø 38-50,47-60 mm, wire saw and 6 blades.
Dimensions: Ø 460x720 mm
Weight: 20 kg approx.

S120

ACCESSORY

S120-01 UPPER TRIMMING PLATEN available from Ø 38 to 110 mm
When ordering please specify required diameter.

S140
ION EXCHANGE DEVICE
SULPHATE CONTENT DETERMINATION

STANDARD: BS 1377:3

This device is used to know the sulphate content of ground water and water soil extracts.
Consisting of a ion exchange glass tube 400 mm long, connector and bottom flask 500 ml capacity.
The unit is assembled on a stand.

Dimensions: 190x110x600 mm
Weight: 5 kg approx.

ACCESSORY

V300-30 Ion exchange resin, 500 g

V300-30

S140

CHLORIDE CONTENT, RAPID METHOD

STANDARDS: BS 812:117 | BS 1377:3

Used to estimate the chloride content of aqueous solutions in sand and fine aggregates.

A019-01 QUANTAB Chloride Titrator Strips, type 1175, range 0.005% to 0.1% (30 to 600 ppm) Na Cl. Pack fo 40 strips.

A019-02 QUANTAB Chloride Titrator Strips, type 1176, range 0+05% to 1% (300 to 6000 ppm) Na Cl. Pack of 40 strips.

SULPHATE CONTENT, RAPID METHOD

STANDARD: BS 1377:3

Used to determine the sulphate ions in aqueous solutions of sand and fine aggregates.

A019-03 SULPHATE TEST STRIPS, detection range 200 to 1600 mg/l. Pack of 100 strips.

A019-01 A019-02 A019-03

B073-01
MAGNETIC STIRRER/HEATER

For titration and stirring of liquid and semi-solid materials.
Plate Ø 150 mm.
Variable speed and temperature by electronic regulators.
Supplied complete with magnetic teflon coated follower.

Power supply:
230V 1ph 50-60Hz 700W

B073-01

pH METERS, DIGITAL

STANDARDS: ASTM D1067 | BS 1377:3

V215
pH METER, POCKET

Battery operated, with replaceable electrode
Range: 0.00 to 14.00 pH - Resolution 0.01 pH
Manual 2 points calibration.
Power supply: standard battery, 3000 hours use.
Supplied complete with: electrode, batteries, 5+5 kit of pH 4 and 7 calibration solutions

Weight: 70 g

V215

V215-01N
pH/mv/°C METER, PORTABLE, WATERPROOF

Range pH: 0.00 to 14.00 - Resolut. 0.01 pH
mV: ± 1999 - Resolut. 0.1mV - 1mV
Temperature: 0 to 100°C
Manual 2 points calibration.
Automatic temperature compensation.
Power supply: 9V battery, 100 hours use.
Supplied complete with: electrode, temperature probe, battery, calibration solutions, case.

Weight: 180 g

V215-01N

Note: Complete range of pH meters at p. 599

A028
UNIVERSAL CARBIDE METER

STANDARDS: BS 6576 I AASHTO T217 I ASTM D4944

For the rapid and accurate determination of moisture content in soil sand, gravel, aggregates etc, based on the calcium carbide method.
It is possible to vary the sample weight from 3 to 100 g achieving a moisture range 50% (3g) - 7.5% (20g) - 1.5% (100g).
The bottle is calibrated and equipped with a surface thermometer.
The glass ampoule containing the calcium carbide is broken when the bottle is closed and shaken, granting better accuracy to the test.
The instrument comprises the testing bottle with manometer, small balance, 25 ampoules of reagent, accessories, case.

Dimensions: 520x340x140 mm
Weight: 6 kg approx.

A028

Note: Other carbide meter models: see p. 29

SPARE

A028-11 Carbide Ampoules (pack of 100)

A028-11

V023-01
MOISTURE DETERMINATION BALANCE

160 g capacity x 0.001/0.01 g sensitivity with tare up to 10 g.
Samples are dried by a infrared lamp with adjustable heat control.
A built-in-timer 0-61 min. switches off the heater at the end of the drying cycle which is signaled by a bell. Moisture loss percentage and residual mass are read directly from the lighted scale.

Power supply: 230V 1ph 50-60Hz

V023-01

A117 + A116-11 + A116-12 + C279-02

A117
END-OVER-END SHAKER

PARTICLE DENSITY OF SOILS

STANDARD: BS 1377:2

Used to determine the particle density of soils containing up to 10% of particles retained on a 37.5 mm sieve.
It rotates two gas jars at approx. 50 rpm to satisfy BS Standard.
The shaker is equipped with an original friction device conforming the unit to CE Safety Directive.
Supplied **without** gas jars to be ordered separately

Power supply: 230V 50Hz 1ph 150W
Dimensions: 550x430x500 mm
Weight: 20 kg approx.

A116-12

A116-11

ACCESSORIES

A116-11 GAS JAR to determine the specific gravity of soils.
Complete with glass cover.
Diameter 75 mm by 300 mm height
Weight: 1.3 kg

A116-12 RUBBER BUNG for the gas jar A116-11

C279-02 SEPARATE CONTROL PANEL, complete with ON/OFF switch, timer, fuse, electric protections.

S155 KIT
PARTICLE SIZE ANALYSIS OF SOILS
HYDROMETER METHOD
STANDARDS: ASTM D422 / AASHTO T88

This complete set is used to determine the quantitative size distribution of very fine particle in soils such as clay and silt.

S155 KIT The complete set comprises:

S155-01 Hydrometer jar, 1000 ml capacity (6 pieces provided with the kit)

V172 Soil hydrometer, 151H, range 0.995 to 1.038 g/ml with div. 0.001

S155-04 Glass tank, dimensions: 600x300x380 mm

S155-09 Heater, **professional type**, complete with thermostat, cooling coil, water circulating unit. 230V 1ph 50-60Hz 1000W

S155-10 Thermometer, range 0 - 50 °C, subdiv. 0.5 °C.

V104-03 Beaker, pyrex, 250 ml capacity

V300-23 Sodium Hexametaphosphate, 1000 g

S156-01 KIT High speed stirrer, 10.000 rpm, complete with cup, paddle, anti-splash baffle, for dispersing soil particles in water. 230V 1ph 50-60Hz

Total weight: 60 kg approx.

ALTERNATIVE:

S155S KIT
PARTICLE SIZE ANALYSIS OF SOIL

Same as S155 KIT but:

S155-09S HEATER **simple type**, complete with thermostat and water circulating unit but without cooling coil (see accessories S155-08). 230V 1ph 50-60Hz

NEW

S155-09S

S155 KIT

S156-01 KIT

S156-03

S156

ACCESSORIES

V172-02 SOIL HYDROMETER 152H, range -5 to 60 g/l (alternative to mod. V172)

S155-02 BUNG, rubber, for the cylinder S155-01

S155-08 COOLING COIL for S155-09S

S155-11 NOMOGRAPHIC CHART, for stoke's law determination.

S156 STIRRER, manual, for cylinders 1000 ml capacity mod. S155-01

C306-03 SEPARATE CONTROL PANEL, complete with on/off switch and electric protections, to get S155-09 heater to CE Safety Directive.

C306-03

ACCESSORIES according to NF P94-057 Standard

S155-03 HYDROMETER JAR, 2500 ml capacity, 85 ± 5 mm Ø, graduated at 500, 1500, 2000 ml.

S156-03 STIRRER MANUAL, 600 mm long for cylinders 2500 ml capacity, mod. S155-03.

V172-03 SOIL HYDROMETER 0.995 to 1030 g/ml.

SPARES for S156-01 KIT Stirrer

S156-11 Anti-splash baffle

S156-12 Paddle

S156-13 Cup (beaker)

S156-13

S156-12

S156-11

S143 KIT
PARTICLE SIZE DISTRIBUTION PIPETTE METHOD

STANDARD: BS 1377:2

This equipment is used to determine the quantitative size distribution of very fine particle in soils, like clay and silt.

The complete set comprises:

S144 Andreasen pipette, 25 ml capacity, for an accurate extraction of the quantities of soil in suspension for analysis.

S144-01 Pipette stand, to accurately raise and lower the pipette with no transmission of vibration to not disturb the sample suspension. Weight: 10 kg

S144-02 Sedimentation cylinder, 500 ml capacity

S144-03 Rubber bung for cylinder

S144-04 Evaporating dish, glass, Ø 90 by 50 mm height.

V172-03 Soil hydrometer, long stem, 0.995 to 1030 g/ml.

S155-04 Glass tank, dimensions: 600x300x380 mm.

S155-09 Heater, **professional type**, complete with thermostat, cooling coil, circulation unit.
Alternative: S155-09S simple type, see p. 474

S155-10 Thermometer, range 0 - 50 °C, subd. 0.5 °C.

Total weight: 40 kg approx.

Note: each item can be ordered separately.

ACCESSORIES

S144-10 ANDREASEN PIPETTE, capacity: 10 ml

C306-03 CONTROL PANEL, complete with on/off switch and electric protections, to get S155-09 heater to CE Safety Directive.

A117 END-OVER-END SHAKER. Technical details: see p. 60

S157 KIT
METHYLENE BLUE TEST SET
CLAY CONTENT IN FINE AGGREGATES

STANDARDS: EN 933-9 | NF P94-068 | UNI 8520-15 | UNE 83180

Utilized to determine the clay content in the fine portions of aggregates. The set comprises:

S157-01 Electric stirrer adjustable from 400 to 700 rpm, complete with Ø 70 mm propeller. 230V 1ph 50-60Hz

S157-06 Support base for stirrer

S157-02 Burette 50 x 0.1 ml with stopcock

S157-07 Support base for burette

S157-08 Pan 200x150x80 mm

S157-03 Filter paper Ø 90 mm (pack of 100)

S157-04 Glass rod Ø 8x300 mm

S157-05 2000 ml capacity plastic beaker

V300-28 Methylene blue, 100 g

V300-29 Kaolinite, 500 g

Total Weight: 10 kg approx.

Note: each item can be ordered separately.

S157-10 AUTOMATIC DISPENSER, 0-10 ml x 0.1 ml grad. Capacity 1000 ml (alternative to S157-02+S157-07)

S157 KIT

S157-20
AUTOMATIC METHYLENE BLUE TESTER

This instrument determines automatically the quantity of clay in sand. It grants accurate and repeatable test results, saving a lot of time (approx. 30 minutes each test). The apparatus is composed of: precision pump, colorimeter, control unit, filters, accessories. To perform the test S157-01, S157-06, V300-28 and V300-29 devices are also needed.

Power supply: 230V 1ph 50Hz
Dimensions: 300x400x350 mm
Weight: 10 kg approx.

S157-20

S158 KIT
SAND EQUIVALENT TEST SET

STANDARDS: ASTM D2419 I AASHTO T176

This complete set comprises:

S158-01N Plexiglass measuring cylinder engraved at 100 and 380 mm, with transparent adhesive label, graduated in mm and inch (5 pieces)

S158-02 Rubber stopper for cylinder (2 pieces)

V176-02 Graduated rule 500 mm, stainless steel

V136-01 Funnel, wide mouth

S158-04N Measuring can 85 ml capacity

V121 Plastic bottle, 5 litre capacity

S158-06 Irrigator tube with stopcock and syphon assembly

S158-07N Weighted foot assembly for sand level

A052-44 Sieve, Ø 200 mm, opening 4.75 mm

S158-09 Concentrated stock solution, 1000 ml

V170 Stop watch, digital

S158-11 Clamp stand set to hold the syphon assembly with bottle

S158-12 Portable carrying case, dimensions: 550x250x400 mm

Total Weight: 18 kg approx.

S158 KIT

S158-20 KIT
SAND EQUIVALENT TEST SET

STANDARDS: EN 933-8 I NF XP18-598 I CNR N.27
UNI 8520-15 I UNE 83131

This complete set comprises:

S158-03N Plexiglass measuring cylinder engraved at 100 and 380 mm (5 pieces)

S158-02 Rubber stopper for cylinder (2 pieces)

V176-02 Graduated rule 500 mm, stainless steel

V136-01 Funnel, wide mouth

S158-05 Measuring can 200 ml capacity

V121 Plastic bottle, 5 litre capacity

S158-10 Irrigator tube with stopcock and syphon assembly

S158-13 Weighted foot assembly for sand level

A052-37 Sieve, Ø 200 mm, opening 2 mm

S158-09 Concentrated stock solution, 1000 ml

V170 Stop watch, digital

S158-11 Clamp stand set to hold the syphon assembly with bottle

S158-12 Portable carrying case, dimensions: 550x250x400 mm

Total Weight: 18 kg approx.

S158-20 KIT

ACCESSORY

S158-08 METALLIC FUNNEL, conforming to EN 933-8 / NF XP18-598 UNI 8520/15 Specifications.

S158-08

Note: each item can be ordered separately.

S159 KIT
SAND EQUIVALENT TEST SET (SIMPLE)
STANDARDS: ASTM D2419 I AASHTO T176

The set comprises:

S158-01N	Plexiglass measuring cylinder engraved at 100 and 380 mm, with transparent adhesive label, graduated in mm and inch (4 pieces)
S158-02	Rubber stopper for cylinder (2 pieces)
V176-02	Graduated rule 500 mm, stainless steel
V136-01	Funnel, wide mouth
S158-04N	Measuring can 85 ml capacity
V121	Plastic bottle 5 litre capacity
S158-06	Irrigator tube with stopcock and syphon assembly
S158-07N	Weighted foot assembly for sand level
S158-09	Concentrated stock solution, 1000 ml

Total Weight: 5 kg approx.

S159-11

S159 KIT

ACCESSORY

S159-11	CARRING CASE, PLASTIC, housing the sand equivalent set mod. S159 KIT or S159-01 KIT except the bottle V121

S159-01 KIT
SAND EQUIVALENT TEST SET (SIMPLE)
STANDARDS: EN 933-8 I NF XP18-598 I UNI 8520-15
CNR N.27 I UNE 83131

The set comprises:

S158-03N	Plexiglass measuring cylinder engraved at 100 and 380 mm (4 pieces)
S158-02	Rubber stopper for cylinder (2 pieces)
V176-02	Graduated rule 500 mm, stainless steel
V136-01	Funnel, wide mouth
S158-05	Measuring can 200 ml capacity
V121	Plastic bottle 5 litre capacity
S158-10	Irrigator tube with stopcock and syphon assembly
S158-13	Weighted foot assembly for sand level
S158-09	Concentrated stock solution, 1000 ml

Total Weight: 5 kg approx.

S159-11

S159-01 KIT

ACCESSORY

S158-08	METALLIC FUNNEL, conforming to EN 933-8 I NF XP18-598 I UNI 8520/15 Specifications.

MEASURING CYLINDERS
Available Models :

S158-01N
STANDARDS: ASTM D2419 I AASHTO T176
PLEXIGLASS MEASURING CYLINDER, engraved at 100 and 380 mm, with transparent adhesive label graduated in mm and inches.

AS ALTERNATIVE:

S158-01GN
STANDARDS: ASTM D2419 I AASHTO T176
PLEXIGLASS MEASURING CYLINDER, engraved at 100 and 380 mm with additional **engraved scale from 0 to 380 mm**

S158-03N
STANDARDS: EN 933-8 I NF XP18-598
PLEXIGLASS MEASURING CYLINDER, engraved at 100 and 380 mm

S158-03N S158-01GN S158-01N

S158-08

Note: each item can be ordered separately.

S160N
MOTORIZED SAND EQUIVALENT SHAKER

STANDARDS: EN 933-8 | ASTM D2419 | AASHTO T176
NF XP18-598 | UNE 83131 | CNR N.27
UNI 8520-15

The unit provides a constant uniform shaking with automatic cycle test. Oscillating excursion is 203 mm at 175...180 adjustable strokes/min. rate. Complete with digital timer that automatically stops the shaker at the end of the test. It cannot be sold in CE markets without security cabinet (see model S160-01N)

Power supply: 230V 1ph 50Hz 250W
Dimensions: 700x360x350 mm
Weight: 30 kg approx.

S160N + S158-03N + S158-02

S160-01N
MOTORIZED SAND EQUIVALENT SHAKER

Same as S160N, but equipped with steel Security Cabinet, conforming to CE Safety Directive. When opening cabinet's door during shaker working, a microswitch automatically stops the machine.

S160-01N + S158-03N + S158-02

S161
SAND EQUIVALENT SHAKER HAND OPERATED

STANDARDS: EN 933-8 | ASTM D2419 | NF XP18-598
AASHTO T176 | UNI 8520-15 | UNE 83131

Hand operated working through handwheel.
Complete with mechanical strokes counter.

Dimensions: 700x350x420 mm approx.
Weight: 20 kg approx.

S161

A058-05N

ASSESSMENT OF FINES: GRADING OF FILLERS

STANDARD: EN 933-10

A058-05N
AIR JET SIEVE SHAKER

Suitable for sieving powder and dry grain products up to 5 microns.
Technical details: see p. 38

SPECIFIC GRAVITY OF SOILS

E136
WATER BATH, DIGITAL

STANDARD: BS 1377:2

For the determination of particle density, pyknometer method, according to BS 1377:2 Specifications, and for general laboratory purposes.
All stainless steel made, with wool insulation and water circulation electric stirrer, the bath ensures an uniform and constant temperature.
Complete with digital thermostat and dual safety thermostat with higher thermic threshold ensuring safe working conditions.
A cooling device to be connected to the water net is used when room temperature exceeds the requested one.
Capacity: 40 litres
Temperature range: ambient to 60 °C, accuracy ± 0.5 °C

Internal dimensions: 510x350x230 mm
Overall dimensions: 680x420x420 mm
Power supply: 230V 1ph 50Hz 1200W
Weight: 28 kg approx.

E136

SPECIFIC GRAVITY BOTTLE, GAY LUSSAC TYPE

STANDARDS: BS 1377:2 | ASTM D854 | AASHTO T100
NF P18-054, NF P94-054

Pyrex glass made, complete with capillary tube stopper, these bottles are used to determine the specific gravity and density of fine soils and filler in fine aggregates.

Models	Capacity
V108	25 ml
V108-01	50 ml
V108-02	100 ml
V108-03	250 ml

V108-01 **V108-02**

DESICCATORS BOROSILICATE GLASS

Complete with perforated porcelain plate.

Without vacuum		With vacuum	
A035	Ø 200 mm	**A039**	Ø 200 mm
A036	Ø 250 mm	**A040**	Ø 250 mm
A036-01	Ø 300 mm	**A040-01**	Ø 300 mm

ACCESSORY

V300-15 DESICCATORS SALTS Silica gel box 1000 g

A039 **A035**

V202
ASPIRATOR PUMP

To be connected to the water net with a minimum pressure of 0.7 kg/cmq, it produces a moderate vacuum pressure.

Weight: 100 g

V202

S147
CONE PYKNOMETER

STANDARDS: EN 1097-6 | BS 1377:2

Used for the determination of specific gravity and water absorption of sands and fine aggregates.
Glass jar with aluminium cone and rubber seal.
Capacity: 1 kg

S147

S148
SAND ABSORPTION CONE AND TAMPER

STANDARDS: EN 1097-6 | BS 812

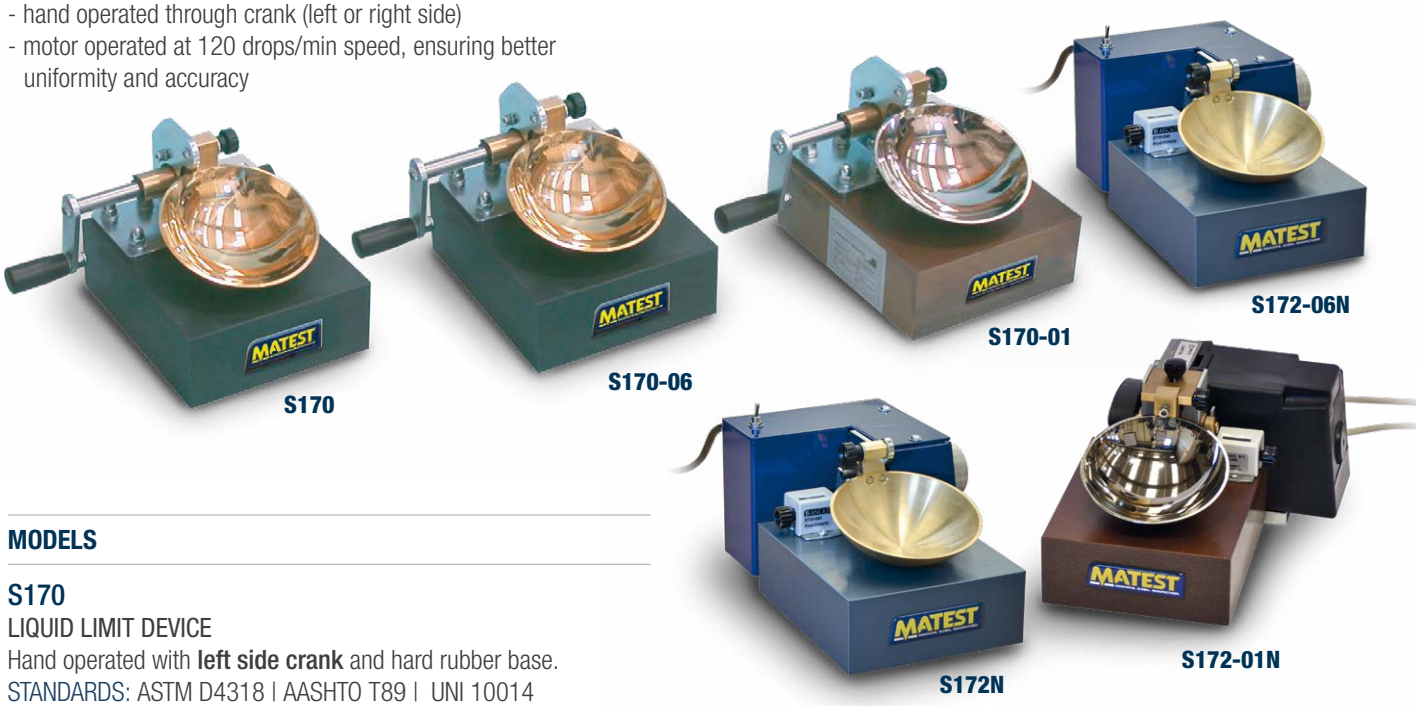
Used to determine the specific gravity and water absorption of fine aggregates.

Weight: 500 g approx.

S148

LIQUID LIMIT CASAGRANDE METHOD

Used to evaluate the relationship between the moisture percentage of a soil sample and the number of blows required to close a groove made into the soil and therefore to determine when a clay soil changes from a plastic to a liquid state.
The unit comprises a removable brass cup which through a cam device drops on a bakelite base (or hard rubber base). Supplied complete with drops counter, but **without grooving tool** which has to be ordered separately.
The instrument is available in two versions:
- hand operated through crank (left or right side)
- motor operated at 120 drops/min speed, ensuring better uniformity and accuracy



S170 S170-06 S170-01 S172-06N S172N S172-01N

MODELS

S170
LIQUID LIMIT DEVICE
Hand operated with **left side crank** and hard rubber base.
STANDARDS: ASTM D4318 I AASHTO T89 I UNI 10014
comparable to: BS 1377:2 I UNE 7377

Weight: 3 kg approx.

S170-05
LIQUID LIMIT DEVICE
Same as mod. S170, but with **right side crank**.

S170-06 NEW
LIQUID LIMIT DEVICE
STANDARD: EN 17892-12
Hand operated with left side crank and cup conforming to EN.

S170-01
LIQUID LIMIT DEVICE
Hand operated with bakelite base and chromed cup.
STANDARD: NF P94-051-1

S172N
LIQUID LIMIT DEVICE
Motor operated with hard rubber base.
STANDARDS: ASTM D4318 I AASHTO T89 I UNI 10014
comparable to: BS 1377:2 I UNE 7377

Power supply: 230V 1ph 50Hz **Weight:** 3.5 kg approx.

S172-01N
LIQUID LIMIT DEVICE
STANDARD: NF P94-051
Motor operated with bakelite base, chromed cup.

Power supply: 230V 1ph 50Hz

S172-06N NEW
LIQUID LIMIT DEVICE
STANDARD: EN 17892-12
Motor operated. Hard rubber and base and cup conforming to EN.
Power supply: 230V 1F 50Hz **Weight**: 3.5 kg approx.

ACCESSORIES

S173-02 ROUGH BRASS CUP, with central smooth band 10 mm wide, as requested by NF P94-051 Standard, used for soils having low plasticity
S173-03 GROOVING TOOL, to UNI 10014 - AASHTO T89 Spec.
S173-04 GROOVING TOOL, to ASTM D 4318-EN 17892-12 Spec.
S173-05 GROOVING TOOL, to NF P94-051-1 Specifications
S173-06 GROOVING TOOL, to BS 1377:2 Specification


S173-01...S173-11

SPARES

S173-01 Brass cup. (ASTM, BS, UNI, UNE, AASHTO)
S173-07 Chromed cup (NF P94-051-1)
S173-10 Cup conforming to EN 17892-12
S173-08 Coupling piece between cup and device, hand operated models.
S173-09 Coupling piece between cup and device, motor operated models.
S173-11 Coupling piece between cup and device for models conforming to EN 17892-12.

S175
SHRINKAGE LIMIT

STANDARDS: ASTM D 427 | AASHTO T 92 | UNI 10014
UNE 103-108 | NF XP94-060-1 | BS 1377:2

Used to determine the maximum moisture content at which the soil does not shrink after drying the sample.
Complete with carrying case.

The set comprises:

V122-04 Shrinkage dish, Ø 45x12,7 mm (2 pieces)
V122-03 Crystallizing dish, Ø 57x32 mm
S175-03 Shrinkage prong plate, made from plexiglass material with three metal prongs
S175-04 Glass evaporating dish, Ø 120 mm flat bottom
V100-01 Graduated cylinder 25 ml capacity
V192 Flexible spatula, 100 mm blade

Case dimensions: 390x300x100 mm
Weight: 2 kg approx.

Note: each item can be ordered separately.

S175

S176

S176
LINEAR SHRINKAGE

STANDARD: BS 1377:2

Mould to produce a specimen of 140 mm long x 12.5 mm radius. This test covers the determination of linear shrinkage of soils and indicates the plastic properties of soils with a low clay content.

Weight: 500 g approx.

S178

S178
PLASTIC LIMIT

STANDARDS: ASTM D4318 | AASHTO T90 | BS 1377:2
UNI 10014 | UNE 103-104 | NF P94-051

The plastic limit determines the lowest moisture content of a soil, by wich a sample can be rolled into threads Ø 3 mm without breaking the same neither longitudinally or transversely.

The set complete with carrying case comprises:

S178-01 Glass plate 300x250x10 mm
S178-02 Rod caliper Ø 3 mm
V114-03 Mixing porcelain dish Ø 120 mm
V192 Flexible spatula, 100 mm blade
V122 Aluminium moisture tins Ø 55x35 mm (Q.ty 6)

Case dimensions: 400x340x100 mm
Weight: 5 kg approx.

Note: each item can be ordered separately.

ACCESSORIES

S178-06 GLASS PLATE 105x50 mm graduated each 10 mm with brass spacer 5 mm to measure the diameter of the soil sample to 3 mm ± 0.5 according to NF P94-051

S179 GLASS PLATE 500x500x10 mm

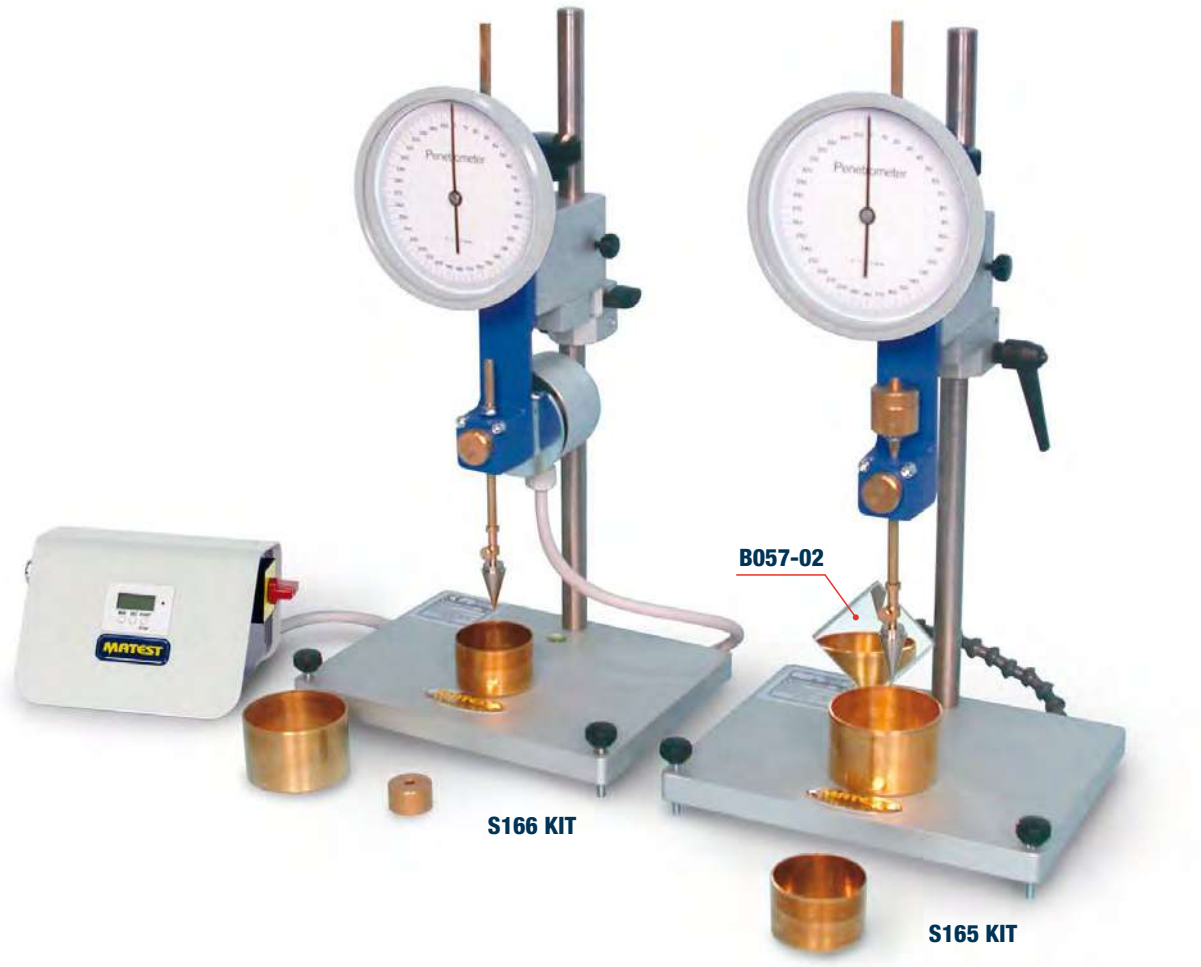
S179

S178-06

CONE PENETROMETER METHOD FOR:

LIQUID LIMIT DETERMINATION
STANDARDS: CEN ISO/TS 17892-12 I BS 1377:2 I NF P94-052-1
The test is based on the relationship between the moisture content at which clay soils pass from a plastic to a liquid state.
This value is obtained from the penetration capacity of the standard cone allowed to free fall into the sample for a period of 5 seconds.

SHEAR STRENGTH DETERMINATION
STANDARD: CEN ISO/TS 17892-06
The cone penetrometer is also suitable to measure the shear undrained strength of undisturbed and reconstituted soil samples as per CEN ISO/TS 17892-06 Standard.



MODELS

S165 KIT
CONE DIAL PENETROMETER

The cone penetrometer consists of:
- Aluminium base with levelling screws and spirit level.
- Chromed vertical rod with **micrometric vertical displacement device.**
- Dial gauge 150 mm diameter, graduated in 360°, division 0.1 mm
- Slider, brass made, with free fall, stop and release push button, automatic zero set.
- Stainless steel penetration test cone 35 mm long, 30° angle
- Weight 20 g
- Two brass cups Ø 55x35 mm and 70x45 mm

Dimensions: 220x170x410 mm
Weight: 13 kg approx.

S166 KIT
SEMIAUTOMATIC CONE DIAL PENETROMETER

Basically structured as mod. S165KIT, but equipped with a magnetic controller device with electronic digital programmable timer that automatically releases the plunger head and ensures free falling of the cone during the 5-seconds test.
Supplied complete.

Power supply: 230V 1ph 50-60Hz 200W
Dimensions: 220x280x410 mm
Weight: 15 kg approx.

S165-01 KIT
CONE DIGITAL PENETROMETER

The cone penetrometer consists of:
- Aluminium base with levelling screws and spirit level.
- Chromed vertical rod with **micrometric vertical displacement device.**
- Digital readout of the penetration values.
- Readings in mm and inch, with 0.1 mm resolution. LCD 5 digits display, with zero set in any position.
  Power: 1.5V battery.
- Slider, brass made, with free fall, stop and release push button, automatic zero set.
- Stainless steel penetration test cone 35 mm long, 30° angle.
- Weight 20 g
- Two brass cups Ø 55x35 mm and 70x45 mm

Dimensions: 220x170x410 mm
Weight: 13 kg approx.

S165-02 KIT
SEMIAUTOMATIC CONE DIGITAL PENETROMETER

Basically structured as mod. S165-01 KIT, but equipped with a magnetic controller device with electronic digital programmable timer that automatically releases the plunger head and ensures free falling of the cone during the 5-seconds test.
Supplied complete.

Power supply: 230V 1ph 50-60Hz 200W
Dimensions: 220x280x410 mm
Weight: 15 kg approx.

ACCESSORIES for S165 KIT, S166 KIT, S165-01 KIT, S165-02 KIT

S166-03 TEST GAUGE, to check the condition of the cone point 30° angle.
B057-02 MIRROR, to facilitate the height adjustment of the cone.
S166-04 TEST CONE 60° angle and 60 g weight (liquid limit and shear strength tests).
S166-05 TEST GAUGE, to check the condition of the cone point 60° angle.
S166-06 WEIGHT, 320g to be added to the cone 30° angle, to get a total weight of 400 g (shear strength test).
V122-08 SAMPLE CUP, aluminum, Ø 55 mm by 40 mm deep, to meet BS 1377:2 Specification

SPARES for S165 KIT, S166 KIT, S165-01 KIT, S165-02 KIT

S166-01 Test cone 35 mm long and 30° angle.
S166-02 Weight 20 g to be added to the cone 30° angle, to get a total weight of 100 g
V122-05 Brass cup Ø 55x35 mm
V122-06 Brass cup Ø 70x45 mm

PROCTOR TEST MOISTURE-DENSITY RELATIONSHIP

STANDARDS: EN 13286-2 I ASTM D558, D698, D1557 I AASHTO T99, T134, T180 I BS 1377:4, 1924:2
CNR N° 69 I NF P94-078, P94-093, P98-231-1 I DIN 18127

PROCTOR MOULDS

Used for determining the relationship between the moisture content and density of compacted soils. Steel made, complete with mould body, collar and base; plated against corrosion. Different proctor mould models are available according to the various international Standards in use.

Models	Description Proctor Mould	Standards	Int. diameter mm	Body height mm	Volume ml	Weight kg
S185	Standard	ASTM I AASHTO I NF I CNR	101.6	116.4	944	4.5
S186	Modified	ASTM I AASHTO I CNR	152.4	116.4	2124	10
S189	Split Standard	ASTM I AASHTO I NF I CNR	101.6	116.4	944	5
S190	Split Modified	ASTM I AASHTO I CNR	152.4	116.4	2124	10
S190-01	Modified	NF	152	152	2758	10
S191	Standard	BS	105	115.5	1000	5
S194	Standard	EN 13286:2 comparable to DIN	100 ± 1	120 ± 1	942	9
S194-01	Modified	EN 13286:2 comparable to DIN	150 ± 1	120 ± 1	2120	13
S194-03	Split Standard	EN 13286:2 comparable to DIN	100 ± 1	120 ± 1	942	7.5
S194-04	Split Modified	EN 13286:2 comparable to DIN	150 ± 1	120 ± 1	2120	12.5
S194-02	Large Size	EN 13286:2 comparable to DIN	250 ± 1	200 ± 1	9817	32

Note:
Annex "A" of EN 13286-2:2010 (E) Standard, allows alternative moulds such as: S185, S186, S189, S190, S190-01, S191, that have cheaper prices. It is intended that these alternatives will be deleted at the next EN revision.

PROCTOR RAMMERS

Used to compact the soil sample into the mould. The spherical hand knob is from bakelite with metal screw and protection ring nut; guide sleeve with vent holes. The rammers are steel made, plated against corrosion, available in different models according to the various International Standards in use. In alternative to the rammers the automatic compactor mod. S199 (see p. 486) can be used.

Models	Description	Standards	Diameter mm	Fall height mm	Rammer weight kg	Total weight kg
S187	Standard Proctor rammer	ASTM I AASHTO CNR I NF	50.8	304.8	2.495	5
S187-01	Standard Proctor rammer	EN 13286:2 comparable to BS	50 ± 0.5	305 ± 3	2.5 ± 0.02	5
S188	Modified Proctor rammer	ASTM I AASHTO CNR I NF	50.8	457.2	4.536	8
S188-01	Modified Proctor rammer	EN 13286:2 comparable to BS	50 ± 0.5	457 ± 3	4.5 ± 0.04	8
S188-02	Proctor rammer Large Size	EN 13286:2	125 ± 0.5	600 ± 3	15 ± 0.04	23

STEEL PLATE (COMPACTION DISK)

STANDARDS: EN 13286:2 I DIN 18127

Used to compact the EN moulds, it is supplied complete with T handle, plated against corrosion.

MODELS

S194-09
PLATE, Ø 99.5 mm thickness 10 mm

S194-10
PLATE, Ø 149.5 mm thickness 10 mm

S194-11
PLATE, Ø 249.5 mm thickness 20 mm

CUTTING COLLAR

Coupled to the Proctor mould body, it gets easier the soil sampling

MODELS

S185-01 Diameter 4”
S200-09 Diameter 6”

S200-09


S114

S114
UNIVERSAL EXTRUDER for moulds Ø 100, 150 mm; 4”, 6”
Technical details at p. 470

S199
AUTOMATIC, PROGRAMMABLE PROCTOR | CBR COMPACTOR WITH MICROPROCESSOR HIGH PERFORMANCE

STANDARDS: EN 13286-47 | ASTM D698, D1557, D1883
AASHTO T99, T180, T193 | BS 1377:4, 1990, 1994
NF P94-093, P94-066 | DIN 18127
UNE 7365, 7255, 103-501-94 | CNR UNI 10009
CNR N. 29, 69 | DUTCH RAW | AS 1289 and most International Standards.

Designed to compact Proctor and CBR specimens, it ensures an extremely uniform compaction degree, granting reliable and repeatable test results.

The microprocessor software allows to select and perform different compaction cycles in a fully automatic system, by strictly meeting the mentioned International Standards.

The blows are automatically distributed as requested by the selected Standard, with turntable rotation and rammer displacement through photoelectric cell sensors and microprocessor. Top quality components and high accuracy mechanical workings grant very long life also under intensive utilisations.

The digital control panel is separate from the machine and it can be fixed to the wall or mounted on a bench.
The high resolution graphic display (blue negative) 320x240 pixels visualizes selected Standard, total number of blows, effected and remaining ones to end the test, and execution of each layer.

The compactor is easy to use, friendly menu driven, versatile, of simple and practical maintenance.

The user can **select and memorize up to 10 personalized test cycles**, that can be later on modified or replaced by other ones. This is a very important function, because it allows to update the Compactor to new Standards, or any Standard not included in the microprocessor, or for research purposes.

The original lift system of the rammer can be selected at 12" or 18", or at 300 or 450 mm, granting a correct and constant fall height. Rammer drop speed: 1 blow each 2 seconds.

The compactor accepts moulds having Ø 4" and 6", 100 and 150 mm, both Matest made or from other producers, thanks to its universal mould fixing system.

The machine is supplied **without rammers** to be ordered separately and selected according to the desired Standard (rammers are interchangeable).
Not sellable in CE markets
(see accessory: safety guards mod S199-11)

Power supply: 230V 1ph 50Hz 500W
Dimensions: 610x470xh1710 mm
Weight: 200 kg approx.

S199-07
S199-06

S199 with mould and rammer

NEEDED ACCESSORIES

S199-06 STANDARD RAMMER Ø 50 ± 0.2 mm and 2500 ± 10 g weight
S199-07 MODIFIED RAMMER Ø 50 ± 0.2 mm and 4535 ± 5 g weight
Modified rammer are hardened for wear resistance.
Conforming to: EN 13286-47 | BS 1377:4 | DIN 18127
UNE 7255, 7365, 103-501-94 Standards.

OR:

S199-08 STANDARD RAMMER Ø 50.8 ± 0.13 mm and 2491,25 ± 1.25 g weight
S199-09 MODIFIED RAMMER Ø 50.8 ± 0.13 mm and 4537 ± 3 g weight
Modified rammer are hardened for wear resistance.
Conforming to: ASTM D558, D559, D698, D1557, D1883
NF P94-066/93 | CNR UNI 10009
CNR N. 69 | ASHTO T99, T180, T193

OR:

S199-13 STANDARD RAMMER, Ø 50 ± 0.4 mm and 2700 ± 10 g weight
S199-14 MODIFIED RAMMER, Ø 50 ± 0.4 mm and 4900 ± 10 g weight
Modified rammer are hardened for wear resistance.
Conforming to: AS 1289 (Australian) Standard.

Test screen

ACCESSORIES

S199-11 SAFETY GUARDS to CE Directive.
If the door is opened when the Compactor is working, it stops automatically.

As alternative:

S199-12 SOUNDPROOF SECURITY CABINET, steel made with microswitch, complying to CE Safety Directive, lined with sound-proofing material for noise reduction. If the door is opened while the Compactor is working, it automatically stops.

Dimensions: 740x730x1900 mm
Weight: 80 kg approx.

SPARES

S198-22 Calibrated rod holding the rammer.

S198-23 Kit of two devices fixing the mould to the table.

S199 + S199-12 with accessories

S199TS
AUTOMATIC PROCTOR | CBR COMPACTOR
TECNOTEST MODEL

STANDARDS: EN 13286-2 | ASTM D698, D1557, D1883 | CNR N. 69, CNR UNI 10009 | AASHTO T99, T180, T193

A selector switch enables the operator to choose type of compaction required (circular blow pattern for 4" or 100mm specimen moulds and double concentric circles for 6" or 150 mm specimen moulds).
Height of rammer drop adjustable to 305 mm or 457 mm.
The number of blows is preset on the electronic microprocessor-based control panel. The machine is designed for long-term operation and has built-in safety features (to CE Standards) to prevent it from being operated without the unbreakable safety guard.
Thanks to its compact height design, the compactor is recommended for mobile laboratories. Complete **without rammer**, to be ordered separately according to the selected standard.

Power supply: 230V 1ph 50Hz
Dimensions: 1760x590x400 mm
Weight: 220 kg approx.

NEEDED ACCESSORY

S199T-03 RAMMER Ø 50 mm with interchangeable weight from 2500 ± 20g to 4500 ± 40g.
STANDARD: EN 13286-2

Or:

S199T-04 RAMMER Ø 50.8 mm with interchangeable weight from 2495 ± 3g to 4539 ± 5g.
STANDARDS: ASTM D698, D1557, D1883 | CNR N. 69, CNR UNI 10009 | AASHTO T99, T180, T193

NEW

S199TS + S199T-03

CALIFORNIA BEARING RATIO - CBR

STANDARDS: EN 13286-47 | EN 13286-4 | ASTM D1883 | AASHTO T193 | CNR UNI 10009 | UNE 103-502
NF P94-078, P94-093, P98-231-1 | BS 1377:4, 1924:2

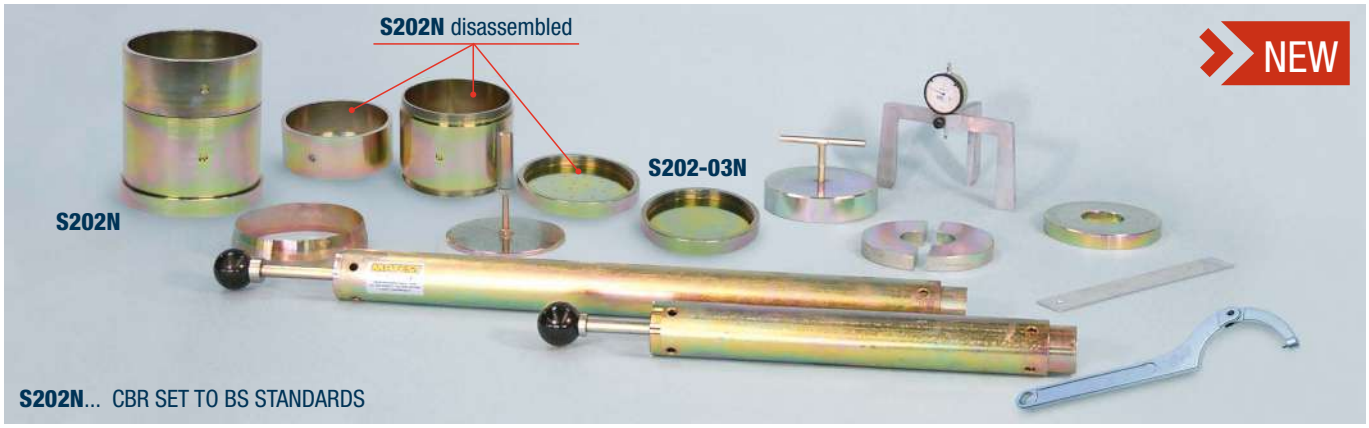
This method has been developed by the California State Highway Department, and is now accepted by almost all the International Standards in force. The test is aimed to the evaluation of the bearing capacity of soil for flexible pavement design in road construction. The compaction test can be performed both with the manual rammers and the automatic compactor mod. S199.

S201-05

S200... CBR SET TO ASTM, AASHTO, CNR/UNI, UNE STANDARDS

S200-04F

S201... CBR SET TO NF STANDARDS



S202N... CBR SET TO BS STANDARDS

S203... CBR SET TO EN 13286-47 STANDARD

The CBR equipment, steel made and plated against corrosion is available in different versions according to the various Standards in force.

S114

Description	Standards			
CALIFORNIA BEARING RATIO Ordering info	ASTM D1883 CNR UNI 1009 UNE 103-502 AASHTO T193	EN 13286-47	NF P94-078 NF P94-093 NFP98-231-1	BS 1377:4 BS 1924:2
CBR mould complete with collar and perforated base: Ø 6" (152.4 mm) x 7" (177.8 mm) height	S200-01N			
Ø. 150 mm x 120 mm height		S203		
Ø 152 mm x 152 mm height			S201	
Ø 152 mm x 127 mm height, threaded ends				S202N NEW
Split CBR mould with collar and perforated base: Ø 6" (152.4 mm) x 7" (177.8 mm) height	S200-13N			
Ø 150 mm x 120 mm height		S203-01		
Ø 152 mm x 152 mm height			S201-01	
Solid base plate for CBR mould	S200-12N	S194-15	S201-12	S202-03N
Perforated base plate for CBR mould	S200-10N	S194-14	S201-10	S202-10N
"C" Spanner, to tighten/loosen the collar, body and base. Two required				S202-04
Filter screen, stainless steel Ø 149 mm mesh 0.150 mm (ASTM n° 100)	S200-02	S200-02	S200-02	S200-02
Spacer disc with "T" handle: Ø 5 15/16" (150.8 mm) x 2.416" (61.4 mm) height	S200-03			
Ø 149.5 mm x 36 mm height		S194-21		
Ø 151 mm x 25.4 mm height			S201-02	
Ø 151 mm x 36 mm height			S201-06	
Ø 150 mm x 50 mm height				S202-07
Perforated (sweel) plate with adjustable stem	S200-04	S194-23	S200-04F	S200-04
Plein swell plate		S194-24		
Tripod (dial gauge support)	S200-05	S194-26	S200-05	S200-05
Dial gauge10 mm range, 0.01 mm subd.	S376	S376		
Dial gauge 25 mm range, 0.01 mm subd.			S377	S377
Annular surcharge weight 2270 g	S200-07			
Annular surcharge weight 2300 g			S200-07	
Annular surcharge weight 2000 g		S202-08		S202-08
Slotted surcharge weight 2270 g	S200-08			
Split surcharge weight 2300 g			S201-04	
Split surcharge weight 2000 g		S202-09		S202-09
Cutting edge	S200-09		S200-09	S200-09
Compaction rammer: Ø 50.8 mm fall height 457.2 mm, weight 4.54 kg.	S188			
Ø 50 mm fall height 457.2 mm, weight 4.54 kg.		S188-01	S188	S188-01
Straight edge 300x30x3 mm	S200-11	S200-11	S200-11	S200-11
Straight edge, cutting rim, 300x30x3 mm	S200-06	S200-06	S200-06	S200-06
Filter paper Ø 150 mm (pack of 100)	S200-14	S200-14	S200-14	S200-14
Soaking tank 600x400x400 mm	S201-05	S201-05	S201-05	S201-05
Universal extruder (see p. 470)	S114	S114	S114	S114

S196N
CLEGG HAMMER - IMPACT SOIL TEST

NEW

STANDARD: ASTM D5874-02

High quality genuine Clegg Impact Soil Tester manufactured under license to Dr. Clegg Pty Ltd (the original inventors).
This apparatus is used to obtain an indication of the degree of compaction of soil. Recorded valves can be directly correlated to the CBR test method. User can quickly enable/disable the readout unit to calculate the 4th drop %CBR following Dr. Clegg's revised and updated equation with inter-drop CIV check TREND algorithm.

MAIN FEATURES

- Well-proven and stable components.
- Easy to use, no set-up is required.
- Back lit highly readable alpha numeric display.
- Optionally fitted Bluetooth with PC Software to allow data transfer of CIV, %CBR, time and data of up to 10000 drop tests.

Lightweight and sturdy aluminum framed transit and storage case is provided.

Dimensions: 710x130x130 mm
Weight: 6.2 kg approx.

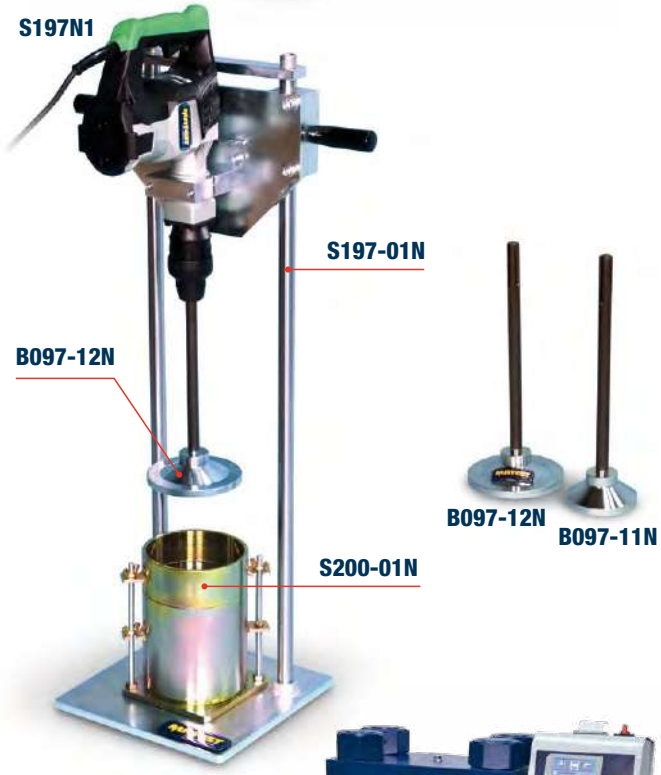
S196N

S197N1
VIBRATING COMPACTION HAMMER

STANDARDS: EN 12697-9, 12697-10, 12697-32, 13286-4
BS 1377:4 | BS 1924:2

It provides an alternative method for the compaction of soil samples in the determination of dry density/moisture content relation (called Proctor), unconfined compressive strength of stabilized soils and CBR tests. This hammer is also used for the compaction of asphalt in the percentage refusal density (see p. 97) and for compacting concrete cube or beam samples.
Supplied without tampers and support frame which must be ordered separately.

Power supply: 230V 1ph 50-60Hz 720W
Weight: 6 kg approx.



ACCESSORIES

S197-01N SUPPORTING FRAME for vibrating hammer. The sliding mass has a total weight (including hammer and tamping foot) of 37 kg as requested by EN Spec. Steel made, plated against corrosion.
Dimensions: 500x320x1100 mm
Weight: 75 kg approx.

B097-11N SMALL TAMPING FOOT, 102 mm diameter. Complete with shank.

B097-12N CBR AND PROCTOR LARGE TAMPING FOOT, 146 mm diameter. Complete with shank.

COMPRESSIVE STRENGTH OF UNBOUND, HYDRAULICALLY BOUND AND SOIL-CEMENT MIXTURES
STANDARDS: EN 13286-41, EN 12390-4

A compression machine with suitable measuring range (0-250/500 kN) is used for compression tests on soil-cement cylindrical mixture specimens. The cement (see p. 418...423) or concrete (see p. 230...251) machines are suitable to perform this test.

STRENGTH OF STABILIZED SOIL DETERMINATION

STANDARDS: EN 13286-53 | NF P94-100 | NF P98-230-2 | BS 1924 :2

Used to prepare specimens bound with cementitious binders or aggregate mixes for determination of the Unconfined compressive strength of fine and medium grained soils. Made of plated steel.

MODELS

S195-01 Mould Ø 50 by 122 mm to obtain specimen dia. 50x50 mm high of fine and medium grained soil (NF)

S195-02 Mould Ø 50 by 172 mm to obtain specimen dia. 50x100 mm high of fine and medium (EN, BS) and of coarse grained soil (NF)

S195-15 Mould Ø 100 by 242 mm to obtain specimen dia. 100x100 mm high of coarse grained soil (EN, BS)

S195-20 Mould Ø 100 by 342 mm to obtain specimen diameter 100x200 mm high of coarse grained soil (EN, BS)

S195-03 Base and upper piston Ø 50 by 36 mm

S195-16 Base and upper piston Ø 100 by 71 mm

S195-04 Penetration and demoulding piston Ø 50 by 125 mm

S195-05 Penetration and demoulding piston Ø 50 by 175 mm

S195-17 Penetration and demoulding piston Ø 100 by 245 mm

S195-21 Penetration and demoulding piston Ø 100 by 345 mm

S195-09 Collecting cylinder Ø 56 by 60 mm

S195-10 Collecting cylinder Ø 56 by 110 mm

S195-18 Collecting cylinder Ø 106 by 110 mm

S195-22 Collecting cylinder Ø 106 by 210 mm

S195-11 Set of 2 displacing collars Ø 50 by 5 mm

S195-06 Set of 2 displacing collars Ø 50 by 6 mm

S195-12 Set of 2 displacing collars Ø 50 by 8.33 mm

S195-23 Set of 2 displacing collars Ø 50 by 10 mm

S195-07 Set of 2 displacing collars Ø 50 by 12.5 mm

S195-24 Set of 2 displacing collars Ø 50 by 16.66 mm

S195-08 Set of 2 displacing collars Ø 50 by 25 mm

S195-13 Set of 2 displacing collars Ø 100 by 10 mm

S195-14 Set of 2 displacing collars Ø 100 by 16.66 mm

S195-25 Set of 2 displacing collars Ø 100 by 20 mm

S195-19 Set of 2 displacing collars Ø 100 by 25 mm

S195-27 Set of 12 displacing collars Ø 100 by 33.33 mm

S195-28 Set of 2 displacing collars Ø 100 by 50 mm

S195-01...S195-28

S131 KIT
UNCONFINED COMPRESSION TESTER

STANDARDS: ASTM D2166 I AASHTO T208 I BS 1377:7

This hand-operated tester, utilized both on site and in laboratory, applies the load by a handwheel and strength is read on a proving ring 200 kg. capacity.
The apparatus can test samples up to Ø 80 mm x 200 mm height .

The S131KIT tester comprises:

S221 Conversion frame
S221-01 Mechanical jack 50 kN capacity
S370-02 Load ring 2 kN capacity
S131-11 Upper+lower compression platens with accessories
S376 Dial gauge 10x0.01 mm
S212-03 Dial gauge holder

Dimensions: 380x460x1380 mm
Weight: 68 kg approx.

S131 KIT

S220 KIT
FIELD CBR TEST SET

STANDARDS: BS 1377:9 , 1924:2 I ASTM D4429
CNR UNI 10009

Used to determine quickly and efficiently the bearing capacity of soils on road constructions, foundations, road subgrades etc.

The S220 KIT tester comprises:

S221-01 Mechanical jack 50 kN capacity
S370-09 Load ring 40 kN capacity
S212-01 CBR penetration piston
S377 Dial gauge 25x0.01 mm
S212-03 Dial gauge holder
S220-01 Datum bar 1400 mm long; slotted surcharge weights 4.5 and 9 kg and annular 4.5 kg; set of extension rods: 2x100 mm, 1x300, 600, 1000 mm; accessories; wooden carrying case.

Weight: 70 kg approx.

S210 KIT
CBR LOADING MACHINE
HAND OPERATED, FIELD MODEL

STANDARDS: EN 13286-47 I ASTM D1883 I AASHTO T193
BS 1377:4 I NF P94-078 I CNR UNI 10009

The load is applied through a mechanical jack with handwheel.
The upper beam can be adjusted in height.

The S210KIT machine comprises:

S221 Conversion frame
S221-01 Mechanical jack 50 kN capacity
S370-10 Load ring 50 kN capacity
S212-01 CBR penetration piston
S376 Dial gauge 10x0.01 mm
S212-03 Dial gauge holder

Dimensions: 420x370x1180 mm
Weight: 65 kg approx.

S210 KIT

Note:
The machines described in this page include some common component (like for ex. the mechanical jack mod. S221-01).
It is therefore possible to combine these components for different machines, with some economical advantage.

S220 KIT

CALIFORNIA BEARING RATIO TESTING MACHINES - CBR

STANDARDS: EN 13286-47 I ASTM D1883 I BS 1377-4 I AASHTO T193 I CNR UNI 10009 I NF P94-078

Used to load the penetration piston into the soil sample at a constant rate of 1.27 mm/min, and to measure the applied loads and piston's penetrations at determined intervals.
Matest proposes a wide range of machines: hand operated, motorized, dual speed, universal multispeed; load measurement by load ring, or by electric load cell and digital unit with X/Y graphic recorder of load/penetration through RS 232 port to PC.

S209 KIT
CBR LOADING MACHINE
HAND OPERATED, LABORATORY MODEL

Load is applied through a meckanical jack and handwheel.
Upper beam can be adjusted in height.
Foreseen of fast approach device of the base plate.

The S209KIT CBR machine comprises:

S209-01 CBR laboratory frame
S212-01 CBR penetration piston
S370-10 Load ring 50 kN capacity
S376 Dial gauge 10x0.01 mm
S212-03 Dial gauge holder

Dimensions: 430x380x1180 mm
Weight: 80 kg approx.

S209 KIT

S211 KIT
CBR LOADING MACHINE, 50 KN
MOTORIZED SPEED RATE: 1.27 MM/MIN

Load is applied through a screw jack driven by an electric motor at a costant penetration rate of 1.27 mm/min (ASTM, BS, EN Spec.) achieved by a built in gear box and **assured also under load**.
Upper beam can be adjusted in height.
Foreseen of fast approach device of the base plate and electric end of stroke switches of the load plate to save the machine from wrong manipulations.

The S211KIT CBR machine comprises:

S211-10 CBR motorized frame
S212-01 CBR penetration piston
S370-10 Load ring 50 kN capacity
S376 Dial gauge 10x0.01 mm
S212-03 Dial gauge holder

Power supply: 230V 1ph 50Hz 750W
Dimensions: 430x380x1180 mm
Weight: 98 kg approx.

S211 KIT

ACCESSORIES

S210-02 CBR RATE INDICATOR
Used to apply the correct rate of 1.27 mm/min penetration to hand operated CBR machine S209 KIT.
Power supply: 230V 1ph 50Hz

S210-02

S374 BRAKE DEVICE, it holds the max. applied load on the dial gauge of the load ring, with manual zero setting.
Suitable for S209 KIT and S211 KIT machines.

S374-01 ELECTRIC DEVICE FOR AUTOMATIC STOP of the CBR machine when reaching the max. capacity load.
To prevent any overload damage this device is mounted on the proving ring of the S211 KIT machine.

S212M
UNIVERSAL MULTISPEED LOAD FRAME 50 KN
DIGITAL, TOUCH-SCREEN

This motorized machine with electronic digital touch-screen controlled by microprocessor, is suitable to perform all the tests where the requested speed rate is within:
0.05 to 63 mm/min with max. load of 50 kN
It can therefore perform:
- Unconfined test with rate of 0.635 mm/min.
- CBR test with rate of 1.27 and 1 mm/min.
- Marshall test with rate of 50.8 mm/min.
- Splitting tensile test on Marshall specimens.
- Quick Triaxial (with trixial cell and suitable accessories)

The speed rate is infinitely variable, easily and promptly selected.
Display LCD TFT, 800x480 pixel, 7'', touch-screen.
Time/date and language selection (English, French, German, Spanish, Italian, Polish).
Symbols of pushbuttons functions.
Foreseen of electric end of stroke switch of the load plate to save the machine from wrong manipulations.
Upper beam can be adjusted in height.
Supplied **without** load ring and accessories which have to be ordered separately.

Power supply: 230V 1ph 50-60Hz 750W
Dimensions: 480x450x1400 mm
Weight: 140 kg approx.

S212M with accessories for CBR test

S213-05N
CBR/MARSHALL 3 SPEEDS FRAME 50 KN

The frame is provided of three fix speed ranges, easily selectable by a frequency changer (inverter) activated by an electric switch:
1.00 mm/min. for CBR tests (Australian and old BS Standards)
1.27 mm/min. for CBR tests
50.8 mm/min for Marshall tests.
Upper beam can be adjusted in height.
Foreseen of electric end of stroke switch of the load plate to save the machine from wrong manipulations.
Supplied **without** load ring and accessories which have to be ordered separately.

Power supply:
230V 1ph 50-60Hz 750W
Dimensions:
450x400x1200 mm
Weight: 130 kg approx.

S213-05N
with accessories for CBR test

ACCESSORIES for S212M and S213-05N frames

CBR test

S212-01	Penetration piston
S370-10S	Load ring 50kN with electric stop safety device
S374	Brake device to hold max. load
S376	Dial gauge 10x0.01 mm
S212-03	Dial gauge holder

MARSHALL test

S212-05	Load piston
B046N	Stability mould
B047	Flow meter
B047-01	Dial gauge for flow meter
S370-08S	Load ring 30kN with electric stop safety device
S374	Brake device to hold max. load (only for S212M model)

UNCONFINED test

S212-08N	Upper + lower compression plates, Ø 100 mm + distance piece with rod

As Alternative

S212-09N	Upper + lower compression plates, Ø 165 mm with upper seat ball
S212-03	Dial gauge holder
S376	Dial gauge 10x0.01 mm
S370-02S	Load ring 2kN with electric stop safety device
S374	Brake device to hold max. load

MULTIFUNCTION TESTING FRAMES

- CBR
- THREE SPEEDS
- UNIVERSAL MULTISPEED

COMBINED WITH "CYBER-PLUS EVOLUTION", COMPUTERIZED TOUCH-SCREEN DIGITAL DISPLAY SYSTEM

TECHNICAL SPECIFICATIONS

The frame is the same as for the previous load frames (mod. S211 KIT to S213-05N), but the load is measured by an electric 50kN cell with high precision strain transducers. The deformation (flow) is measured by a displacement transducer 50 mm stroke and ± 0.1% indipendent linearity.
The "CYBER-PLUS EVOLUTION" computerized multichannel digital display system (technical details: see mod. B044N-SET at p. 498, Hardware technical details at p. 18), measures and displays at the same time the load (stability) in kN and the deformation (flow) in mm with pick hold features and possibility to print certificates and graphics directly on a laser printer via USB or to transfer them to PC via Ethernet.

AVAILABLE MODELS

S216 KIT
CBR DIGITAL COMPUTERIZED MACHINE

SPEED RATE: 1.27 mm/min
Technical details of the frame: see mod. S211 KIT, p. 493
SUPPLIED COMPLETE except the software (see next page mod. S218N).

S216 KIT + CBR mould

S214-05N KIT
CBR/MARSHALL 3 SPEEDS LOAD FRAME
DIGITAL, COMPUTERIZED

The frame is provided of three fix speed ranges, easily selectable by an electric switch:
1.00 mm/min. for CBR tests (Australian and old BS Standards)
1.27 mm/min. for CBR tests
50.8 mm/min for Marshall tests.
Technical details of the frame: see mod. S213-05N, p. 494
Supplied complete with "Cyber-Plus Evolution" system, load cell and displacement transducer, but **without** accessories and Software for CBR and Marshall tests, to be ordered separately (see accessories at next page).

S214-05N KIT + MARSHALL accessories

S215A
UNIVERSAL MULTISPEED LOAD FRAME
DIGITAL, TOUCH-SCREEN, COMPUTERIZED

Comprising:

S212N Universal multispeed load frame 50 kN, touch-screen. Technical spec.: see p. 494

S212A Acquisition and data processing system up to 8 analogical/digital channels for load cells and transducers. Graphic and numbers visualization, processing and printing of the test results.
Technical spec.: see B044N Cyber-plus 8 Evolution Touch-Screen, next page.

S337-34 Load Cell 50 kN capacity, complete with cable and connector.

S336-14 Linear Displacement Transducer 50 mm stroke, complete with cable and connector.

S305-05 Mounting device of the coupling pliers.

S335-15 Coupling pliers to hold the transducer.

Supplied **without** accessories for CBR, Marshall, Unconfined tests and Software, to be ordered separately (see accessories).

The Universal Multispeed tester, is the ideal solution to perform the following tests :

- CBR (California Bearing Ratio)
- UNCONFINED COMPRESSION
- QUICK TRIAXIAL
- MARSHALL

Detail of 8 channels

S215A with CBR mould

S215A with CBR mould

ACCESSORIES for the 3 speeds and the multispeed load frames, mod. S214-05N KIT and S215A to perform

CBR tests

S212-01 PENETRATION PISTON

MARSHALL tests

S212-05 LOAD PISTON

B046N STABILITY MOULD, cast aluminium alloy

UNCONFINED test

S212-08N UPPER + LOWER COMPRESSION PLATES, Ø 100 mm + distance piece with rod

As Alternative

S212-09N Upper + lower compression plates, Ø 165 mm with upper seat ball

QUICK TRIAXIAL TEST (only with S215A frame + suitable accessories)

S337-31 STRAIN LOAD CELL 2.5 kN capacity

S205-11 LOADING PISTON WITH BALL

S305 TRIAXIAL CELL + accessories

S218-02N SOFTWARE for quick triaxial test

STANDARDS: ASTM D2850 I BS 1377

SOFTWARES for the frames combined with "Cyber-Plus Evolution" System

S218N SOFTWARE UTM2 Licence for **CBR** Test

STANDARDS: EN 13286-47 I CNR UNI 10009 I ASTM D1883 BS 1377 I NF P94-078 I AASHTO T193

S218-01N SOFTWARE UTM2 Licence for **UNCONFINED** test

STANDARDS: ASTM D2166

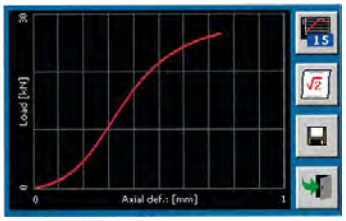
B043-01N SOFTWARE UTM2 Licence for **MARSHALL** test

STANDARDS: EN 12697-34 I ASTM D1559, D5581, D6927

B043-02N SOFTWARE UTM2 Licence for **TENSILE SPLITTING** test

STANDARDS: EN 12697-23 I ASTM D6931

Description and technical details of Software UTM2: see p. 18



B044N-SET
CYBER-PLUS 8 EVOLUTION TOUCH-SCREEN

Developed for the implementation and upgrading of any type of existing machines (even not manufactured by Matest) applicable to:

- Marshall mechanical load frame mod. B042 KIT.
- CBR/Marshall 3 speeds load frame mod. S213-05N.
- CBR loading machine motorized mod. S211 KIT.

Suitable to perform the following tests:

- MARSHALL: EN 12697-34 | ASTM D6927, D5581, D1559, CNR N. 30 | NF P98-251-2 | BS 598 :107 AASHTO T245
- INDIRECT TENSILE TEST: EN 12697-23, EN 12697-12 ASTM D6931, D4123 | AASHTO T283
- DETERMINATION OF THE WATER SENSIBILITY OF BITUMINOUS SPECIMENS: EN 12697-12
- CBR TEST: EN 13286-47 | CNR | UNI 10009 | AASHTO T193 ASTM D1883 | BS 1377:4 | NF P94-078.
- UNCONFINED TEST: ASTM D2166

MAIN FEATURES

- Acquisition and data processing system up to 8 analogical/digital channels.
- Remote control through PC and UTM2 software.
- Graphic display 1/4 VGA color Touch-Screen.
- Instant display of load and deformation.
- Automatic correction of the axis origin and automatic calculation of all the results.
- Safety switch-off at max reached load and/or deformation.
- IT TECH

B044N SET

HARDWARE SPECIFICATIONS

- 8 indipendent channels available for the load cells or potentiometrics transducers for load, or displacement measurements;
- Stabilized power supply of the analogical channels: 5 Vcc and 3 Vcc;
- Analogue input: ± 20 mV and ± 5 V;
- Nominal resolution: 24 bit;
- Acquisition up to 200 readings for each channel;
- Safety discrete On/off output;
- Graphic display ¼ VGA colour Touch-Screen;
- Time and calendar system.

FIRMWARE SPECIFICATIONS

- Instant visualization of the load measured by an extensometric cell.
- Instant visualization of the deformation measured by 4 linear displacement transducers.
- Visualization of the graphic of the test.
- Visualization of date and time.
- Semi-automatic configuration and calibration of all transducers connected.
- 20 steps lining that can be set by the enduser.
- Automatic correction of the axis origin for CBR/Marshall tests.
- Setting of all the parameters for test: alarms, zero threshold, end-test percentage, calculation parameters.
- Time/date and language selection (Italian, English, French, German, Spanish, Polish).
- Unlimited file for each type of test
- Symbols of pushbuttons functions
- Informative messages (planning alarms, load cell and strain transducer setting, etc.)
- Printing of the results on the incorporated thermal graphic printer (accessory C127N). Transfer and management via Ethernet of the filed data or real-time.

Hardware technical details: see p. 18

B044N-SET is composed of:

B044N
CYBER-PLUS 8 EVOLUTION
Unit for data acquisition.
Power supply: 230V 1F 50-60Hz.

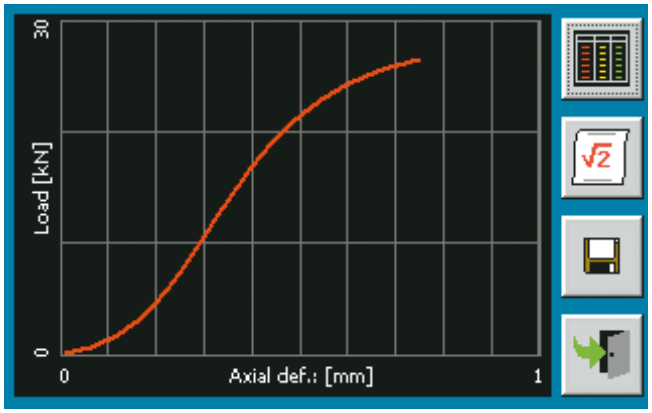
S337-34
LOAD CELL
50kN capacity, with high precision strain transducers, complete with cable and connector.

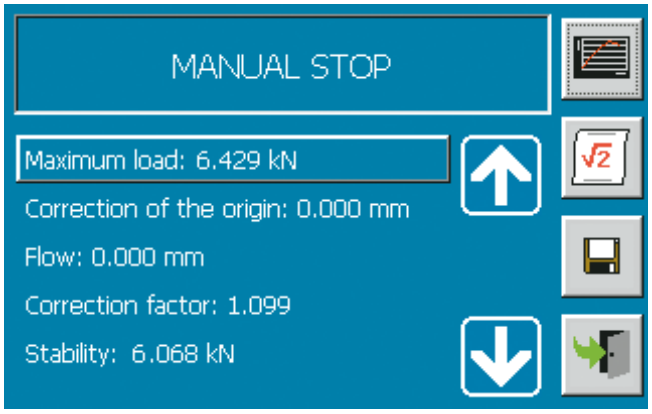
S336-14
LINEAR DISPLACEMENT TRANSDUCER
50 mm stroke, independent linearity ± 0.1% complete with cable and connector.

All necessary accessories for fixing the load cell and transducer to the test machine, are provided.
The system is calibrated ready to use and COMPLETE with a calibration certificate.
Every item can be ordered separately.

ACCESSORIES

B043-01N
SOFTWARE UTM2 (Universal Testing Machine 2)
Licence for **MARSHALL** test
Data processing program for "X-Y STABILITY/FLOW"
STANDARDS: EN 12697-34 I ASTM D6927, D5581, D1559
BS 598:107 I NF P98-251-2





B043-02N
SOFTWARE UTM2 (Universal Testing Machine 2)
Licence for **INDIRECT TENSILE STRENGTH**
STANDARDS: EN 12697-23 I ASTM D6931

S218N
SOFTWARE UTM2 (Universal Testing Machine 2)
Licence for **CBR** Test
STANDARDS: EN 13286-47 I UNI CNR 10009 I ASTM D1883
BS 1377 I NF P94-078 I AASHTO T193

S218-01N
SOFTWARE UTM2 (Universal Testing Machine 2)
Licence for **UNCONFINED** Test
STANDARDS: ASTM D2166

Description and technical details of Software UTM2: see p. 18

H009-01
PERSONAL COMPUTER, complete with LCD monitor 22", keyboard, mouse, connection cables, installation and setting up of the purchased software.

C128
LASER PRINTER for test certificate and graphics printing with direct connection to CYBER-PLUS 8.

S205M
UNITRONIC 50 KN NEW

UNIVERSAL MULTIPURPOSE TOUCH-SCREEN COMPRESSION, FLEXURAL AND TENSILE FRAME

- COMPRESSION AND FLEXURAL TESTS, 50 KN MAX. CAPACITY LOAD
- TENSILE TESTS, 25 KN MAX. CAPACITY LOAD (OPTION MOD. S205-05M)

With automatic load or displacement/deformation control, for testing:

SOIL:
- CBR (California Bearing Ratio)
- UNCONFINED COMPRESSION
- QUICK TRIAXIAL

ASPHALT:
- MARSHALL
- SPLITTING TENSILE
- DIRECT SHEAR (Leutner) on the connection between bituminous strata
- AUTO SCB

CONCRETE:
- FLEXURE ON BEAMS AND TILES

CEMENT:
- FLEXURE on 40x40x160 mm specimens
- COMPRESSION on cubes 40, 50, 70 mm
- TENSILE on mortar briquettes (option mod. S205-05M)

METAL, PLASTIC, WIRES, ROPES, TEXTILES, PAPERS ETC.
- TENSILE TESTS, 25kN max capacity load (option mod. S205-05M)

CLAY BLOCKS:
- PUNCHING

ROCK AND STONES:
- UNIAXIAL SPLITTING TENSILE

S205M / S205-05M

Equipped with suitable devices, Unitronic tester performs compression, flexural, splitting tensile and direct tensile tests, with automatic load or displacement/deformation control, within the limits of its max. **50 kN capacity** for compression/flexural **and 25 kN for tensile** (see model S205-05M).

The load is applied by a mechanical jack that is driven by a stepper motor and controlled by an internal microprocessor on a **high precision control board**.

Stroke electric end switches are applied to the load piston to save the machine from accidental handlings.

The crosshead foresees couplings to fix the different test devices (see accessories). The stress is measured by an electric load cell and the displacement control is achieved directly by the high technology electronic board incorporated into the machine within a variable **speed range up to 51 mm/min** to cover the Marshall test.

Real time display of time, load, deformation, displacement and graph simultaneously is allowed thanks to the latest generation control board (See technical specifications – firmware).

TECHNICAL SPECIFICATIONS

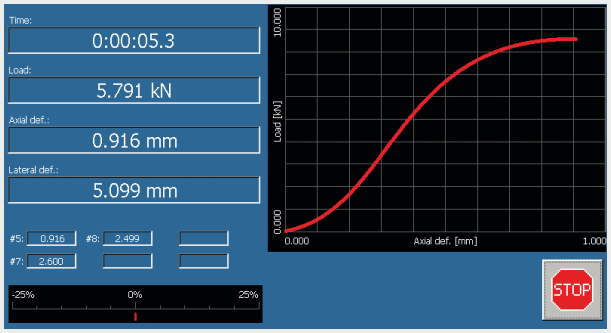
HARDWARE

- Maximum Sample Diameter: 150 mm
- Minimum testing speed: 0.00001 mm/min
- Maximum testing speed: 51 mm/min
- Maximum compression force: 50 kN
- Minimum vertical clearance: 390 mm
- Maximum vertical clearance: 1110 mm
- Horizontal clearance: 380 mm
- Platen diameter: 177 mm
- Platen travel: 100 mm
- Unitronic 50 kN is **supplied without accessories and software** to perform specific tests that must be ordered separately (see accessories at next pages)

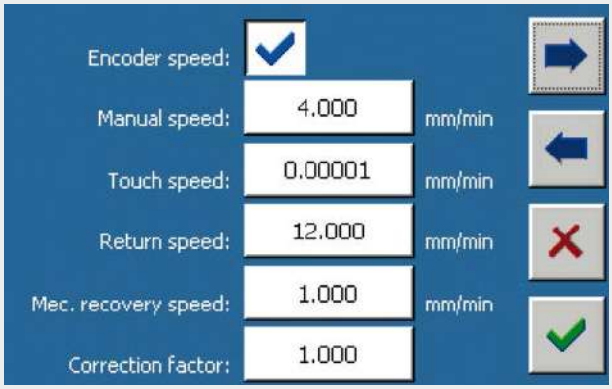
Power supply: 230V 1ph 50-60Hz 1500W
Dimensions: (h x w x d) 1675x500x530 mm approx.
Weight: 130 Kg approx.

FIRMWARE

- Touch-screen TFT LCD graphic display, 800x480 pixels, 7 inches.
- Windows base interface (no external PC required either for advanced tests)
- 8 analog channels (24 bit) suitable for connection of load, displacement, deformation, LVDT, temperature (PT100, PT1000, NTC) transducers and strain gauges (by using an external adapter)
- 10 profiles, with a potential of 80 storable calibrations, for an immediate use of multiple sensors.
- Ports: Ethernet, RS232, RS485, 2 x USB Host-port
- Internal memory Slot for Micro SD



Indirect tensile bitumen test

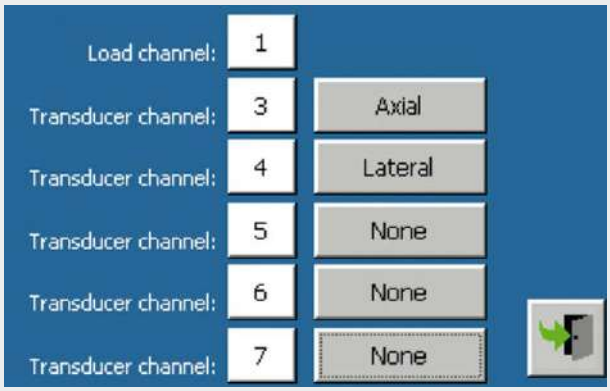


Device settings

S205-05M
UNITRONIC 25KN
COMPRESSION AND TENSILE FRAME

The Unitronic frame S205M is modified and improved to perform also tensile tests with max. capacity of 25 kN

Note: This modification is possible only in MATEST factory.



Channels configuration

S205M UNITRONIC 50 KN CAN PERFORM THE FOLLOWING TESTS:


CBR TEST


MARSHALL TEST


CEMENT COMPRESSION


CONCRETE FLEXURE


QUICK TRIAXIAL


SPLITTING TENSILE


CEMENT FLEXURE


CLAY BLOCKS PUNCHING


UNCONFINED COMPRESSION


DIRECT SHEAR (LEUTNER)


TENSILE TEST ON MORTAR BRIQUETTES


TILE FLEXURE


UNIAXIAL ROCK SPLITTING TENSILE


AUTOMATIC SCB SYSTEM


TRANSVERSE / DEFORMATION TEST ON ADHESIVE


TENSILE TEST ON METALS, PLASTIC, WIRES, TEXTILES ETC.

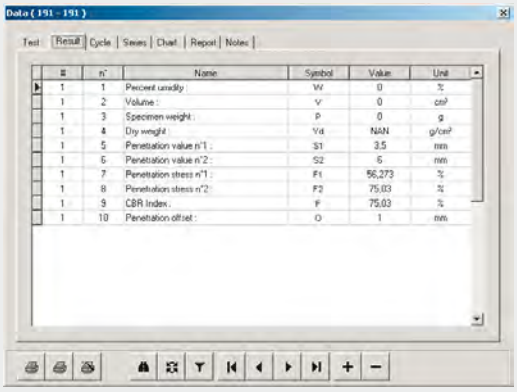
S205N | S205-05N UNITRONIC, SPECIFIC APPLICATIONS

CBR: CALIFORNIA BEARING RATIO TEST

STANDARDS:
EN 13286 -47
ASTM D1883
BS 1377:4
AASHTO T193
NF P94-078
CNR UNI 10009

Test development with displacement control.

S205N Unitronic 50 kN
S337-34 Strain gauge load cell, 50 kN capacity
S337-51 Calibration process of load cell / Unitronic
S212-01 Penetration piston
S218N Software for CBR test



S218N Software CBR test

QUICK TRIAXIAL TEST

STANDARDS:
ASTM D2850
BS 1377

Test development with displacement control.

Note:
Additional needed accessories see p. 555, 556.

S205N Unitronic 50 kN
S337-31 Strain gauge load cell 2.5 kN capacity
S337-51 Calibration process of load cell / Unitronic
S205-11 Loading piston with ball
S305 Triaxial cell (for accessories see p. 546, 555, 556)
S218-02N Software for QUICK TRIXIAL test

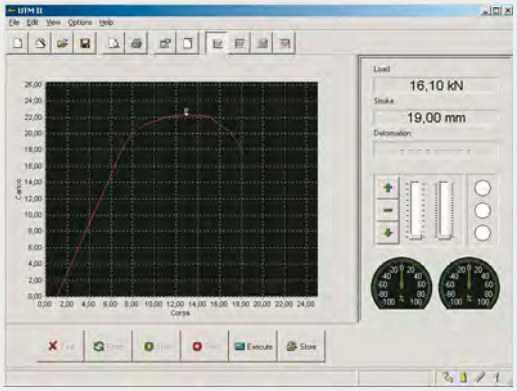
UNCONFINED COMPRESSION TEST

STANDARDS:
ASTM D2166
BS 1377:7
AASHTO T208

Test development with displacement control.

S205N Unitronic 50 kN
S337-31 Strain gauge load cell 2.5 kN capacity.
S337-51 Calibration process of load cell / Unitronic
S212-08N Upper and lower compression platens Ø 100 mm with accessories

As Alternative
S212-09N Upper + lower compression plates, Ø 165 mm with upper seat ball
S218-01N Software for Unconfined Compression test



S218-01N Software unconfined test

UNIAXIAL SPLITTING TENSILE TEST OF ROCK CORE SPECIMENS

STANDARD:
ASTM D3667

Test development with displacement control.

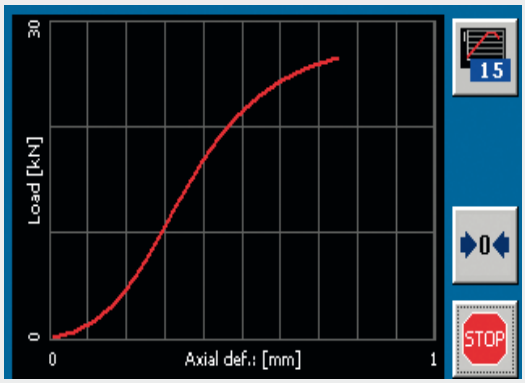
S205N Unitronic 50 kN
S337-34 Strain gauge load cell 50 kN capacity
S337-51 Calibration process of load cell / Unitronic
S212-05 Loading piston
E171 Compression device

MARSHALL STABILITY TEST

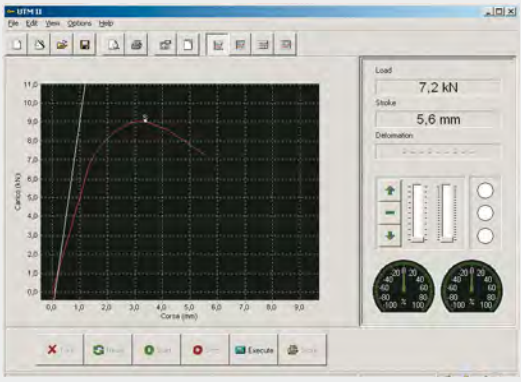
STANDARDS:
EN 12697-34
ASTM D1559
D5581, D6927
AASHTO T245
BS 598 :107
NF P98-251-2

Test development with displacement control.

S205N Unitronic 50 kN
S337-34 Strain gauge load cell, 50 kN capacity
S337-51 Calibration process of load cell / Unitronic
S212-05 Loading piston
B046N Stability mould
B043-01N Software for Marshall test



File Marshall test



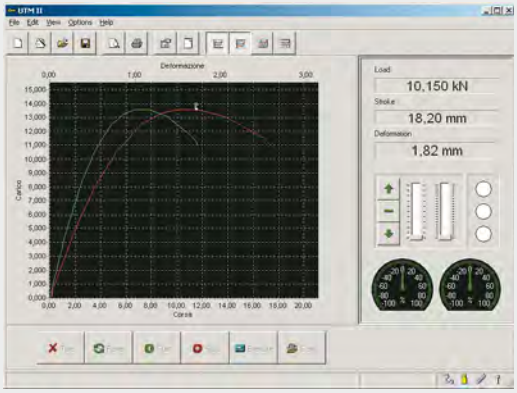
B043-01N Software Marshall test

SPLITTING TENSILE TEST

STANDARDS:
EN 12697-23,12
ASTM D6931
AASHTO T283
CNR 134

Test development with displacement control.

S205N Unitronic 50 kN
S337-34 Strain gauge load cell, 50 kN capacity
S337-51 Calibration process of load cell / Unitronic
S212-05 Loading piston
B047-02 Splitting tensile device for samples Ø 4" and 6"
B047-04 Set of TWO displacement transducers with accessories
B043-02N Software for Splitting Tensile test



S043-02N Software splitting tensile test

DIRECT SHEAR (LEUTNER) BETWEEN BITUMINOUS STRATA

STANDARD:
ALP A StB T4

Test development with displacement control.

S205N Unitronic 50 kN
S337-34 Strain gauge load cell 50 kN capacity
S337-51 Calibration process of load cell / Unitronic
S212-05 Loading piston
B047-10 LEUTNER testing head for specimens Ø 150 mm
B047-11 Spacers for Ø 100 mm specimens with Leutner head
B043-03N Software for Marshall and Leutner tests

Direct shear test (LEUTNER) on the connection between bituminous strata, carried out on asphalt cylinder specimens Ø 150 mm or 100 mm obtained from road cores or on laboratory made specimens.

AUTO SCB SEMI-CIRCULAR BEND

STANDARDS:
EN 12697-44
AASHTO TP124
ASTM D8044

Test development with displacement control.

EN 12697-44

B250-01 Basic indirect tensile (idt) jig, for 100-150 mm diameter
B254-01 Scb jig (requires basic idt jig)
B254-51 Pair of scb wear plates
S337-34 Load cell 50 kn capacity
B045-13 Loading piston
S336-15 Transducer type "B" travel: 10 mm
B045-14 Coupling hardware
S335-15 Universal coupling pliers for transd./dial
B043-05N Software for auto-scb test

AASHTO TP124 | ASTM D8044

B208 SCB frame
B254-02 Springs
B254-10 Roller support
S337-31(*) Load cell 2,5 kn capacity
B045-13 Loading piston
S336-15 Transducer type "b" travel: 10 mm
B045-14 Coupling hardware
S335-15 Universal coupling pliers for transd./dial
B043-05N Software for auto-scb test

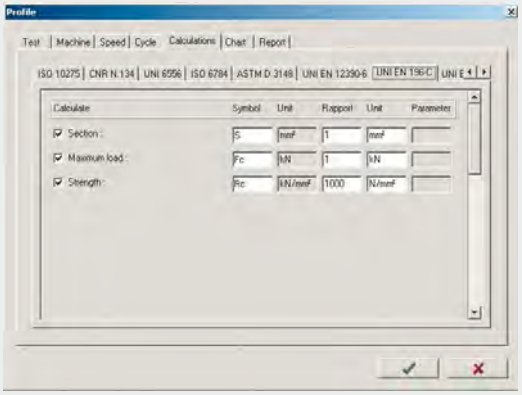
Note: for more details see p. 128.

COMPRESSION TEST ON MORTAR SPECIMENS (50KN MAX. LOAD)

STANDARDS:
EN 196-1
EN ISO 679
ASTM C109, C349
NF P15-451
BS 3892
DIN 1164

Test development with displacement control.

S205N Unitronic 50 kN
S337-34 Strain gauge load cell 50 kN capacity
S337-51 Calibration process of load cell / Unitronic
S212-05 Loading piston
E170 Compression device on portion of 40x40x160 mm specimens
E163N Software for compression tests



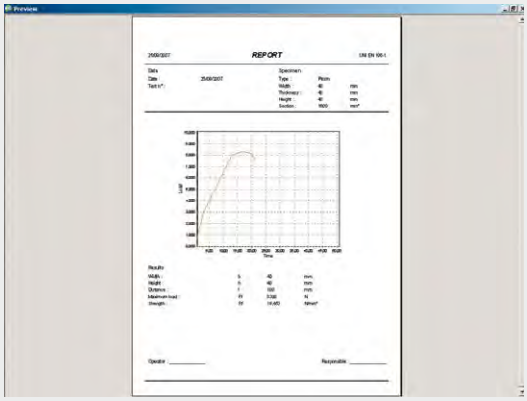
E163N Software for mortar compression

FLEXURAL TESTS ON MORTAR PRISM 40X40X160 MM

STANDARDS:
EN 196-1
ASTM C348
NF P15-451
DIN 1164
EN ISO 679

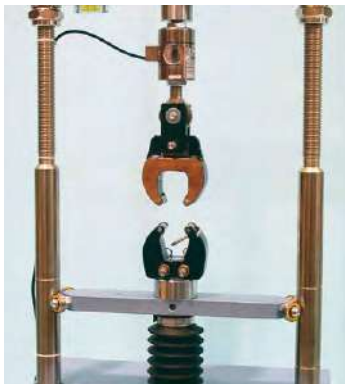
Test development with displacement control.

S205N Unitronic 50 kN
S337-32 Strain gauge load cell 10 kN capacity
S337-51 Calibration process of load cell / Unitronic
S212-05 Loading piston
E172-01 Flexure EN device for 40x40x160 mm specimens (available also to ASTM, see p. 428)
E164N Software for flexural tests



E164N Software for mortar flexure

TENSILE TEST ON MORTAR BRIQUETTES "8" SHAPED



STANDARDS:
ASTM C190, C307
AASHTO T132

Test development with load control.

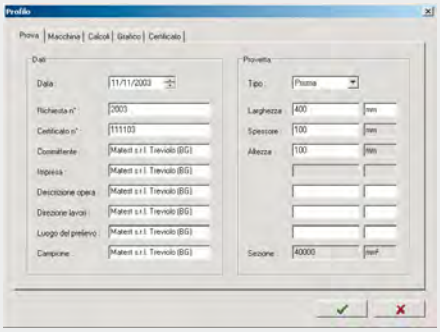
S205-05N Unitronic Compression 50 kN / Tensile 25 kN
S337-32 Tensile/Compression strain load cell 10kN capacity
S337-51 Calibration process of load cell / Unitronic
S205-07 Tensile jaws "8" shaped for mortar briquette
S205-08N Software for tensile test
E111 Briquette mould (see p. 408)

TWO POINT FLEXURAL AND TRANSVERSE TESTS ON CONCRETE BEAMS AND BENDING TEST METHOD ON GLASS-FIBRE REINFORCED CONCRETE

STANDARDS:
EN 12390-5
EN 1170-4
ASTM C78, C293

Test development with load control for concrete beams and displacement control for bending test on glass-fibre reinforce cement.

S205N Unitronic 50 kN
S337-34 Strain gauge load cell 50 kN capacity
S337-51 Calibration process of load cell / Unitronic
S205-16 Two-point bending device to test glass-fibre reinforced cement. Rollers dimensions: Ø 40 by 310 mm long. Lower rollers adjustable from 110 to 310 mm. Upper rollers adjustable from 45 to 120 mm. Weight: 20 kg approx
C109-11N Software for flexure tests on concrete beams



C109-11N Flexure: Outline of test data

TRANSVERSE/DEFORMATION TEST ON ADHESIVES FOR TILES

STANDARD:
EN 12004-2

Test development with displacement control.

S205-13 A, B, C

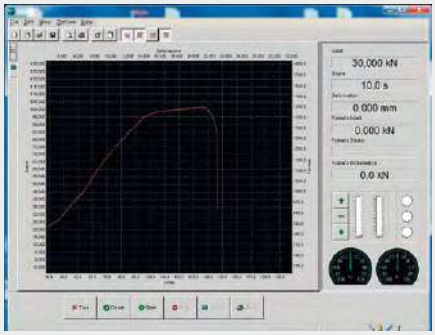
S205N Unitronic 50 kN
S205-14 Strain gauge load cell 500 N capacity
S337-51 Calibration process of load cell / Unitronic
S205-13 Flexure device with lower bearers and upper loading piston
S205-13A Template A: rectangular frame for specimens to EN 12002, internal dimensions 280x45x5 mm
S205-13B Template B: mould for specimens to EN 12002, dimensions 300x45x3 mm
S205-13C Weight 100 N, cross sectional area of 290x45 mm, for preparation of specimens to EN 12002

PUNCHING TEST ON CLAY BLOCKS

STANDARDS:
EN 15037-2, -3
UNI 9730-3

Test development with load control.

S205N Unitronic 50 kN
S337-32 Strain gauge load cell 10 kN capacity
S337-51 Calibration process of load cell / Unitronic
C093-11 Flexural punching device
S205-15 Holding beam for the punching device
C109-16N Software for punching test on clay blocks



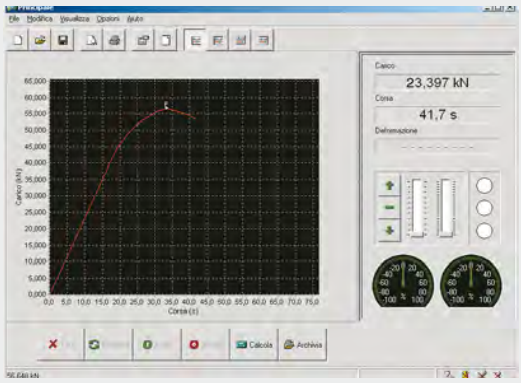
C109-16N

FLEXURAL TEST FOR CENTRE POINT LOADING ON CLAY TILES AND CONCRETE BEAM

STANDARDS:
EN 12390-5, 491, 538
ASTM C78, C293
BS 1881:118

Test development with
load control.

S205N Unitronic 50 kN
S337-34 Strain gauge load cell, 50 kN capacity
S337-51 Calibration process of load cell / Unitronic
S205-18 Flexure device for centre point loading to test clay tiles and concrete beams dimensions 100x100x400(500) mm. Consisting of lower beam with two bearers (one articulated) adjustable from 110 to 310 mm, and upper central articulated bearer fixed to the load cell.Bearer dimensions: Ø 40 mm by 310mm long. Weight: 20 kg approx
C109-11N Software for flexure tests

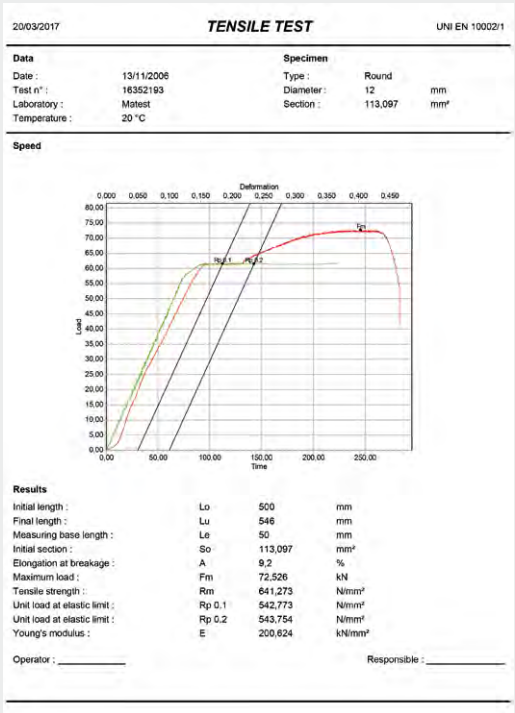


C109-11N Software for flexural test on concrete beam

TENSILE TESTS ON METALS, PLASTICS, WIRES, TEXTILES ETC.

STANDARDS:
ASTM D2166
BS 1377:7
AASHTO T208

Test development with
load control.



TENSILE TEST

20/03/2017 — UNI EN 10002/1

Data		Specimen		
Date :	13/11/2006	Type :	Round	
Test n° :	16352193	Diameter :	12	mm
Laboratory :	Matest	Section :	113,097	mm²
Temperature :	20 °C			

Speed

Deformation

Load

Time

Results

Initial length :	Lo	500	mm
Final length :	Lu	546	mm
Measuring base length :	Le	50	mm
Initial section :	So	113,097	mm²
Elongation at breakage :	A	9,2	%
Maximum load :	Fm	72,526	kN
Tensile strength :	Rm	641,273	N/mm²
Unit load at elastic limit :	Rp 0.1	542,773	N/mm²
Unit load at elastic limit :	Rp 0.2	543,754	N/mm²
Young's modulus :	E	200,624	kN/mm²

Operator : _____ Responsible : _____

H009N

S205-05N Unitronic Compression 50 kN / Tensile 25 kN
S337-36 Tensile strain load cell 25 kN capacity
S337-51 Calibration process of load cell / Unitronic
H005-11 Tensile heads (upper and lower)
S205-09 Coupling for tensile heads installation
H005-21 Flat seizing grips for flat specimens 1 - 10 mm thickness by 25 mm max. width and round specimens Ø 3-5 mm
H005-31 "V" shape seizing grips for round specimens Ø 5-12 mm
H014-06 to H014-10 Extensometer, electronic, for tensile deformation strength tests. (See p. 445)
H009N Software for visualisation in real time of load/ deformation, graphic, test certificate etc

At p. 444 you will find devices to test plastics, wires, ropes, flexural and bending tests and various models of extensometers. On request it is also possible to equip the Unitronic frame S205-05N with devices for tensile tests of different materials, within the 25kN max. capacity load.

Note: Needed accessories listed above, are common for different tests. We recommend to check them when ordering, to avoid duplications.

S206N
UNITRONIC 200 KN
UNIVERSAL MULTIPURPOSE TOUCHSCREEN COMPRESSION/FLEXURAL AND TENSILE FRAME FOR:

- COMPRESSION / FLEXURAL TESTS, 200 kN MAX. CAPACITY LOAD
- TENSILE TESTS, 50 kN MAX. CAPACITY LOAD

With automatic load or displacement/deformation control, for testing:

SOIL:
- CBR (California Bearing Ratio)

ASPHALT:
- DURIEZ
- MARSHALL
- SPLITTING TENSILE
- DIRECT SHEAR (Leutner) on the connection between bituminous strata

CONCRETE:
- FLEXURE ON BEAMS AND TILES

CEMENT:
- FLEXURE on 40x40x160 mm specimens
- COMPRESSION on cubes 40, 50, 70 mm

METAL, PLASTIC, WIRES, ROPES, TEXTILES, PAPERS ETC.
- TENSILE TESTS, 50kN max capacity load

CLAY BLOCKS:
- PUNCHING

ROCK AND STONES:
- UNIAXIAL SPLITTING TENSILE

S206N

TECHNICAL FEATURES:

By using suitable devices, Unitronic tester, within the limits of its max. 200 kN capacity for compression/flexural and 50 kN for tensile, performs compression, flexural, splitting tensile and direct tensile tests, with automatic load or displacement/deformation control.

The load is applied by a mechanical jack that is driven by a motor **brushless with closed loop through optic encoder** and controlled by a microprocessor. Stroke electric end switches are applied to the load piston to save the machine from accidental handlings.

The two crossheads foresee couplings to fix the different test devices (see accessories). The stress is measured by an electric load cell; the measurement and the displacement control of the crosshead is achieved by the electronic device incorporated into the machine.

FIRMWARE

- Electronic control unit “Cyber-plus Evolution” with Touch-Screen colour display, that runs like a standard PC based on Windows operating system for the management and analysis of the data, test results, graphs.
- The Touch-Screen icon interface allows an easy set up of the parameters and immediate execution of the test.
- The machine can be connected to a PC for remote test execution through suitable Software; the machine can in any case perform the tests without any external PC, because of the “Cyber-Plus” grants performances like a PC.
- Direct connection to Intranet (connection to a LAN network) and Internet to establish a remote communication and receive an immediate diagnostic analysis from Matest technicians, or for updates of the software.
- Unlimited memory storage with: 2 USB ports, 1 SD card slot.
- RJ45 network connection
- Possibility to select different languages.
- Hardware technical details: see p. 18

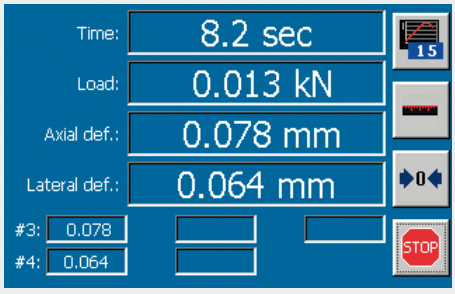
SPECIFICATIONS OF THE FRAME

- Max. load: 200 kN Compression; 50 kN tensile.
- Max. vertical daylight: 900 mm (without accessories)
- Max. vertical daylight with compression platens: 800 mm
- Compression platens diameter: 216 mm (upper platen on seat ball)
- Distance between columns: 650 mm
- Crosshead travel: ± 200 mm (400 mm total)
- Testing speed range: from 0.01 to 100 mm/min
- Load rate: from 1 N/s to 5 kN/s
- Displacement resolution: 0.01 mm with accuracy better than 0.2%
- Machine Class: 1

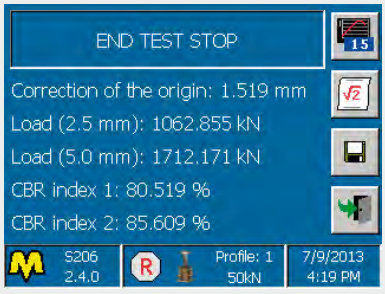
The Unitronic 200 kN is **supplied complete with**:
Electric load cell 200 kN capacity, crosshead displacement device, upper with seat ball and lower compression platens.
Are not included: accessories and software for specific tests that must be ordered separately (see accessories).

Note: The machine can be equipped with intermediate load cells to the max. capacity of the machine, to satisfy specific test requirements.

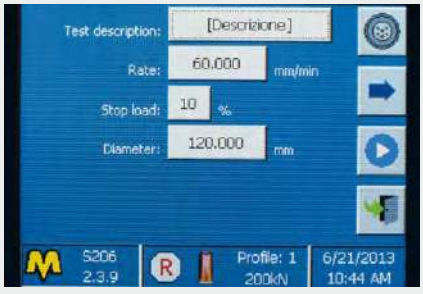
Power supply: 230V 1ph 50-60Hz 850W
Dimensions: 950x560x2400 mm
Weight: 820 kg approx.



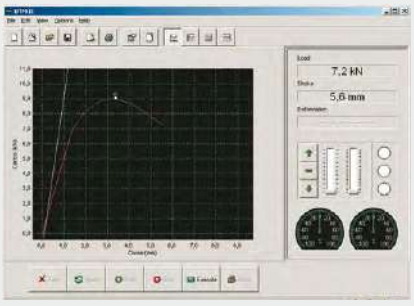
UNITRONIC screen examples: CBR test



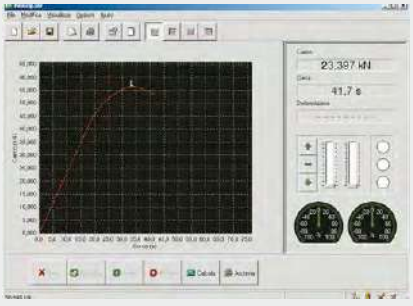
CBR test result



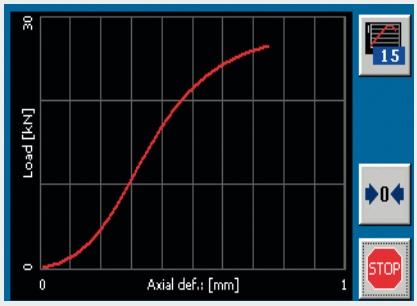
S206-21N Software for Duriez test



B043-01N Software Marshall test



C109-11N Software for flexural test on concrete beam



File Marshall test

S206N UNITRONIC 200 KN CAN PERFORM THE FOLLOWING TESTS:


CBR TEST


MARSHALL TEST


CEMENT COMPRESSION


CONCRETE FLEXURE


DURIEZ


SPLITTING TENSILE BITUMEN


CEMENT FLEXURE


CLAY BLOCKS PUNCHING


UNCONFINED COMPRESSION


DIRECT SHEAR (LEUTNER)


SPLITTING TENSILE BLOCK PAVERS


TILE FLEXURE


UNIAXIAL ROCK SPLITTING TENSILE


AUTOMATIC SCB SYSTEM


SPLITTING TENSILE CONCRETE CYLINDERS


TENSILE TEST ON METALS, PLASTIC, WIRES, TEXTILES ETC.

Note: S206N UNITRONIC 200 kN can perform many other different test (like for ex.: quick triaxial, unconfined, etc.) by utilizing suitable accessories and electric load cells.

S206N UNITRONIC 200 KN, CAN PERFORM THE FOLLOWING TESTS:

CBR: CALIFORNIA BEARING RATIO TEST

STANDARDS: EN 13286 -47 I ASTM D1883 I BS 1377:4
AASHTO T193 I NF P94-078 I CNR UNI 10009

CBR Mould

S206N Unitronic 200 kN
S337-34 Strain gauge load cell 50 kN capacity
S337-51 Calibration process of load cell / Unitronic
S206-31 Flange/connector of the load cell S337-34
S212-01 Loading piston
S218N Software for CBR test (p. 18)

DURIEZ TEST ON 80 AND 120 MM DIAMETER SAMPLES

STANDARD: NF P98-251/1, NF P98-251/4

B095-01

S206N Unitronic 200 kN
B096-01 Duriez set Ø 80 mm (p. 131)
B095-01 Duriez set Ø 120 mm (p. 131)
S206-21N Software for Duriez test (p. 18)

MARSHALL STABILITY TEST

STANDARDS: EN 12697-34 I ASTM D1559, D5581, D6927
AASHTO T245 I BS 598:107 I NF P98-251-2

B046N

S206N Unitronic 200 kN
S337-34 Strain gauge load cell 50 kN capacity
S337-51 Calibration process of load cell / Unitronic
S206-31 Flange/connector of the load cell S337-34
S212-05 Loading piston
B046N Stability mould
B043-01N Software for Marshall test (p. 18)

DIRECT SHEAR (LEUTNER) BETWEEN BITUMINOUS STRATA

STANDARD: ALP A StB t.4

Direct shear test (LEUTNER) on the connection between bituminous strata, carried out on asphalt cylinder specimens Ø 150 mm or 100 mm obtained from road cores or on laboratory made specimens.

S337-34
S212-05

B047-10 + B047-11

S206N Unitronic 200 kN
S337-34 Strain gauge load cell 50 kN capacity
S337-51 Calibration process of load cell / Unitronic
S206-31 Flange/connector of the load cell S337-34
S212-05 Loading piston
B047-10 LEUTNER testing head for specimens Ø 150 mm
B047-11 Spacers for Ø 100 mm specimens with Leutner head
B043-03N Software for Leutner and Marshall tests (p. 18).

SPLITTING TENSILE TEST

STANDARDS: EN 12697-23, 12 I ASTM D6931 I AASHTO T283
CNR 134

B047-02 + B047-04

S206N Unitronic 200 kN
S337-34 Strain gauge load cell 50 kN capacity
S337-51 Calibration process of load cell / Unitronic
S206-31 Flange/connector of the load cell S337-34
S212-05 Loading piston
B047-02 Splitting tensile device for samples Ø 4" and 6" (p. 123)
B047-04 Set of TWO displacement transducers with accessories (p. 123)
B043-02N Software for Splitting Tensile test (p. 18)

PULL OFF TENSION TEST

STANDARD: TP ASPHALT - StB 81

S206N Unitronic 200 kN
B260-10SP Pull off tension jig
H009N Software for tensile test
S337-51 Calibration process of load cell / Unitronic

Note: Accessories for temperature measurement not included.

B260-10SP

FLEXURAL TEST ON CONCRETE BEAMS

STANDARDS: EN 12390-5 | ASTM C78, C293 | AASHTO T97
NF P18-407 | BS 1881:118 | UNE 83305

C106

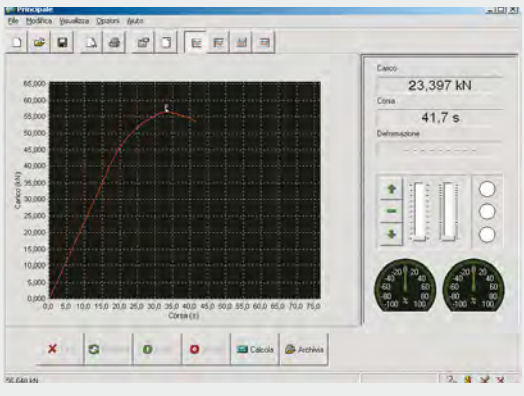
S206N Unitronic 200 kN
C106 Flexure device (p. 315)
C109-11N Software for flexural tests on concrete beams. (p. 18)

TWO POINT FLEXURAL AND TRANSVERSE TESTS ON CONCRETE BEAMS AND BENDING TEST METHOD ON GLASS-FIBRE REINFORCED CONCRETE

STANDARDS: EN 1170-4, EN 12390-5 | ASTM C78, C293

S206N Unitronic 200 kN
S337-34 Strain gauge load cell 50kN capacity
S337-51 Calibration process of load cell / Unitronic
S205-16 Four-point bending device to test glass-fibre reinforced concrete.
Rollers dimensions: Ø 40 by 310 mm long
Lower rollers adjustable from 110 to 310 mm
Upper rollers adjustable from 45 to 120 mm
Weight: 20 kg approx.
S206-31 Flange/Connector of the load cell S337-34
C109-11N Software for flexure tests on concrete beams (p. 18)

S205-16

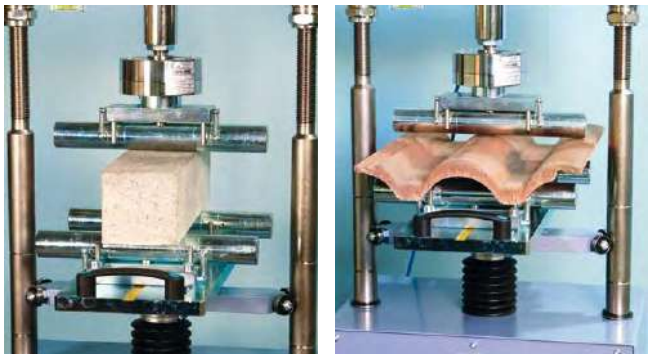


C109-11N Software for flexural test on concrete beam

FLEXURAL TEST WITH CENTRE POINT ON CONCRETE BEAMS AND CLAY TILES

STANDARDS: EN 12390-5 | ASTM C78, C293 | BS 1881:118

S206N Unitronic 200 kN
S205-18 Flexure device with centre point loading to test clay tiles and concrete beams dimensions 100x100x400(500) mm
Consisting of lower beam with two bearers
(one articulated) adjustable from 100 to 315 mm, and upper central articulated bearer fixed to the load cell.
Weight: 20kg approx.
S337-34 Strain gauge load cell 50 kN capacity
(to replace the 200 kN load cell)
S206-31 Flange/connector of the load cell S337-34
C109-11N Software for flexural tests on concrete beams (p. 18)



S205-18

SPLITTING TENSILE TEST ON CONCRETE CYLINDERS

STANDARDS: EN 12390-6 | ASTM C496 | NF P18-408 | BS 1881:117

C100-01 + C101-01

S206N Unitronic 200 kN
C101-01 Splitting tensile test device (technical details and other devices: p. 314)
C100-01 Packing strips for the device C101-01
C109-12N Software for splitting tensile test. (p. 18)

SPLITTING TENSILE TEST ON CONCRETE CUBES AND BLOCK PAVERS

STANDARDS: EN 1338 | EN 12390-6

C100-02 + C103

S206N Unitronic 200 kN
C103 Splitting tensile test device (p. 314)
C100-02 Packing strips for the device C103
C109-12N Software for Splitting tensile test (p. 18)

PUNCHING TEST ON CLAY BLOCKS

STANDARDS: EN 15037-2, 15037-3 | UNI 9730-3

S206N Unitronic 200 kN
C093-11 Punching device for clay block for flooring tests
S205-15 Holding beam for the device
S337-32 Strain gauge load cell 10 kN capacity
S206-32 Flange/Connector for the load cell S337-32
S337-51 Calibration process of load cell / Unitronic
C109-16N Software for the punching test (p. 18)

COMPRESSION TEST ON MORTAR SPECIMENS

STANDARDS: EN 196-1 | ASTM C109, C349 | NF P15-451
EN ISO 679 | DIN 1164

S206N Unitronic 200 kN
E170 Compression device on portions of 40x40x160 mm specimens
(devices for different specimens described at p. 428)
E163N Software for the compression test (p. 18)

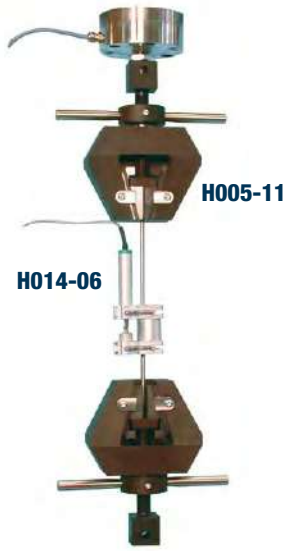
FLEXURAL TEST ON MORTAR PRISMS 40X40X160 MM

STANDARDS: EN 196-1 | ASTM C348 | NF P15-451
DIN 1164 | EN ISO 679

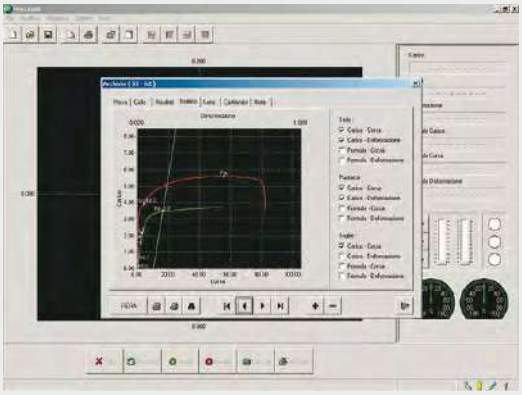
S206N Unitronic 200 kN
E172-01 Flexure device for 40x40x160 mm specimens
(available also device to ASTM, see p. 428)
S337-32 Strain gauge load cell 10 kN capacity
S206-32 Flange/connector of the load cell S337-32
S337-51 Calibration process of load cell / Unitronic
E164N Software for the flexural test (p. 18)

TENSILE TESTS ON METALS, PLASTICS, WIRES, TEXTILES ETC.

STANDARDS: ASTM D2166 | BS 1377:7 | AASHTO T208



S206N Unitronic 200 kN
H005-11 Tensile heads, upper and lower (p. 444).
Daylight between heads: min. 50 mm / max. 420 mm
S206-33 Flange/connector of the tensile heads H005-11
H005-21 Flat seizing grip for flat specimens 1-10 mm thickness by 25 mm max. width, and round specimens Ø 3-5 mm
H005-31 "V" shape seizing grips for round specimens Ø 5-12 mm



H009N Practical example of a saving test graph where the user can select which traces have to be shown, modify the scales or personalize the colors and give a new name to the axis upgrading.

OPTIONAL ACCESSORIES

H014 Extensometer, electronic, for tensile deformation strength tests (p. 445)
H009N Software for load/deformation, graphs, test certificate

Technical specifications: see p. 449 where there are also listed devices to test plastics, wires, ropes, flexural and bending tests and various models of extensometers.

Note: Accessories for specific tests listed above, are common for different tests. We recommend to check them when ordering, to avoid duplications.

PLATE BEARING TEST

STANDARDS: ASTM D1194, D1195, D1196 I BS 1377:9 I CNR N° 92 and 146 I UNE 7391 I Comparable to DIN 18134

This test is performed for the determination of the bearing capacity of a soil in-situ on road constructions, foundations, road subgrades, airport and highway pavements.
A wide range of plate bearing test equipment is available, together with many accessories according to the different Standards and specific end-user needs.
The hand pumps 100 kN and 200 kN capacity are "Enerpac Made" and all models have double speed, ensuring fast approach.

AVAILABLE MODELS

S222 KIT
PLATE BEARING TEST EQUIPMENT
100 KN CAPACITY - 1 DIAL GAUGE MODEL

ANALOGUE MEASURING SYSTEM WITH DIAL MANOMETER
STANDARD: CNR N° 146, method "A"

Consisting of:

S222-01 Hydraulic jack 100 kN capacity, complete with hand pump, rubber pipe with fast connector, set of extension rods of different lengths, carrying case.
S222-02 Analogue pressure gauge 0-100 kN, div. 0.5 kN
S226-05 Load plate Ø 300 mm
S226-12 Device for centre dial gauge measure, with spherical seat.
S222-03 Datum bar assembly, 2.5 m long, telescopic, aluminium made, adjustable in height, complete with base supports, plumb and spirit level. Packed separayely.
S377 Dial gauge 25x0.01 mm
S226-16 Articulated dial gauge support with adjustment device.

Weight: 60 kg approx.

S223-01 I S223-02

S222D KIT
PLATE BEARING TEST EQUIPMENT
100KN CAPACITY - 1 DIGITAL GAUGE MODEL

NEW

DIGITAL MEASURING SYSTEM WITH DIGITAL MANOMETER

Same composition of S222KIT except:

S222-02D Digital pressure manometer 0 - 100 kN with 10N resolution, instead of the analogue gauge S222-02.

S222-02D I S225-02D
DIGITAL PRESSURE MANOMETER

The applied load is measured by a high precision electric load cell with digital display, **granting accurate readings also at low loads**.

- 65.000 divisions
- 10N resolution
- linearity: 0.05%
- hysteresis: 0.03%
- repeatability: 0.02%
- display: LCD with high visibility
- display height: 16 mm
- battery operated, 12 months life

S222-02D I S225-02D

S222-02D
S225-02D

S222 KIT

ACCESSORY for S222 KIT and S223 KIT

S223-01 PRESSURE GAUGE, range 0 - 50 kN, div. 0.25 kN with large dial Ø 200 mm, complete with fast connector, used **for accurate readings at low loads**, as for ex. pre-load of 0.5 kg/cmq.

S223 KIT

PLATE BEARING TEST EQUIPMENT 100 KN CAPACITY - 3 DIAL GAUGES MODEL

ANALOGUE MEASURING SYSTEM WITH DIAL MANOMETER

STANDARDS: CNR N° 146, method "B" | BS 1377:9

Consisting of:

S222-01 Hydraulic jack 100 kN capacity, complete with hand pump, rubber pipe with fast connector, set of extension rods of different lengths, carrying case.

S222-02 Analogue pressure gauge 0-100 kN, div. 0.5 kN.

S226-13 Upper spherical seat.

S226-05 Load plate Ø 300 mm

S226-06 Intermediate plate Ø 160 mm

S222-03 Datum bar assembly, 2.5 m long, telescopic, aluminium made, adjustable in height, complete with base supports, plumb and spirit level. Packed separayely.
(Alternative solutions: S223-03 "Y" measuring system, Swiss method. See p. 519).

S377 n° 3 dial gauges 25x0.01 mm

S226-16 n° 3 articulated dial gauge supports with adjustment device.

Weight: 60 kg approx.

S223 KIT

S223D KIT

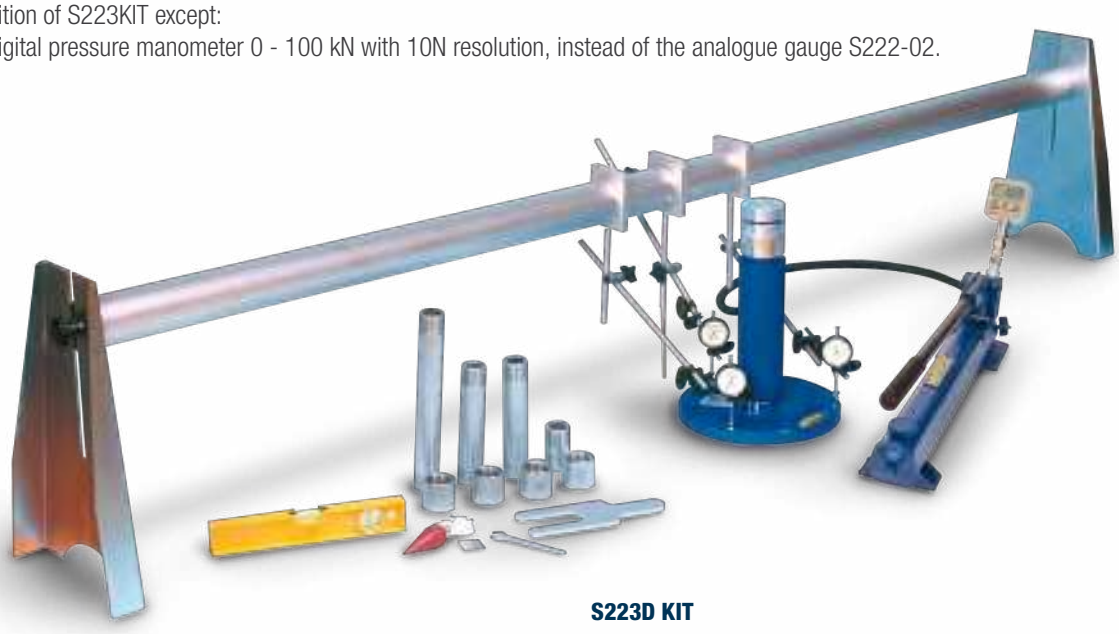
PLATE BEARING TEST EQUIPMENT 100 KN CAPACITY - 3 DIAL GAUGES MODEL

NEW

DIGITAL MEASURING SYSTEM WITH DIGITAL MANOMETER

Same composition of S223KIT except:

S222-02D Digital pressure manometer 0 - 100 kN with 10N resolution, instead of the analogue gauge S222-02.



S223D KIT

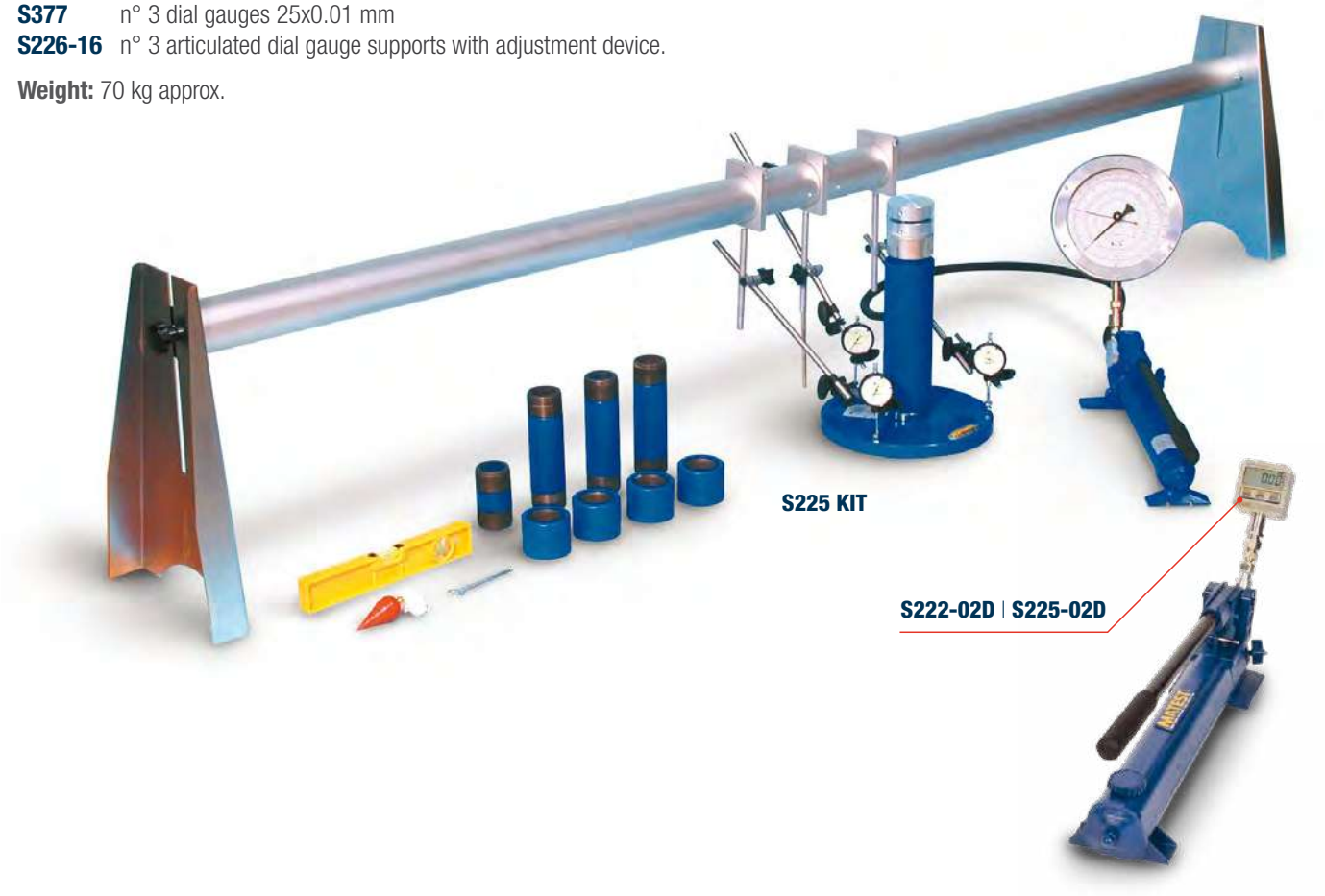
S225 KIT
PLATE BEARING TEST EQUIPMENT 200 KN CAPACITY - 3 DIAL GAUGES MODEL
ANALOGUE MEASURING SYSTEM WITH DIAL MANOMETER

STANDARDS: CNR N° 146, method "B" | BS 1377:9, and using loading plates (accessory) dia. 450, 600, 760 mm, it meets also: ASTM D1195, D1196 | CNR N. 92

Consisting of:

S225-01 Hydraulic jack 200 kN capacity, complete with hand pump, rubber pipe with fast connector, set of extension rods of different lengths, carrying case.
S225-02 Analogue pressure gauge 0-200 kN, div. 1 kN.
S226-13 Upper spherical seat.
S226-05 Load plate Ø 300 mm
S226-06 Intermediate plate Ø 160 mm
S222-03 Datum bar assembly, 2.5 m long, telescopic, aluminium made, adjustable in height, complete with base supports, plumb and spirit level. Packed separayely. (Alternative solutions: S223-03 "Y" measuring system, Swiss method. See p. 519).
S377 n° 3 dial gauges 25x0.01 mm
S226-16 n° 3 articulated dial gauge supports with adjustment device.

Weight: 70 kg approx.



S225D KIT
PLATE BEARING TEST EQUIPMENT 200 KN CAPACITY - 3 DIAL GAUGES MODEL
NEW
DIGITAL MEASURING SYSTEM WITH DIGITAL MANOMETER

Same composition of S225KIT except:

S225-02D Digital pressure manometer 0 - 200 kN with 10N resolution, instead of the analogue gauge S225-02.

ACCESSORY for S225 KIT

S223-02 PRESSURE GAUGE, range 0 - 50 kN, div. 0.25 kN with large dial Ø 200 mm, complete with fast connector, used **for accurate readings at low loads**, as for ex. pre-load of 0.5 kg/cmq.

B103-10
BEARING PLATE 600 MM Ø CAST ALUMINIUM
STANDARD: NF P94-117-1

Used to determine the static deformation of flexible road pavement and with the plate bearing equipment.
Technical details: see p. 167

B103-10

S226 KIT

PLATE BEARING TEST EQUIPMENT 500 KN CAPACITY - 3 DIAL GAUGES MODEL

ANALOGUE MEASURING SYSTEM WITH DIAL MANOMETER

STANDARDS: CNR N° 146, method "B" | BS 1377:9, and using loading plates (accessory) Ø 450, 600, 760 mm, it meets also: ASTM D1195, D1196 | CNR N. 92

Consisting of:

S227-02 Hydraulic jack 500 kN capacity, complete with hand pump, spherical seat, rubber pipe with fast connector, set of extension rods of different lengths, carrying case.
S227-03 Analogue pressure gauge 0-500 kN, div. 2 kN.
S226-05 Load plate Ø 300 mm
S226-06 Intermediate plate Ø 160 mm
S222-03 Datum bar assembly, 2.5 m long, telescopic, aluminium made, adjustable in height, complete with base supports, plumb and spirit level. Packed separayely. (Alternative solutions: S223-03 "Y" measuring system, Swiss method. See p. 519).
S377 n° 3 dial gauges 25x0.01 mm
S226-16 n° 3 articulated dial gauge supports with adjustment device.

Weight: 110 kg approx.

S226 KIT

S226D KIT

PLATE BEARING TEST EQUIPMENT 500 KN CAPACITY - 3 DIAL GAUGES MODEL

NEW

DIGITAL MEASURING SYSTEM WITH DIGITAL MANOMETER

STANDARDS: CNR N° 146, method "B" | BS 1377:9, and using loading plates (accessory) Ø 450, 600, 760 mm, it meets also: ASTM D1195, D1196 | CNR N. 92

Same composition of S226 KIT except for:

S227-03D Digital pressure manometer 0 - 500 kN with 20N resolution, instead of the analogue gauge S227-03.

S226D KIT

S224 KIT
DIGITAL PLATE BEARING TEST EQUIPMENT 100 KN CAPACITY
3 LINEAR DISPLACEMENT TRANSDUCERS AND CYBER-PLUS DATA ACQUISITION SYSTEM

STANDARDS: CNR N° 146, method "B" I BS 1377:9

Consisting of:

S222-01 Hydraulic jack 100 kN capacity, complete with hand pump, rubber pipe with fast connector, set of extension rods of different lengths, carrying case.
S226-13 Upper spherical seat.
C116-09S Pressure transducer, connected to the pump.
C405-15N Cyber-Plus Evolution "Touch Screen" for data acquisition, visualization, processing and storing, directly connected to PC or printer. Technical details: see p. 520
S224-21N Software for test data processing.
S226-05 Load plate Ø 300 mm
S226-06 Intermediate plate Ø 160 mm
S222-03 Datum bar assembly, 2.5 m long, telescopic, aluminium made, adjustable in height, complete with base supports, plumb and spirit level. Packed separayely. (Alternative solutions: S223-03 "Y" measuring system, Swiss method. See p. 519).
S336-14 n° 3 linear displacement transducers, 50 mm travel.
S336-31 n° 3 Extension cables for transducer, 5 m long.
S226-16 n° 3 articulated transducer supports with adjustment device.
S335-15 n° 3 universal coupling pliers for transducers.

Weight: 60 kg approx.

S224-01 KIT
DIGITAL PLATE BEARING TEST EQUIPMENT 200 KN CAPACITY
3 LINEAR DISPLACEMENT TRANSDUCERS AND CYBER-PLUS DATA ACQUISITION SYSTEM

STANDARDS: CNR N° 146, method "B" I BS 1377:9, and using loading plates (accessory) Ø 450, 600, 760 mm, it meets also: ASTM D1195, D1196 I CNR N. 92

Consisting of:

S225-01 Hydraulic jack 200 kN capacity, complete with hand pump, rubber pipe with fast connector, set of extension rods of different lengths, carrying case.
S226-13 Upper spherical seat.
C116-09S Pressure transducer, connected to the pump.
C405-15N Cyber-Plus Evolution "Touch Screen" for data acquisition, visualization, processing and storing, directly connected to PC or printer. Technical details: see p. 520
S224-21N Software for test data processing.
S226-05 Load plate Ø 300 mm
S226-06 Intermediate plate Ø 160 mm
S222-03 Datum bar assembly, 2.5 m long, telescopic, aluminium made, adjustable in height, complete with base supports, plumb and spirit level. Packed separayely. (Alternative solutions: S223-03 "Y" measuring system, Swiss method. See p. 519).
S336-14 n° 3 linear displacement transducers, 50 mm travel.
S336-31 n° 3 Extension cables for transducer, 5 m long.
S226-16 n° 3 articulated transducer supports with adjustment device.
S335-15 n° 3 universal coupling pliers for transducers.

Weight: 70 kg approx.

S224-01 KIT
(similar to S224 KIT and S224-02 KIT)

S224-02 KIT
DIGITAL PLATE BEARING TEST EQUIPMENT 500 KN CAPACITY
3 LINEAR DISPLACEMENT TRANSDUCERS AND CYBER-PLUS DATA ACQUISITION SYSTEM

STANDARDS: CNR N° 146, method "B" | BS 1377:9, and using loading plates (accessory) Ø 450, 600, 760 mm, it meets also: ASTM D1195, D1196 | CNR N. 92

Consisting of:

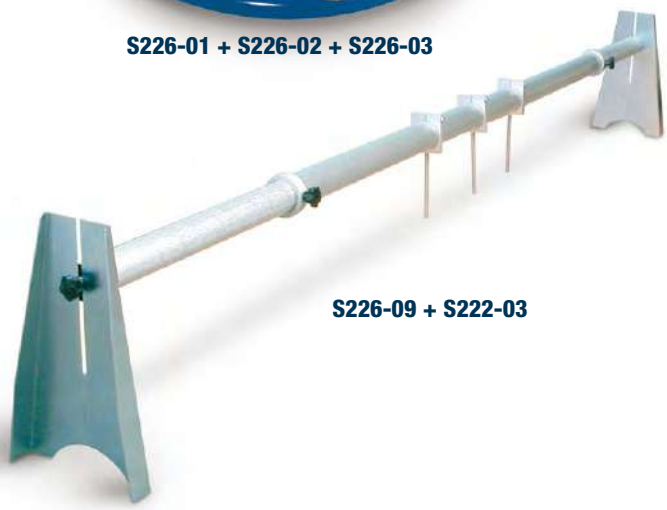
S227-02 Hydraulic jack 500 kN capacity, complete with hand pump, spherical seat, rubber pipe with fast connector, set of extension rods of different lengths, carrying case.
C116-09S Pressure transducer, connected to the pump.
C405-15N Cyber-Plus 8 Evolution "Touch Screen" for data acquisition, visualization, processing and storing, directly connected to PC or printer. Technical details: see p. 520
S224-21N Software for test data processing
S226-05 Load plate Ø 300 mm
S226-06 Intermediate plate Ø 160 mm
S222-03 Datum bar assembly, 2.5 m long, telescopic, aluminium made, adjustable in height, complete with base supports, plumb and spirit level. Packed separayely. (Alternative solution: S223-03 "Y" measuring system, Swiss method).
S336-14 n° 3 linear displacement transducers, 50 mm travel.
S336-31 n° 3 Extension cables for transducer, 5 m long.
S226-16 n° 3 articulated transducer supports with adjustment device.
S335-15 n° 3 universal coupling pliers for transducers.

Weight: 110 kg approx.

S226-01 + S226-02 + S226-03

ACCESSORIES

S226-01 LOADING PLATE Ø 450 mm
S226-02 LOADING PLATE Ø 600 mm
S226-03 LOADING PLATE Ø 760 mm
S226-09 SET OF TELESCOPIC EXTENSION RODS, aluminium made, to be connected to the datum bar mod. S222-03 (2.5 m long) to obtain a max. adjustable lenght of 5.5 m as requsted by ASTM, CNR Specifications



S226-09 + S222-03

S223-03
"Y" MEASURING SYSTEM - SWISS METHOD

STANDARD: SNV 70312

Aluminium alloy made, lightweight and very easy to use, it may be used as alternative solution to the datum bar assembly mod. S222-03. This system is applicable to the plate bearing equipment with 3 dial gauge or 3 displacement transducers.

Weight: kg 7 approx.

S223-03 + S226-16

BENKELMAN BEAM APPARATUS

STANDARDS: NF P94-117-1 | NF P98-200/2 | AASHTO:T256

Utilized in conjunction with the plate bearing test equipment, to determine the static deformation of road pavements EV1 - EV2 and Westergard. See section "B" Bitumen, mod. B100 p. 166

B100 **B102**

S226-50
OFFICIAL ACCREDIA CALIBRATION CERTIFICATE

(equivalent UKAS, ENAC, DAKKS, SAS, COFRAC etc.) of the applied load for the Bearing Test Equipment from mod. S222KIT to mod. S226KIT (p. 514 to 518) and for Field CBR/Unconfined test equipment mod. S131KIT, S210KIT, S220KIT (see p. 492...508).
The calibration is carried out only at Matest factory.

C405-15M
CYBER-PLUS TOUCH SCREEN
DATA ACQUISITION AND PROCESSING SYSTEM

8 Channels acquisition and processing data system, 24 bit resolution. Electronic advanced technology, **display** LCD, TFT, 800x480 pixels, 7", **touch screen**, high graphic performances, the unit automatically performs test and data processing. A certificate can be printed through an external USB printer (optional). The Cyber-Plus is equipped with LAN port for connection to PC and with USB port for an unlimited memory storage.
Contained in a practical and sturdy watertight carrying case, can be powered from an electrical network 90-270 V or use the internal battery and charger granting one full day on-site use.
Hardware technical details: see p. 18

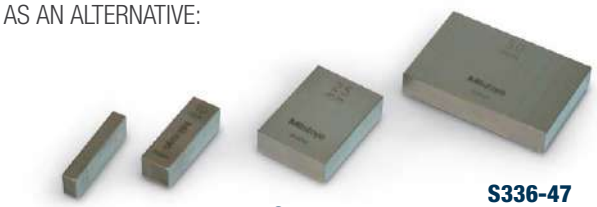
C405-15M

HARDWARE SPECIFICATIONS

- 8 independent channels available for the load cells or potentiometric transducers for load, or displacement measurements;
- Stabilized power supply of the analogical channels: 5 Vcc and 3 Vcc;
- Analogue input: ± 20 mV and ± 3 V;
- Nominal resolution: 24 bit;
- Acquisition up to 200 Hz readings for each channel;
- Safety discrete on/off output;
- Display LCD, TFT, 800x480 pixels, 7'', touch screen;
- Time and calendar system.

S337-51
Calibration process between one displacement transducer and the data acquisition system C405-15M

AS AN ALTERNATIVE:

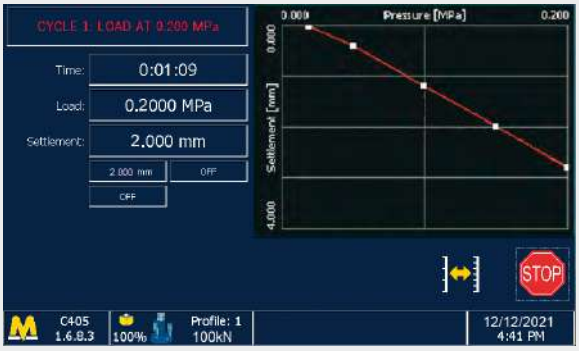


S336-41 **S336-43** **S336-45** **S336-47**

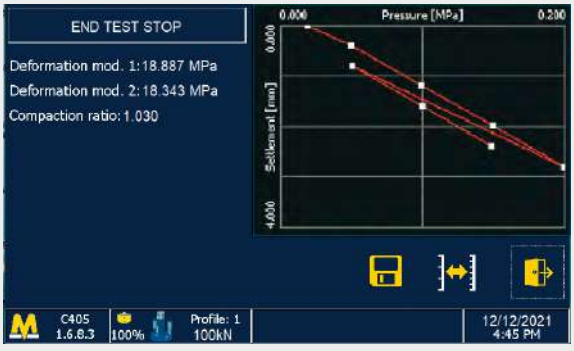
GAUGE BLOCKS. Grade 1
Used to calibrate the linear displacement transducers.

AVAILABLE MODELS

S336-43 Gauge block, nominal length 10 mm
S336-45 Gauge block, nominal length 25 mm
S336-47 Gauge block, nominal length 50 mm



Test execution



Final results and test graph

S228N
DYNAMIC PLATE LOAD TEST
LIGHT WEIGHT DEFLECTOMETER

STANDARDS: ASTM E 2835-11 | TP BF-StB part B 8.3 | ZTV E-StB 2017 | RIL 836 | RVS 08.03.04 (Austria)

Used in earthwork and road construction to determine the soil bearing capacity and the compaction quality of soils and non cohesive subbases, as well as for soil improvement applications. The test method is suited for coarse-grain and mixed-grain soil having maximum grain size of 63 mm. The test method may be used to determine the dynamic modulus of deformation of soil in the range Evd = 15...70 MN/m².

ADVANTAGES over the static plate load tester:
- Immediate evaluation of each measurement
- Only 2 minutes per measurement point
- Time and cost-saving
- No need for construction plant as kentledge
- Easy to handle by one person
- Ability to test in inaccessible locations

Being easy to handle and providing immediate measuring results, the Light Weight Deflectometer is additionally suited for monitoring intra-company operations. It facilitates quick decisions for continuing construction work at the site.

SPECIFICATIONS:
- Measuring instrument - small, portable and precise
- Intuitive menu navigation with 10 selectable languages
- Variable text input and pre-loading pulses
- Three settlement values shown during test
- Settlement mean value and Evd modulus automatically calculated
- Drop weight: 10 kg (extendable to 15 kg)
- Measure range: Evd 15-70 MN/m² (extendable to 105 MN/m²)
- Measure depth: 600 mm
- Load plate Ø 300 mm
- SD card for storage of 10.000 data tests
- Up to 1.500 tests with just one set of batteries (4xR6)
- High quality zinc plated galvanization of metallic parts, against corrosion

The tester is supplied complete with loading unit, load plate, measuring instrument with SD card and instructions (in weatherproof full leather carrying case)

Total Weight: 30 kg approx.

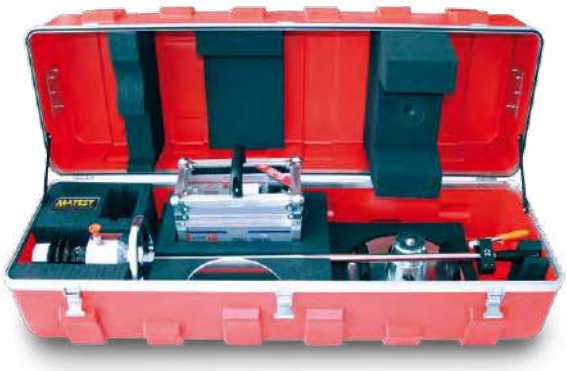
S228-14

S228-13

S228N

ACCESSORIES

S228-05 DROP WEIGHT of 15 kg. Measuring range of 70-105 MN/m².
S228-10 PROTOCOL SOFTWARE. Add information about the measuring point and use the confortable user interface for issuing and easy-view archiving of representative A4-protocols.
S228-11 THERMAL PRINTER in case (with power battery, power supply and connection cable)
S228-12 INTEGRATED GPS SYSTEM. To proof the exact coordinates of the measuring point.
S228-13 TRANSPORT CART. For long distances at the site.
S228-14 MAGNETIC STAND. For proper positioning of loading unit.
S228-15 TRANSPORT BOX. For safe transport and storage.
S228-06 WI-FI SD CARD. Fast data transfer to mobile, phone, tablet or PC. Free mobile apps for both Android and iOS.



S228-15

RELATIVE DENSITY OF COHESIONLESS SOIL
VIBRATING TABLE METHOD

The relative density set is proposed in two versions according to EN or ASTM Specifications:

S238N KIT
RELATIVE DENSITY OF COHESIONLESS SOILS

STANDARD: EN 13286-5

This test covers the determination of the maximum dry density and the water content (humidity/density ratio) of cohesionless mixtures where the max density by the impact method is lower than the vibratory method.
The method is applicable to materials containing up to 12% fines (< 0.063 mm) by mass and max. particle size is 80 mm.
The test is performed to road construction mixtures.

The set is composed of:

S238-10 Vibrating electromagnetic table, dimensions 762x762 mm, vibration frequency 3600 rpm, amplitude range: 0.05 to 0.64 mm, max. load capacity 250 kg, complete with separate control panel.

Power supply: 230V 1ph 50-60Hz

S238-11EN Relative density mould 14 liters capacity with accessories.

S238-12 Surcharge weight and base with handle to EN for the 14 liters mould.

Total weight: 290 kg approx.

S238-01N KIT
RELATIVE DENSITY OF COHESIONLESS SOILS

STANDARDS: ASTM D4253, D4254

The method is applicable for the determination of the relative density of cohesionless soil where impact compaction will not produce a well defined moisture/density relationship curve.
The maximum density of the impact test is normally less than the vibratory method.

The set is composed of:

S238-10 Vibrating electromagnetic table, as above described. Power supply: 230V 1ph 50-60Hz

S238-11N Relative density mould 0,5 cu. ft. capacity with accessories.

S238-13N Relative density mould 0,1 cu. ft. capacity with accessories.

S238-14N Surcharge weight and base with handle to ASTM for the 0.5 cu. ft. mould.

S238-15N Surcharge weight and base with handle to ASTM for the 0.1 cu. ft. mould.

S238-16 Relative density gauge measuring set.

Total weight: 310 kg approx.

ACCESSORY

NEW

S238-17 Pouring devices Ø 12.5 and 25 mm

S238-17

S238N KIT

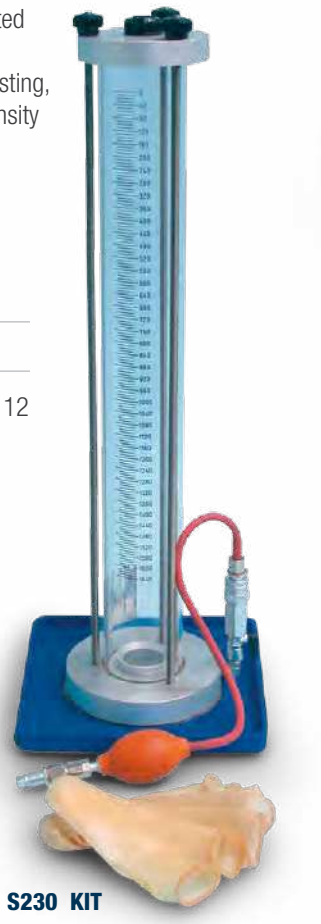
S238-01N KIT

S230 KIT
ASTM I AASHTO BALLOON DENSITY APPARATUS
1600 ML CAPACITY

STANDARDS: ASTM D2167 I AASHTO T205 I CNR N° 22

Used to determine the in-sity density of fine graded compacted or bonded soil. The apparatus is placed over the hole excavated in the soil, and water is pumped into a rubber balloon and forced into the hole. The amount of water displaced into the ballon is measured from the graduation of the scale.
The instrument consists of a graduated plexiglass cylinder 1600 ml capacity housed within an aluminium alloy casting, a rubber pump with stop valve, a density plate and 12 rubber balloons.

Dimensions: 340x340x700 mm
Weight: 6 kg approx.



S230 KIT

SPARE

S230-01 Rubber balloons, pack of 12

S232 KIT
NF BALLOON DENSITY APPARATUS
3000 ML CAPACITY

STANDARD: NF P94-061-2

Used to determine the in-situ density of fine graded compacted or bonded soil, this unit has the same test system of mod. S230 KIT, but with a capacity of 3000 ml as requested by French Specification. A hand-driven piston forces the water into the rubber membrane. A dial gauge measures the water pressure so to execute all the test at the same pressure.
An index engraved on the stem of the piston measures the volume of water filling the hole.
The unit is supplied complete with 6 reinforced rubber membranes, 4 locking clamps, base plate, accessories.

Dimensions: 360x360x700 mm
Weight: 10 kg approx.

SPARE

S232-01 Reinforced rubber membrane, pack of 6

S232 KIT S233 KIT

S233 KIT
NF BALLOON DENSITY APPARATUS
6000 ML CAPACITY

Identical to mod. S232 KIT, but with capacity of 6 litres.

Weight: 15 kg approx.

SPARE

S233-01 Reinforced rubber membrane, pack of 6

ACCESSORIES

Used for levelling, digging, collecting and maintaining the soil samples:

S240-01 SCRAPER to level the ground
S240-02 METAL DIBBER TOOL
S240-05 METAL POINTED ROD
V195 RUBBER MALLET Ø 50 mm
V193 STEEL HAMMER 300 g
V194 STEEL HAMMER 2 kg
V199 DENSITY PICK
V198 CHISEL 300 mm long x 25 mm wide
V186 DENSITY SPOON, big sized
V188 TROWEL, 100x200 mm
V183 ALUMINIUM SCOOP 325 cc
V125-03 TINNED CAN 5 litre cap.

S240-01...V199

FIELD DENSITY SAND REPLACEMENT METHOD

STANDARDS: ASTM D1556 | AASHTO T191 | NF P94-061-3 | CNR N° 22 | UNE 7371

Used to determine the in-situ density of fine graned compacted soil and to verify the degree of compaction.
The test consists in digging a hole into the ground and then collect, dry and weight the sampled soil.
The hole is now filled with dry sand from the cone container and the volume of sand recorded.
Three versions are available Ø 4" 6.5" 12" each one suitable for different grain sized.
The S231KIT model Ø 12" is recommended for coarse grained soil and gravel (over 38 mm diameter).

The kit consists of:

- Metal double cone assembly with valve, galvanized for rust protection.
- Metal base with rimmed centre hole for cone housing, galvanized.
- Two plastic jar, 5 litre capacity. (One jar only 15 litre capacity complete of cone fixing device for S231 KIT version)

The calibrating container is an accessory, to be ordered separately.

Model	Diameter inch / mm	Double cone with valve	Metal base with hole	Jar plastic	Dimensions mm	Weight kg	Calibrating container (optional accessory)
S234-10 KIT	4" (101.6 mm)	**S234-11**	**S234-12**	**V121** (2)	190x190x500	2.300	**S234-13**
S234 KIT	6.5" (165.1 mm)	**S234-05**	**S234-06**	**V121** (2)	305x305x600	3.350	**S234-01**
S231 KIT	12" (304.8 mm)	**S231-05**	**S231-06**	**S231-11** (1)	620x620x920	13.600	**S231-01**

Note: all parts can be purchased individually.

ACCESSORIES

S235N STANDARD SAND for density tests, passing 600 micron and retained on 300 micron. ASTM, AASHTO, BS. Bag of 25 kg.

S235-01N STANDARD SAND, passing 0.4 mm and retained on 2 mm. CNR N° 22. Bag of 25 kg

BS SAND REPLACEMENT APPARATUS

STANDARDS: BS 1377:9, BS 1924:2

Used to determine the in-situ density of fine graned compacted soil.
The apparatus consists of: sand pouring cylinder with shutter made of cast aluminium and accurately machined, upper cylinder, metal tray with fixed centre hole for cone housing.
The cylinder is available with 100, 150 and 200 mm diameter (Ø 200 mm is recommended for coarse grained soil and gravel).

S236 KIT...S237 KIT

Available Models	Ø mm	Pouring cylinder, shutter and upper cylinder	Metal tray with centre hole	Optional accessory: Calibrating container	Weight of the complete KIT
S236 KIT	100 Consisting of:	**S236-05**	**S236-06**	**S236-07**	kg 10.800
S236-01 KIT	150 Consisting of:	**S236-10**	**S236-11**	**S236-12**	kg 14.150
S237 KIT	200 Consisting of:	**S237-05**	**S237-06**	**S237-07**	kg. 22.600

S244
PINHOLE TEST EQUIPMENT

DISPERSIBILITY DETERMINATION

STANDARDS: ASTM D4647 | BS 1377:5

Utilized to evaluate the erosion on soil samples having high degree of sodium content, the Pinhole apparatus reproduces the water flowing in a cavity obtained from a soil specimen.
The apparatus consists of a cylindrical container equipped at its ends of water inlet/outlet connectors, tube with graduated scale, base support with rod.

Weight: 4 kg approx.

ACCESSORIES

S245-04 CONSTANT LEVEL TANK. Details and picture: see p. 526
V230-02 TUBING, inside Ø 8 mm, 5 m long

S244

CONSTANT HEAD PERMEAMETERS

STANDARDS: BS 1377:5 | ASTM D2434 | AASHTO T215

Used to determine the permeability of granular, gravel and sand soils. The specimen is formed in an acrylic permeability cell, and water is passed through it from a constant level tank.
The permeability cell has pressure points at different levels which are connected to the manometer tubes fixed on a stand with graduated scale. Two constant head permeability cells are available: 75 mm and 114 mm diameter.

S245-01
CONSTANT HEAD PERMEABILITY CELL Ø 75 MM
with three pressure take-off points.
Formed by an acrylic plexiglass body held between two aluminium anodized end plates.

Weight: 3 kg approx.

S245-02
CONSTANT HEAD PERMEABILITY CELL Ø 114 MM
with six pressure take-off points and an additional six blanked-off pressure points. Formed by an acrylic plexiglass body held between two aluminium anodized end plates. When using this cell, two manometer tube stands mod. S245-03 are required.

Weight: 7 kg approx.

S245-03
MANOMETER TUBES AND STAND, comprising three tubes of constant bore, graduated scale, tubing and connectors.
Dimensions: 210x50x1160 mm
Weight: 5 kg approx.

S245-04
CONSTANT LEVEL TANK, made from acrylic plexiglass, wall mounting. The inlet, outlet and overflow pipes can be adjusted for height within the tank.
Weight: 3 kg approx.

FALLING HEAD PERMEAMETER

STANDARD: CEN ISO/TS 17892-11

Used to determine the permeability of fine-grained soils such as clay-like or silty soils. The specimen is confined within the permeameter which is connected to the manometer tube filled with water. The sample must be completely satured with water before the test, and the operator will check the rate of fall of the water in the tube passing through the test specimen.

The set consists of:

S246-01
Permeameter stand with three manometer tubes each Ø 3, 4 and 6 mm for the different degrees of permeability, soaking reservoir with cock, tubing and connectors.

Dimensions: 1700x220x50 mm
Weight: 10 kg approx.

S252
COMPACTION PERMEAMETER
Ø 4" complete
(technical details: see next page)

ALTERNATIVE:

S253
COMPACTION PERMEAMETER
Ø 6" complete.

ACCESSORIES for Compaction Permeameters Ø 4"

S252-01 PLEIN BASE and COLLAR Ø 4" for compaction tests.
S252-02 MOULD BODY Ø 4" with two lateral water inlet/outlet.

ACCESSORIES for Compaction Permeameters Ø 6"

S253-01 PLEIN BASE and COLLAR Ø 6" for compaction tests.
S253-02 MOULD BODY Ø 6" with two lateral water inlet/outlet.

ACCESSORIES

S355 DE-AIRING TANK 20 litre capacity made from acrylic plexiglass (see p. 550)
S355-01 WATER TRAP to collect the water condensation.
V203 PORTABLE VACUUM PUMP, 230V 1ph 50Hz
V230-03 RUBBER TUBING for vacuum, 3 m long.
S325 NYLON TUBING, 20 m

S248
PERMEAMETER STAND 4 CELL CAPACITY
FOR CONSTANT AND FALLING HEAD TESTS

This 4 cells capacity stand is designed to perform both constant head and falling head permeability tests on compacted granular soil samples.
The stand consists of a metal frame with water tank adjustable in height between 1350 and 3450 mm for constant head tests. Supplied complete with tubes, graduated rules, piping, connectors and cocks; but without permeameters to be ordered separately.
The stand can hold up to 4 permeameters having Ø 4" or 6" to perform different types of tests at the same time.

Dimensions: 1050x900x2000/3850 mm
Weight: 75 kg approx.

S248 + Permeameters

COMPACTION PERMEAMETERS

STANDARD: CEN ISO/TS 17892-11

Used for determining permeability to water of soil gravel, clay, sand samples. Supplied complete with clamped upper and lower plate giving the possibility to perform permeability tests also on compacted samples, water inlet with valve, water outlet, two perforated upper and lower plates, two stainless steel screens.
Stell made, galvanized against corrosion.

S253

S253 disassembled

MODELS

S252 COMPACTION PERMEAMETER Ø 4" complete.
Weight: 8 kg approx.

S253 COMPACTION PERMEAMETER Ø 6" complete.
Weight: 16 kg approx.

ACCESSORIES for S252

S252-01 PLEIN BASE and COLLAR for compaction test before the permeability test

S252-02 MOULD BODY with two lateral water inlet/outlet for test with piezometric measurement

ACCESSORIES for S253

S253-01 PLEIN BASE and COLLAR for compaction test before the permeability test

S253-02 MOULD BODY with two lateral water inlet/outlet for test with piezometric measurement

ACCESSORIES

CUTTING COLLAR, coupled to the Permeameter body, it gets easier the soil sampling.

S200-09

MODELS

S185-01 Ø 4" cutting collar
S200-09 Ø 6" cutting collar

CONSOLIDATION TEST

STANDARDS: ASTM D2435, D3877, D4546 I BS 1377:5
AASHTO T216 I XP P94 090-1, P94-091
UNE 103-405, 103-602

The one-dimensional consolidation test of a soil sample enables to ascertain the settlement characteristic over a given period of time. The soil specimen under test is axially loaded and laterally contained.
Loads are applied with progressive increases and the settlement values are read on a dial gauge or on a digital display (through a displacement transducer).

Two different oedometer models are proposed:

S260 Front loading oedometer with dial gauge or digital data acquisition system.

S262N Edotronic, pneumatic, fully automatic touch-screen consolidation apparatus (see next pages).

S260
FRONT LOADING OEDOMETER
CONSOLIDATION APPARATUS

Rigidly manufactured from aluminium alloy casting to provide a high degree of accuracy with any frame distorsion under load. The load bridge group is supported in high accuracy self-aligning seat balls. The beam provides three loading ratio: 9:1 10:1 11:1 and the beam assembly is fitted with an adjustable counterbalance weight.
Maximun load: 170 kg of slotted weights, corresponding to 1870 kg using the beam ratio 11:1
The oedometer accepts cells up to 100 cm^2
Supplied complete with rod holding the weights and coupling block holding the dial gauge or transducer.
Supplied **without**: consolidation cell, weights, dial gauge (or transducer), holding bench which have to be ordered separately.

Weight: 25 kg approx.

S260
with cell and dial gauge

S265

S334

S260 with cell and S334 Cyber-Plus 8 Evolution

ACCESSORIES

S376 DIAL GAUGE 10 mm travel x 0.01 mm subdiv. for vertical displacements.

or:

S375-01 DIAL GAUGE 12 mm travel x 0.002 mm subdiv.

Alternative solution:

S336-11 LINEAR VERTICAL DISPLACEMENT TRANSDUCER, 10 mm travel
S336-30 EXTENSION CABLE 2 metres long, or:
S336-31 EXTENSION CABLE 5 meters long, or:
S336-32 EXTENSION CABLE 10 meters long

S337-51
CALIBRATION process of the displacement transducer to the data acquisition unit of the oedometer.

S334
CYBER-PLUS 8 EVOLUTION

8 channels acquisition and processing data system (expandable to 16 channels) colour "Touch Screen" display, it automatically performs test and data processing. Directly connected to PC via USB, it prints the test certificate. Equipped with slots for external Pendrive or SD Card infinite memory supports.
Technical details: see p. 559, Hardware details at p. 18

S260-05N
Software OedoLab Reports - MATEST MADE
Technical Data: see p. 531

CONSOLIDATION CELLS - FIXED RING

Made from **brass**, with specimen holding fixed ring having cutting rim so as to be utilized also to sample undisturbed specimens.
Accurately manufactured these cells are supplied complete with loading piston, couple of porous stones and plexiglass transparent water jacket.

Model	Specimen diameter mm	Specimen area cm²	Specimen thickness mm	Spare cutting ring mm	Specimen tamper	Spare of porous stones Upper	Lower
S268	50,47	20	20	**S122**	**S123**	**S274U**	**S274L**
S268-05	63,5	31,67	20	**S122-19**	**S123-05**	**S274-10U**	**S274-10L**
S268-01	71,40	40	20	**S122-01**	**S123-01**	**S274-01U**	**S274-01L**
S268-04	75,00	44,16	20	**S122-17**	**S123-04**	**S274-09U**	**S274-09L**
S268-02	79,80	50	20	**S122-02**	**S123-02**	**S274-02U**	**S274-02L**
S268-03*	112,80	100	25	**S122-03**	**S123-03**	**S274-03U**	**S274-03L**

* The consolidation cell Ø 112.8 mm is made from aluminium.

S268 disassembled — **S268** — **S268-03** — **S268-01**

CONSOLIDATION CELLS - PERMEABILITY ATTACHMENT

Made from **brass**, similar in manufacture to the fixed ring cells, they are also provided of a pipe connector with cock and graduated glass burette 10 ml capacity allowing to perform permeability tests.

Model	Specimen Ø mm	Specimen area cm²	Specimen thickness mm	Hollow punch	Specimen tamper	Spare of porous stones (1 pc)
S272	50.47	20	20	**S122-04**	**S123**	**S274-04U**
S272-05	63.5	31.67	20	**S122-20**	**S123-05**	**S274-10U**
S272-01	71.40	40	20	**S122-05**	**S123-01**	**S274-01U**
S272-04	75.00	44.16	20	**S122-18**	**S123-04**	**S274-09U**
S272-02	79.80	50	20	**S122-06**	**S123-02**	**S272-02U**
S272-03*	112.80	100	25	**S122-07**	**S123-03**	**S274-03U**

* The consolidation cell Ø 112.8 mm is made from aluminium.

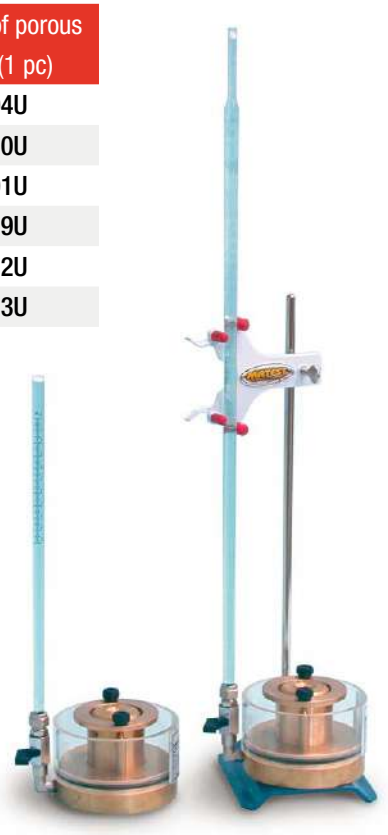
S275
PERMEABILITY ATTACHMENT

Complete with stand, clamps and hose it is connected to the cells mod. S272 to S272-05.
Recommended for soil samples having great value of permeability.
Burette has 50 ml capacity and subdiv. 0.1 ml.

Weight: 5 kg approx.

S274 KIT

S272 disassembled



S272 — **S272 + S275**

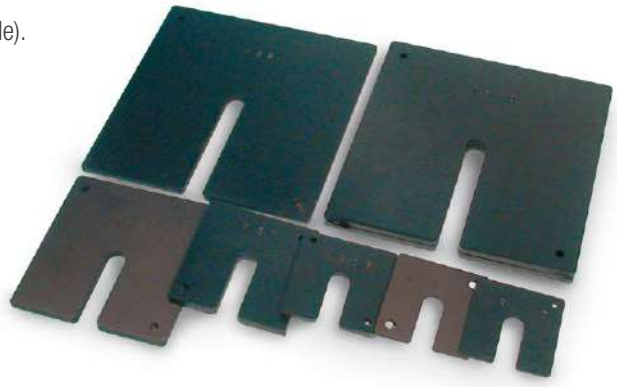
OEDOMETER: ACCESSORIES

SLOTTED WEIGHTS
Steel made, painted against corrosion (mod. E066-02 brass made).

Available slotted weights:

Model	Weight
E066-02	100 g
S273-06	250 g
S273-05	500 g
S273-04	1 kg
S273-03	2 kg

Model	Weight
S273-07	4 kg
S273-02	5 kg
S273-08	8 kg
S273-01	10 kg



KIT OF SLOTTED WEIGHTS

S273 KIT	S273-01 KIT	S273-02 KIT
S273-01 = 4x10 kg	**S273-08** = 7x8 kg	**S273-01** = 6x10 kg
S273-02 = 1x5 kg	**S273-07** = 1x4 kg	**S273-02** = 3x5 kg
S273-03 = 2x2 kg	**S273-03** = 1x2 kg	**S273-03** = 1x2 kg
S273-04 = 1x1 kg	**S273-04** = 1x1 kg	**S273-04** = 1x1 kg
	S273-05 = 1x500 g	**S273-05** = 3x500 g
	S273-06 = 2x250 g	**S273-06** = 2x250 g
TOTAL: 50 kg	**TOTAL:** 64 kg	**TOTAL:** 80 kg

S265

HOLDING BENCH, made from sturdy structural painted steel, complete with locking bolts and nuts.

S265 BENCH HOLDING one apparatus
S265-01 BENCH HOLDING three apparatuses

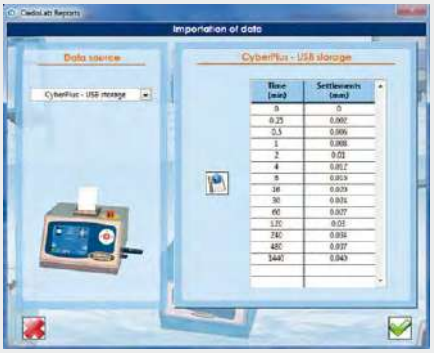
GAUGE BLOCKS
GRADE 1
Used to calibrate the linear displacement transducers.

AVAILABLE MODELS

S336-41 GAUGE BLOCK, nominal length 5 mm
S336-43 GAUGE BLOCK, nominal length 10 mm

S336-43

S336-41



S260-05N
Data import from the CyberPlus

SPARES

S335-15 Universal coupling pliers for dial gauge/transducer. It accepts all Matest displacement transducers and dial gauges (Ø from 8 to 20 mm)

S260-13 Mounting device between the universal coupling pliers S335-15 and the consolidation apparatus to fix the transducer/dial gauge for the vertical displacement.

S336-30
S335-15
S260-13
S336-11

S260-05N
SOFTWARE OEDOLAB REPORTS

STANDARDS: ASTM D2435-80 I XP P94-090-1 I BS 1377:5

OedoLab Reports is the new informatic tool which allows geotechnical laboratories to process data and to view the results obtained from oedometric tests.

Used in conjunction with Cyber-Plus S334, the new features of this software allow the users to:

- Create a test file from data entered manually or imported
- Create a project to perform calculations according to the selected standard
- Integrate test files (from OedoLab Connect or manually entered) to a project
- Elaborate, customize and print their test reports which can be read without the need of a specific software.

The program can be used in a very simple and intuitive way. A dedicated window allows the user to import data from a specific location (for instance, from the Cyberplus through USB or SD card).

OedoLab Reports provides the user with a simple and flexible graphical interface giving the possibility to view, edit and print all the parameters involved in the oedometric tests.

The input information for each stress level is the following:

- Settlements in mm.
- Time in min.

The Software allows also to enter information related to the soil sample, among which:

- Extraction method.
- Blue value.
- Attemberg's limits.
- Soil classification according to AASHTO/USCS/GTR.
- Particle size analysis.

Laboratory coefficients of:

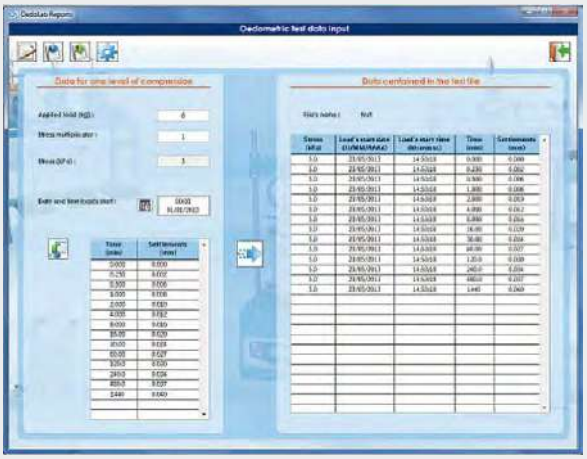
- Consolidation – root method.
- Void ratio.
- Water content.
- Densities.
- Compressibility.

CHARTS:

- Settlements (mm) / Time (min).
- Void ratio (%) / Applied pressure (kPa).
- Passing (%) / Opening (mm).

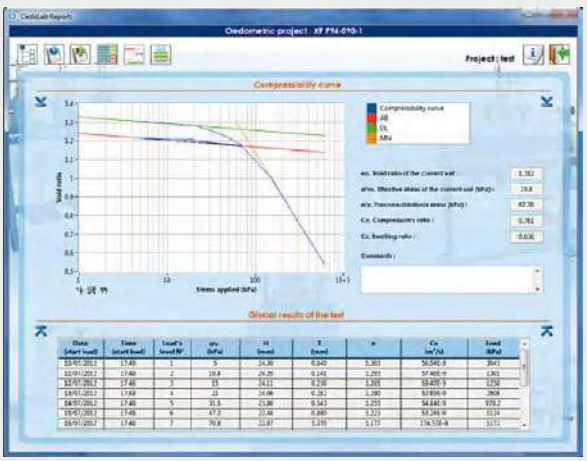
PC specification:

- Operating system: Windows XP or more recent



S260-05N Data feeding/acquisition

S260-05N Test data visualization



S260-05N Results preview

BUYER'S GUIDE FOR ONE STANDARD CONSOLIDATION SYSTEM AND ONE AUTOMATIC CONSOLIDATION DATA ACQUISITION/PROCESSING SYSTEM.

S260
with accessories

S265-01

S334

Configuration for one standard Oedometer apparatus	Model
Front loading oedometer	S260
Oedometer bench (for one or three oedometers)	S265 / S265-01
Dial gauge	S376 / S375-01
Consolidation cell, fixed ring	S268 / S268-05
Spare cutting ring (to combine to the consolidation cell)	S122 / S122-19
Specimen tamper (to combine to the consolidation cell)	S123 / S123-05
Spare porous stones (to combine to the consolidation cell)	S274 / S274-10
Set of slotted weights	S273 / S273-10
Permeability measurement:	
Permeability consolidation cell	S272 / S272-05
Permeability attachment (50 ml burette)	S275
Hollow punch (to combine to the consolidation cell)	S122-04 / S122-20
Spare porous stones (to combine to the consolidation cell)	S274-04 / S274-11

Configuration for one Oedometer apparatus with electronic measurement and data acquisition/processing:	Model
Oedometer with accessories as listed in the standard configuration (without the dial gauge S376), and also:	
Cyber-Plus 8 Evolution, 8 channels (expandable to 16 channels) automatic data acquisition/processing	S334
Displacement transducer (in quantities as the oedometers)	S336-11
Extension cable (in quantities as the transducers)	S336-30 / S336-32
Software OedoLab Reports - Matest made	S260-05N
Gauge blocks to calibrate the transducers	S336-41 / S336-43
or:	
Transducer / Oedometer calibration process	S337-51

S261

EDOMEC

AUTOMATIC CONSOLIDATION APPARATUS (OEDOMETER)

ADVANCED ELECTROMECHANICAL SYSTEM

STANDARDS: BS 1377:5 | ASTM D2435, D3877, D4546 | AASHTO T216 | NF P94-090-1, NF P94-09

This automatic consolidation system, ideal for modern and efficient laboratories, has been developed to eliminate or reduce to the absolute minimum any forms of manual intervention, which the oedometer test.

This machine has innovative technology for controlling the application of loads. The load application system is guaranteed by a sophisticated PID electromechanical system. It is able to control load very accurately, thanks to the high frequency control up to 1KHz. This allows high precision at low loads, high speed of load application at high loads.

The test is configured using a special test icon, in which it is possible to set loads and acquisition times; both the loads and the acquisition times are freely configurable. The large display makes it easy to visualize test data and graphs.

Frame Specifications:

- Standard load cell :10kN (up to 25 kN on request)
- Precision: 0.15 % at full range
- Ram travel: up to 25 mm
- Minimum speed: 0.00001 mm/min
- Maximum speed: 99.99999 mm/min
- Control frequency: up to 1 kHz
- Horizontal clearance: 175 mm
- Vertical clearance: 185 mm (without extension columns)
  265 mm (with extension columns)
- Maximum cell size dia: 112.8 mm
- Safety function for automatic machine stop when maximum load or maximum strain/deformation is reached.

Firmware:

- Equipped with 8 channels, suitable for connection of load, displacement, deformation, LVDT, temperature (PT100, PT1000, NTC) and strain gauge (by using an external adapters) trans-duc-ers.
- Semi-automatic configuration and calibration of all transducers connected.
- Automatic calculations and real time display of graphs and results according to the Standard.
- The digital controller (PC) works on Windows CE based system and can be easily updated through the USB with no need to uninstall or move the controller.
- Sampling frequency of 2 kHz with a selectable sampling rate between 1 Hz and 20 Hz (5 levels).
- Unlimited memory storage with: 2 USB ports, 1 SD card. Ethernet port for remote control through PC.

ACCESSORIES

SSW-EDOA	SmartLab software for automatic oedometer.
SSW-LINKA	SmartLab mode enable for automatic machines.
S336-11	LINEAR DISPLACEMENT-DEFORMATION
S337-51	CALIBRATION PROCESS of the linear displacement transducer combined with the Edotronic.
S268/S272-05	CONSOLIDATION CELLS, different models: see p. 529

MAIN FEATURES

- Automatic calculations and real time display of graphs and result according the standard.
- Maximum vertical force: up to 25 kN
- Minimum speed: 0.00001 mm/min
  Maximum speed: 99.99999 mm/min
- 8 channels for acquisition and data processing system.
- Sampling frequency of 2 kHz with a selectable sampling rate between 1 Hz and 20 Hz

S261

S262-12N
SOFTWARE OEDOLAB CONNECT

STANDARD: ASTM D2435-80 | XP P094-090-1 | BS 1377:5

To be used with the Edotronic mod. S262

OedoLab Connect is an extension of the OedoLab Reports S262-05N software, specifically designed to guide the user through the entire consolidation test.
This software allows automatic data acquisition and to save the results in a specific file.
Thus, the file obtained can be then added to a project created with OedoLab Reports, providing the users not only with the same features given by the S262-05N but also with new ones.

OedoLab Connect can be connected to one or more pneumatic oedometers, allowing automatic data acquistion and control during the test. Each oedometer is controlled by the PC via network connection.

OedoLab Connect provides the user with a simple and flexible graphical interface. A dedicated window allows to select the oedometer the user wants to work with.

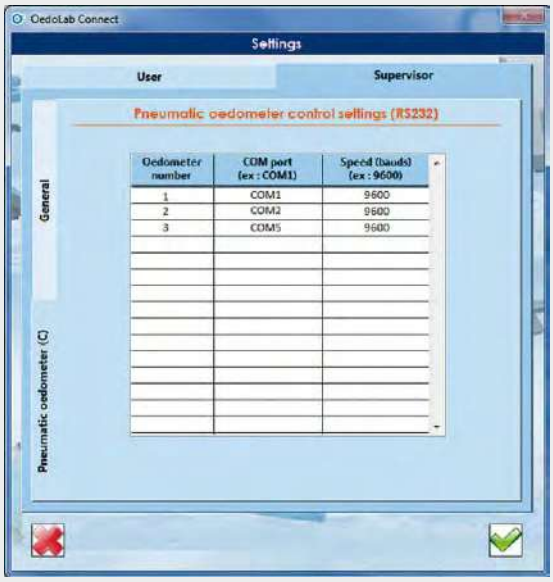
Once a consolidation step is completed, the software automatically shifts to the next level; hence re-performing all the control and acquisition operations needed to complete the test. Furthermore, by setting test parameters which are included in the Software and dedicated to the loading sequences control (minimum speed of settlement and swelling threshold), the user is also able to program the test and save a lot of time then.

PC specification:

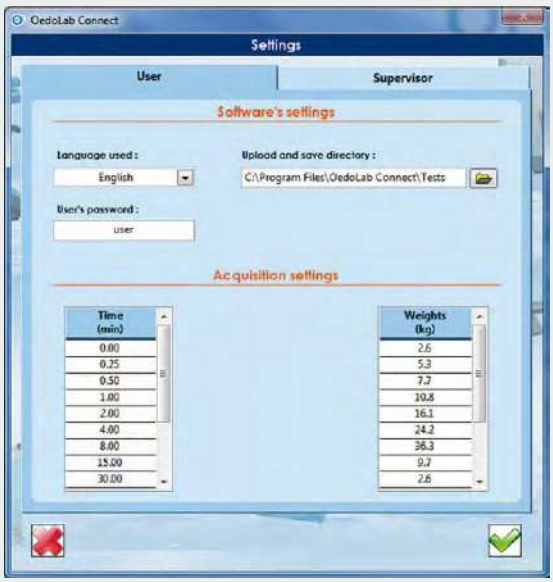
- Operating system: Windows XP or more recent.

Supplied complete with connection cable.

S262-12N Test view



S262-12N Control settings



S262-12N Acquisition settings

S262-12N Information about the test

MODULARITY TEST OPTION

S262-12N Modularity View

S334-12

S334-11

Oedolab Connect S262-12N allows automatic data acquisition and control for each oedometer configured into the dedicated Pneumatic Oedometer control settings window (see above image).

This way, up to 24 units can be connected to the same PC by using an Ethernet network, providing modern geotechnical laboratories with a powerful tool to control single or multiple units at choice.

ACCESSORIES

S334-11 Network connection RS45 cable
S334-12 Switch to connect from 2 to 7 Cyber-plus units to the Ethernet Network

DIRECT / RESIDUAL SHEAR TEST APPARATUS, DIGITAL TOUCH-SCREEN

STANDARDS: ASTM D3080 | BS 1377:7 | NF P94-071-1, NF P094-071-2 | AASHTO T235 | CEN-ISO-TS 17892-10

This apparatus is used to determine the resistance to shearing of all types of soil specimens including both consolidated and drained, undisturbed or remolded. The machine can accommodate round specimens Ø 50, 60, 63.5, 100 mm and square 60x60, 10x100 mm.
The machine has an integral closed loop control motor with epicycloid reducers.
At the beginning of each test the machine performs an automatic and complete internal check including a position reset resulting in the elimination of all position errors.
A user-friendly microprocessor controlled touch screen is used to input all test patterns providing an efficient and flexible interface.
(All data are input and stored when the machine is in stand-by, without affecting the specimen under test with quick machine setting.)
Facility for shear box maximum extension detection, to automatically stop the test.
Facility to input a different return speed (residual shear) in relation to the one used for the shear test, thus allowing a quick playback of the residual shear test, saving a lot of time.
The effects of the primary consolidation can be identified directly on the consolidation curve, only with data acquisition version. Automatic calculation of the appropriate shear velocity with selection of optimal consolidation parameters for t50, t90 and t100 (only with data acquisition version). This provides efficiency and cost effectiveness.

Frame Specifications:

- Maximum shear load: 5000 N possible on the whole speed range.
- Shear speed: 0.00001 to 15,0000 mm/min.
- Display of both speed and displacement with 0.00001 mm resolution.
- Possibility of direct vertical load, or with a lever arm ratio 10:1
- Max vertical direct load: 500N; lever arm: 5500N
- Box group mounted on ball track with high quality antifriction system.
- Extremely easy and practical use, not requiring qualified staff.

Firmware:

- Electronic control unit Cyber-plus Evolution with Touch-Screen color graphic display ¼ VGA, that runs like a standard PC based on Windows operating system, for the management of the data. (Analysis of the data, test results, graphs with S277-40N Software; optional accessory).
- The Touch-Screen icon interface allows an easy set-up of all the parameters and prompt execution of the test. Read value results are immediate and of extreme accuracy.
- The machine can perform the tests without any external PC, because of the Cyber-Plus grants performances like a PC.
- Direct connection to Intranet (connection to a LAN network) and Internet to establish a remote communication and receive an immediate diagnosis from Matest technicians, or for upgrades of the Firmware.
- Unlimited memory storage with: 2 USB ports, 1 SD card.
- Possibility to select different languages.
- Hardware technical details: see page 24
- The machine is equipped with 8 connectors for the acquisition and data processing system (3 analogical/digital channels are activated with the S277-31 optional firmware for load cell and transducers; and 5 channels can be activated with the S277-32 optional firmware).

Power supply: 230V 1ph 50-60Hz 200W
Dimensions: 1040x420xh1350 mm
Weight: 120 kg approx.

Detail of the 8 connectors

MAIN FEATURES

- Automatic calculation of the appropriate shear velocity based on optimal consolidation parameters.
- Shear speed: 0.00001 to 15,0000 mm/min
- Different return speed facility for residual shaer test.
- Integral closed loop control motor.
- User-friendly microprocessor controlled touch screen.
- 8 connectors for acquisition and data processing system.

S276 KIT + S284

THE DIRECT/RESIDUAL SHEAR TESTING MACHINE IS AVAILABLE IN THREE VERSIONS

S276 KIT
SHEARLAB DIGITAL BASIC VERSION
DIGITAL SHEAR TESTING MACHINE

comprising:

S276-10 Shear Frame, with digital Touch-Screen microprocessor, complete with beam loading device, shear box case with adaptors, dial gauge supports.
S370-03S Load Ring, 3000N capacity with electric safety stop device (load rings of different capacities up to 5000N available on request).
S377 Dial indicator 25mm x 0.01mm for horizontal displacement.
S376 Dial indicator 10mm x 0.01mm for vertical displacement.
S273 KIT Set of 50 kg of slotted weights.

Note: Shear box, hollow punch, tamper **are not included** and have to be ordered separately (see accessories)

S276-01M
AUTO SHEARLAB DATA ACQUISITION VERSION
DIGITAL SHEAR TESTING MACHINE WITH INCORPORATED DATA ACQUISITION SYSTEM AND BASIC FIRMWARE

comprising:

S276-10M Shear Frame with digital Touch-Screen microprocessor, complete with beam loading device, shear box case with adaptors, transducers supports.
S277-20 Load Cell, electric, 3000N capacity, complete with cable.
S336-11 Linear vertical transducer, 10 mm travel.
S336-12 Linear horizontal transducer, 25 mm travel.
S277-31 Firmware activating 3 connectors for basic data acquisition.
S273 KIT Set of 50 kg of slotted weights.

Note: Shear box, hollow punch, tamper and Software (see next pages) **are not included** and have to be ordered separately.

S276-01M + S284

ACCESSORIES

S277-21 LOAD CELL, 5000 N
SSW-SHEARM SmartLab software for manual shear.
SSW-LINKM SmartLab mode enable for semi-automatic machines.

GAUGE BLOCKS. Grade 1
Used to calibrate the linear displacement transducers (see p. 541)

SPARES

S335-15 Universal coupling pliers for dial gauge/transducer. It accepts all Matest displacement transducers and dial gauges (Ø from 8 to 20 mm)
S280-15 Mounting device between the universal coupling pliers S335-15 and the shear machine to fix the vertical displacement transducer or dial gauge.
S280-16 Mounting device between the universal coupling pliers S335-15 and the shear machine to fix the horizontal displacement transducer or dial gauge.

ACCESSORIES

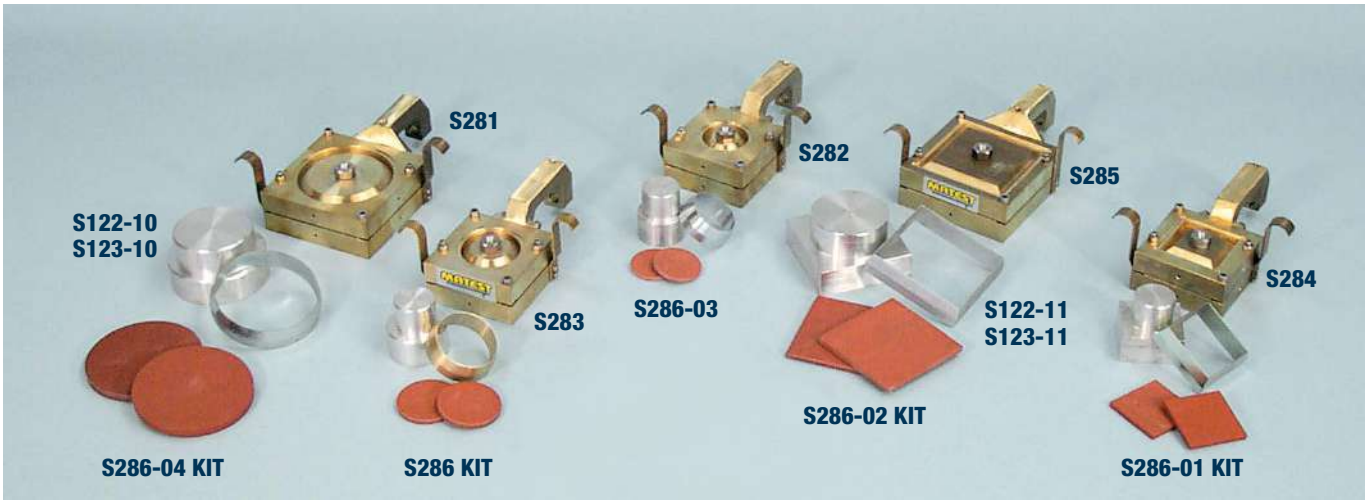
SHEAR BOX assemblies, made from brass, accurately machined, complete with carriage, walled round or square hole, base plate, two grids, two perforated grids, two porous stones, adapters to fit the box holder.

Models	Shear box	Spare of porous stones (1 pc)
Round specimens Ø 50 mm	**S282**	**S286-03**
Round specimens Ø 60 mm	**S283**	**S286**
Round specimens Ø 63.5	**S283-01**	**S286-05**
Round specimens Ø 100 mm	**S281**	**S286-04**
Square specimens 60x60 mm	**S284**	**S286-01**
Square specimens 100x100 mm	**S285**	**S286-02**

HOLLOW PUNCH (sample cutter) and
TAMPER (extrusion tool)

The hollow punch with cutting rim is used to prepare the soil sample, and the tamper ejects the specimen filling it directly into the shear box without disturbing it.

Models	Hollow punch	Tamper
Ø 50xh 23 mm	**S122-08**	**S123-08**
Ø 60xh 23 mm	**S122-09**	**S123-09**
Ø 63.5xh 23 mm	**S122-21**	**S123-17**
Ø 100xh 23 mm	**S122-10**	**S123-10**
Square 60x60xh 23 mm	**S122-11**	**S123-11**
Square 100x100xh 23 mm	**S122-12**	**S123-12**



S290

CONSOLIDATION FRAME

It accepts up to 3 shear boxes or consolidation cells.
Used to applly a constant load on the specimen in the shear box, so as to shorten the test duration when a lot of specimens have to be tested and just few shear machines are available. The frame can also be used to consolidate oedometric cells. Produced in a rugged steel structure, it is supplied complete with three lever arms ratio 10:1 having each max. load up to 550 kg, centering devices and dial gauge holders. Supplied without weights, water container, cells and dial gauges to be ordered separately.

Dimensions: 2300x450x900 mm
Weight: 150 kg approx.

S290 with accessories

Note: On request the shear machine can be equipped with load rings or load cells having capacity from 500 N to 5000 N:

ACCESSORIES for S290

S291 WATER CONTAINER, made from plexiglass and aluminium, it accomadates the shear box up to max size Ø 60 mm or 60 mm during the consolidation test, by keeping the specimen deep into the water.

S291-01 WATER CONTAINER, it accomodates all the shear boxes up to Ø 100 mm or 100 mm size.

S273 KIT Set of 50 kg of slotted weights

S376 Dial gauge 10x0.01 mm

S291-01 **S291**

S277-40N
SOFTWARE SHEARLAB REPORTS

STANDARDS: ASTM D3080-72 I NF P94-071-1 I NF P94-071-2
BS 1377:7

To be used with the shear testing machine, data acquisition processing version, mod. S276-01

ShearLab Reports is the new informatic tool which allows geotechnical laboratories to process data and to view the results obtained from direct and residual shear tests.

The new features of this software allow the users to:
- Create a test file from data entered manually or imported
- Create a project to perform calculations according to the selected standard
- Integrate test files to a project
- Elaborate, customize and print their test reports which can be read without the need of a specific software

The program can be used in a very simple and intuitive way.
A dedicated window allows the user to import data in the test file.

ShearLab Reports provides the user with a simple and flexible graphical interface giving the possibility to view, edit and print all the parameters involved in shear tests.

The input information is the following:
- Settlement in mm
- Time in min
- Horizontal displacement in mm
- Force in kN

In the project management window, the Software automatically calculates the shear parameters:
- Peak strength in kPa
- Residual strength in kPa
- Peak displacement in mm
- Residual displacement in mm

Laboratory coefficients of:
- Water content
- Densities
- Void ratio

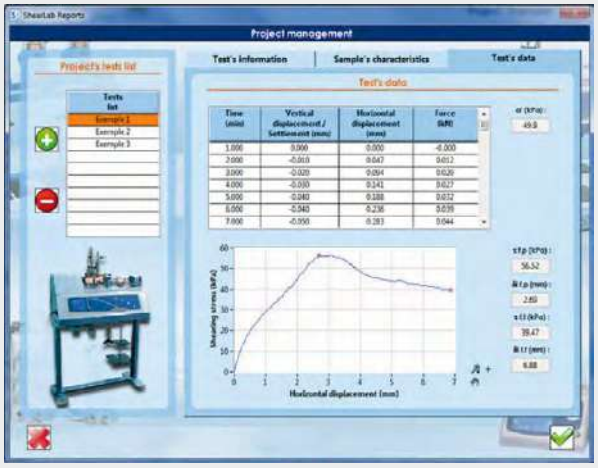
ShearLab Reports automatically draws the curves of shear and compaction, hence performing all the calculations required by the standard. Comments on the current project can also be added if necessary.

CHARTS:
- Shear stress (kPa) / Horizontal displacement (mm)
- Settlement (mm) / Horizontal displacement (mm)
- Shear strength (kPa) / Normal stress (kPa)

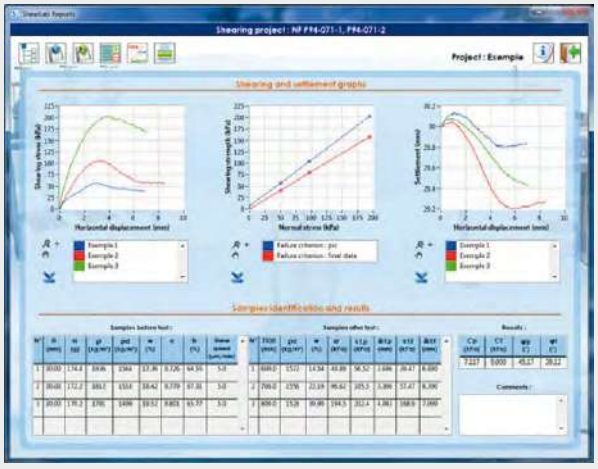
PC specification:
- Operating system: Windows XP or more recent.

Supplied complete with connection cable

S277-40N Data import



S277-40N Test data calculation



S277-40N Results preview

S278
SHEARMEC
AUTOMATIC ELECTROMECHANICAL SHEAR MACHINE
DIRECT AND RESIDUAL SHEAR TESTING

Shearmec is a machine designed to perform direct and residual shear tests in a fully automatic and reliable way, including consolidation phases, direct and residual shear.

The machine adopts robust electromechanical servo-controlled actuators which ensure a precise application of vertical and horizontal loads. The user-friendly interface allows the entire test to be set up while eliminating or reducing need for manual intervention to perform both standardized tests or tests for research purposes.

S278

MAIN FEATURES

- High performances for both standardized tests and tests for research purposes.
- Cyber-Plus Progress controller with 8 channels for an accurate setting of the vertical load, thanks to an electromechanical actuator placed under the shear box.
- Automatic calculation of the shear speed in compliance with standards.
- Automatic load frame release for removing of the shear box.
- Connection to SmartLab software for data processing and for remote control.
- Possibility to perform tests 24/7.

TECHNICAL SPECIFICATIONS

- Maximum horizontal force: up to 5 kN
- Maximum travel: 20 mm
- Shear speed: from 0.00001 to 15.0000 mm/min
- Maximum vertical load: up to 10 kN

Power supply: 230V 1ph 50-60Hz 200W
Dimensions: 1030x400x580 mm
Weight: 100 kg approx.

SHEARMEC SYSTEM INCLUDES:

S277-21 Load cell, electric, 5 kN capacity.
S277-22 Load cell, electric, 10 kN capacity.
S336-11 Linear vertical transducer, 10 mm travel.
S336-12 Linear horizontal transducer, 25 mm travel.
S277-31 Firmware activating 4 connectors for data acquisition.

FIRMWARE

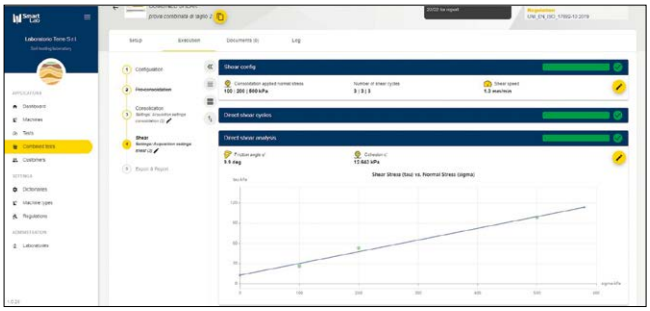
Shearmec automatically calculates the appropriate shear velocity to be applied to the specimen by selecting the optimal consolidation parameter among t50, t90 and t100, improving effciency and cost effectiveness.

Note: Shear box, hollow punch, tamper (see accessories at page 538) and Software Smartlab are not included and have to be ordered separately.

RECOMMENDED ACCESSORIES

SSW-SHEARA SMARTLAB SOFTWARE for shear test. For fully automatic data control, acquisition, processing and visualisation in direct/residual shear tests, with graphics on all the test phases.

SSW-LINKA SMARTLAB MODE ENABLE FOR AUTOMATIC MACHINES
Firmware and hardware upgrade of the machine allowing two-way communication and remote control with SmartLab software. It shall be installed by Matest engineer.

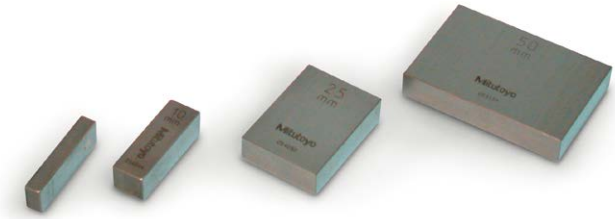


SmartLab software

GAUGE BLOCKS. Grade 1

Used to calibrate the linear displacement transducers.
Available models:

S336-41 Gauge block, nominal length 5 mm
S336-43 Gauge block, nominal length 10 mm
S336-45 Gauge block, nominal length 25 mm



S336-41 **S336-43** **S336-45** **S336-47**

SPARES

S335-15 Universal coupling pliers for dial gauge/transducer. It accepts all Matest displacement transducers and dial gauges (dia. from 8 to 20 mm)
S280-15 Mounting device between the universal coupling pliers S335-15 and the shear machine to fix the vertical displacement transducer or dial gauge
S280-16 Mounting device between the universal coupling pliers S335-15 and the shear machine to fix the horizontal displacement transducer or dial gauge

S280-16
S280-15
S335-15

S277-41N
SOFTWARE SHEARLAB CONNECT

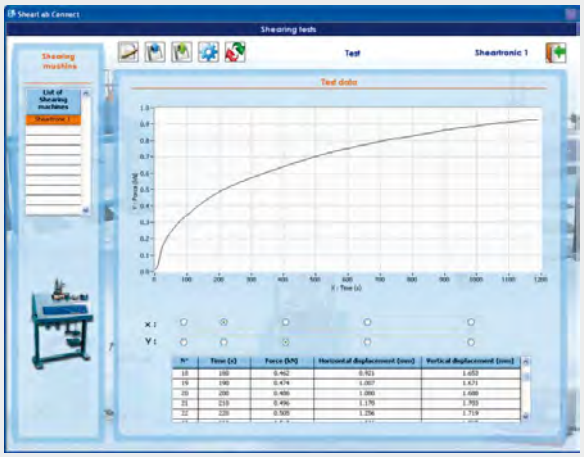
STANDARDS: ASTM D3080 | NF P94-071-1, P94-071-2 | BS 1377:7

ShearLab Connect is an extension of the ShearLab Reports S277-40N software, specifically designed for automatic data control, acquisition, processing and visualization of direct/residual shear tests.

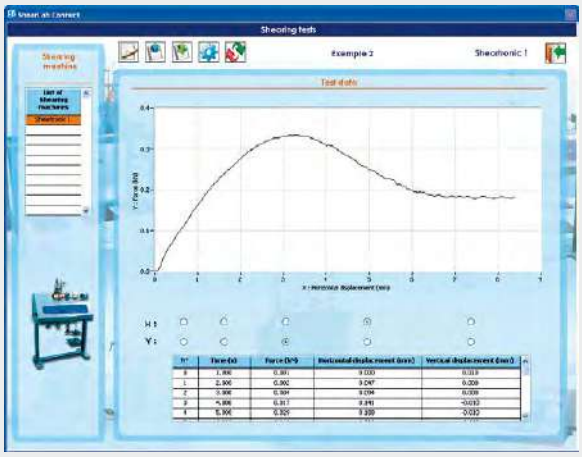
The file obtained can be then added to a project created with ShearLab Reports S277-40N, which features are detailed on p. 539

The program can be used in a very simple and intuitive way; a dedicated window allows to select the machine the user wants to work with while a test-specific setup guides the acquisition process, including data collection parameters that best fit the specific test. All test-specific initial, intermediate and final parameters are calculated based on input of specimen information, such as sample type (cylindric or square), sample diameter or width (mm), initial height of sample (mm), initial and final wet masses (g), dried mass after oven (g), applied load (kg), grain density (kg/m^3), consolidation time (min).

ShearLab Connect can be connected to one or more shearing machines, thus allowing automatic data control and acquisition during the test. Each Sheartronic is connected via LAN or serial cable to the PC



S277-41N Test-specific parameters

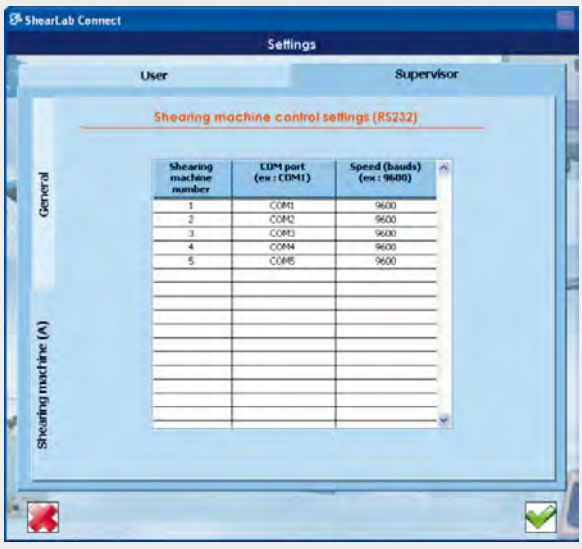


S277-41N Test-specific parameters

Displayed CHARTS (by selecting 2 of the following parameters):
- Time (s)
- Applied force (kN)
- Horizontal displacement (mm)
- Vertical displacement (mm)

PC specification:
- Operating system: Windows XP or more recent

Supplied complete with LAN cable.



277-41N Control settings

TRIAXIAL TESTS

STANDARDS: BS 1377:8 | ASTM D2850, ASTM D4767, ASTM D7181 | NF P94-070, NF P94-074 | CEN-ISO | TS 17892-8.9

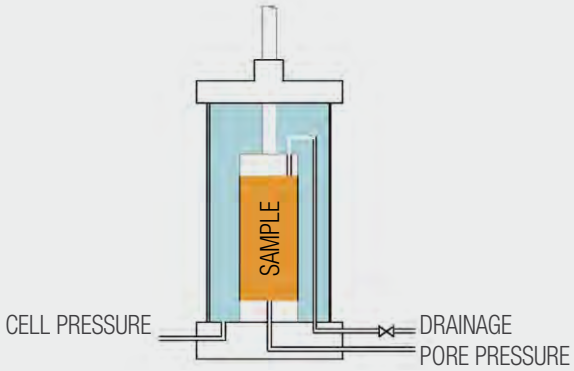
Introduction

A knowledge of stress-strain behaviour and the shear strength parameters of soils is required when soil is interacting with structures or when soil is used as a construction material in many engineering purposes such as:

1. Excavations
2. Shallow foundations
3. Piles and deep foundations
4. Earth retaining structures, diaphragm walls, anchors
5. Slope stability
6. Ground improvement
7. Design of embankments, earth dams

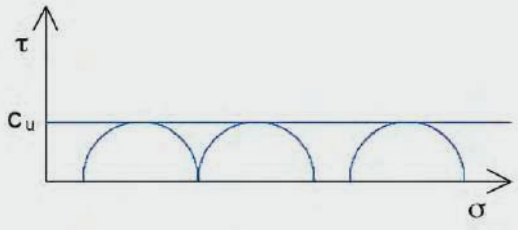
The most widely used testing apparatus for investigating the stress-strain behaviour and the strength parameters of soils is the triaxial apparatus.

Triaxial tests are typically performed with two stages: an isotropic loading followed by shear loading which is carried out up to failure. A cylindrical saturated soil sample, undisturbed or reconstituted, is placed in a rubber membrane in order to isolate it from direct contact with the surrounding water with which the testing cell is filled, and which is pressurized. The sample sits in the cell between a rigid base and a rigid top cap and is loaded by means of a ram, at a constant speed. The water drainage in or out the sample can be allowed by means of opening or closing a valve.
The two phases are carried out under different combinations of drainage conditions and give rise to 3 different standard triaxial tests. Each test is usually performed on three saturated specimens at three different confining pressures.



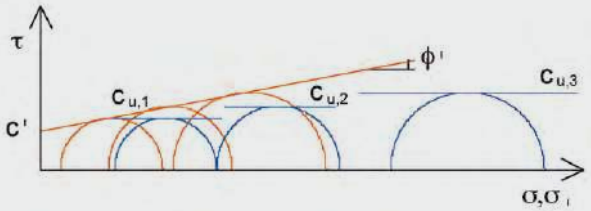
"UU" unconsolidated undrained test

This test is used in order to estimate the undrained shear strength parameters (undrained shear strength c_u and undrained friction angle $\phi_u = 0$). It is usually performed on fine grained soils. In this test, both phases are carried out with the drainage valve closed. No volume change is allowed during the test and distortions during the shear phase occur up to the failure. This test gives a unique value of undrained shear strength, as the envelope of the Mohr circles plotted in total stresses is horizontal. The angle ϕ_u has to be zero or it is an error in the test, e.g. poor saturation.
The stress-strain behaviour and the strength parameters are then used to model engineering problems when undrained conditions are present, typically in short term design.



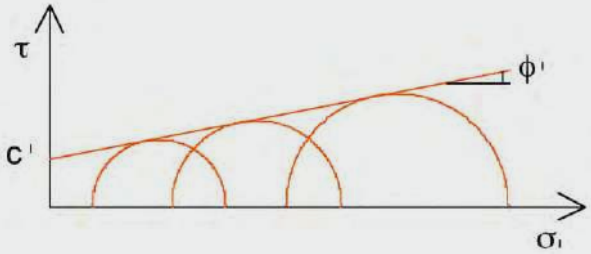
"CU" consolidated undrained test

This test is used in order to estimate the drained and undrained shear strength parameters (effective cohesion c', effective friction angle ϕ', and undrained shear strength c_u). It is usually performed on fine grained soils. In this test, the first phase is carried out with an open drainage valve in order to allow the consolidation and volume change to occur. During the second phase, the drainage valve is closed and the change of pore water pressure is measured; there is no volume change and distortions occur up to failure. It gives three values of undrained shear strength, which are the radii of the Mohr's circles, and the values of the effective cohesion and of the effective friction angle, which are derived from the envelope of the effective stress Mohr's circles. The stress-strain behaviour and the strength parameters are then used to model engineering problems when undrained conditions are present, after consolidation processes or in long term applications.



"CD" consolidated drained test

This test is used in order to estimate the effective shear strength parameters (effective cohesion c', effective friction angle ϕ'). It is usually performed on coarse grained soils. In this test, both phases are carried out with the drainage valve open. Volume change occurs in both phases and during the second phase, distortions occur up to failure. The CD test gives the values of the effective cohesion and of the effective friction angle, which are derived from the envelope of effective stress Mohr's circles. The stress-strain behaviour and the strength parameters are then used to model engineering problems when drained conditions are present, typically in long term design.



S301N
TRIAXIAL LOAD FRAME 50KN, DIGITAL TOUCH-SCREEN

This versatile, compact, heavy duty load frame has been designed for routine tests, for central laboratories, but also for research purposes.
The frame is of rigid chromed steel twin column construction.
The electronic color digital touch-screen display with microprocessor control system allows to perform tests within a speed range of 0.00001 to 12 mm/min.
The maximum load capacity is 50 kN, and it is suitable either for cells S305 (max. specimen size 70x140mm) and S306 (max. specimen size 100x200mm), Matest or other manufacturers made. The system guarantees high resolutions in real time.
The load plate is foreseen of electric end of stroke, to save the machine from wrong manipulations.

S301N with data acquisition

Frame Specifications:
- Maximum load capacity: 50kN
- Infinitesimal testing speed: from 0.00001 to 12 mm/min.
- Minimum vertical clearance: 400 mm (140 mm with ring)
- Maximum vertical clearance: 1100 mm (840 mm with ring)
- Horizontal clearance: 380 mm
- Platen diameter: 177 mm

Firmware:
- Electronic control unit “Cyber-plus Evolution” with Touch-Screen color graphic display ¼ VGA, that runs like a standard PC based on Windows operating system for the management of the data. (Analysis of the data, test results, graphs with S335-10N software; optional accessory).
- The Touch-Screen icon interface allows an easy set-up of the parameters and immediate execution of the test.
- The machine can perform the tests without any external PC, because of the “Cyber-Plus” grants performances like a PC.
- Direct connection to Intranet (connection to a LAN network) and Internet to establish a remote communication and receive an immediate diagnosis from Matest technicians, or for upgrades of the Firmware.
- Unlimited memory storage with: 2 USB ports, 1 SD card.
- Possibility to select different languages.
- Hardware technical details: see p. 18
- The machine is equipped with 8 connectors for the acquisition and data processing system up to 8 analogical/digital channels (that is activated with the S301-05 optional firmware) for load cells and transducers. Extra slot available to expand the on-board channels to 16 (with S301- 06)

S301N with load ring

The frame is supplied with loading ram and sphere, but **without** load rings, dial gauges, electric load cells or displacement transducers that **have to be ordered separately** (see next pages).

Power supply: 230V 1ph 50-60Hz 600W
Dimensions: 490x510xh1800 mm
Weight: 115 kg approx.

Note: Triaxial load frame 50kN is available also with wider variable speed range from 0.00001 to 100 mm/min. See model S301-02

Detail of the 8 connectors

UPGRADING ACCESSORIES

S301-05 FIRMWARE FOR ACQUISITION AND DATA PROCESSING
system up to 8 analogical/digital channels for load cells and transducers.
Graphic and numbers visualization, processing, printing and storing of the test results.
This software activates the 8 connectors foreseen on the load frame.

S301-06 8-CHANNEL INTERNAL MODULE, for system expansion to 16 channels of the triaxial load frame. This upgrade is possible only in Matest factory.

S335-10N SOFTWARE TRIAXLAB CONNECT & REPORTS See p. 554

S301-02
AVANT-GARDE
TRIAXIAL LOAD FRAME 50 KN
EXPANDED VARIABLE SPEED RANGE

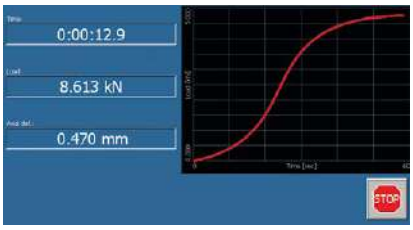
NEW

Matest Avant-garde is the new high-performance load frame specifically designed for advanced laboratories.
The expected variable speed range of this electro-mechanical machine **up to 100 mm/min** makes it suitable to perform Unconfined, CBR and Marshall tests other than standard triaxial tests.
This heavy-duty load frame has provision for automatic load and displacement/deformation control, thanks to the latest generation control board incorporated into the machine. Distinguished by its **elegant shape with rounded corners**, Avant-garde counts with a **touch-orientable display**, front mounted, which allows an easy and innovative control of the main functions and data acquisition, including detailed charts.
If desired, the display can be detached by using a dedicated Kit to allow on-spot complete test managing. This feature might be useful in cases where a direct overview of hardware is preferred (eg pre-saturation conditions checks during triaxial testing).

S301-02

MAIN FEATURES

- Maximum testing speed: 100 mm/min
- Maximum specimen diameter: 150 mm
- Maximum compression capacity: 50kN
- Suitable to perform Unconfined, CBR, Marshall and Standard Triaxial tests.
- 10 profiles, with a potential of 80 storable calibrations, for an immediate use of multiple sensors.
- Real time display of time, load, deformation, displacement and graph simultaneously.
- Responsive and precise control board.



Load vs time graph during triaxial testing

THECNICAL SPECIFICATIONS

HARDWARE
- Maximum Sample Diameter : 150 mm
- Minimum testing speed : 0.00001 mm/min
- Maximum testing speed : 100 mm/min
- Maximum compression force: 50 kN
- Minimum vertical clearance : 390 mm
- Maximum vertical clearance : 1100 mm
- Horizontal clearance : 380 mm
- Platen diameter : 177 mm
- Platen travel : 100 mm

Dimensions: (h x w x d) 1675x500x530 mm approx.
Power supply: 230V 1ph 50/60Hz 1500W
Weight: 130 kg approx.

FIRMWARE
- Display LCD, TFT, 800x480 pixels, 7 inches, graphic touchscreen
- 8 analog channels (24 bit) suitable for connection of load, displacement, deformation, LVDT, temperature (PT100, PT1000, NTC) transducers and strain gauges (by using an external adapter).
- Ethernet, RS232, RS485, 2 x USB Host-port.
- Slot for Micro SD

Triaxial test general settings

TRIAXIAL CELLS

Triaxial cells are provided in two different dimensions, mod. S305 and S306. Top and low cell caps are made in aluminium corodal alloy and the transparent cell cylinder is in high resistant acrylic material. The cell can be easily assembled and disassembled by means of quick clamping rods. In order to reduce as much as possible friction, a particular care is deserved during loading ram realisation. The low cell cap is supplied with "four inlet valves": back pressure, low drainage, pore pressure, cell pressure.
In order to measure the specimen axial deformation, an adjustable dial gauge or a displacement transducer is also provided.

Note: No top caps, base adapters, rubber membranes and sealing rings, porous stones, dial gauges, etc. are included and **should be ordered separately**. In the table all accessories for triaxial cells are listed.

S305 WITH ACCESSORIES **S306**

Models	S305	S306
Max. specimen size mm	Ø 70x140	Ø 100x200
Max. cell pressure	1700 kPa	1700 kPa
Overal dimensions mm	Ø 280x480	Ø 310x540
Weight kg	8	16

Note: Cell S305 can be also used also for specimens having diameter 50x100 and 38x76 mm with accessories of suitable diameter, but it is not suitable for 100x200 mm samples.

Note: Cell S306 can be also used also for specimens having diameter 70x140, 50x100 and 38x76 mm with accessories of suitable diameter.

MAXIMUM REACHABLE VERTICAL TOTAL STRESS:

Sample	Ø 38x76 mm	Ø 50x100 mm	Ø 70x140 mm	Ø 100x200 mm
Cell **S305**	~ 44 MPa	~ 25 MPa	~ 13 MPa	–
Cell **S306**	~ 44 MPa	~ 25 MPa	~ 13 MPa	~ 6 MPa

Accessories for Triaxial Cells:	Ø 38x76 mm	Ø 50x100 mm	Ø 70x140 mm	Ø 100x200 mm	Ø 150x300 mm
Rubber membrane (pack of 10)	**S310**	**S310-01**	**S310-02**	**S310-03**	**S310-04**
"O" ring (pack of 10)	**S311**	**S311-01**	**S311-02**	**S311-03**	**S311-04**
Membrane stretcher	**S312**	**S312-01**	**S312-02**	**S312-03**	**S312-05**
Split former	**S313**	**S313-01**	**S313-02**	**S313-03**	**S313-04**
Split mould NEW	**S313-10**	**S313-11**	**S313-12**	**S313-13**	**S313-14**
Top cap with drainage	**S314**	**S314-01**	**S314-02**	**S314-03**	**S314-04**
Base adapter for cell. mod. S305	**S315**	**S315-01**	**S315-02**	–	–
Base adapter for cell. mod. S306	**S315-04**	**S315-05**	**S315-06**	**S315-07**	–
Porous disc (2 pcs)	**S316**	**S316-01**	**S316-02**	**S316-03**	**S316-04**
Perspex plain disc (2 pcs)	**S317**	**S317-01**	**S317-02**	**S317-03**	**S317-04**
"O" ring for base adapter	**S318**	**S318-01**	**S318-02**	**S318-03**	**S318-04**
Filter paper for lateral drainage (50 pcs)	**S319**	**S319-01**	**S319-02**	**S319-03**	**S319-04**
Filter paper for base (100 pcs)	**S320**	**S320-01**	**S320-02**	**S320-03**	**S320-04**
Stainless core cutter	**S122-13**	**S122-14**	**S122-15**	**S122-16**	
Dolly for extraction	**S123-13**	**S123-14**	**S123-15**	**S123-16**	
Drainage burette, 10 ml cap.	**S321**	**S321**	**S321**	–	
Drainage burette, 50 ml cap.	–	–	–	**S322**	
Nylon tube Ø 6x4 (20 m)	**S325**	**S325**	**S325**	**S325**	
Terminal for connection tube (10 pcs)	**S326**	**S326**	**S326**	**S326**	
Flaring tool	**S327**	**S327**	**S327**	**S327**	
Vaseline oil (1000 ml)	**S328**	**S328**	**S328**	**S328**	
Silicon grease (1 kg)	**S329**	**S329**	**S329**	**S329**	
Grease pump	**S330**	**S330**	**S330**	**S330**	
Null displacement valve (spare)	**S331**	**S331**	**S331**	**S331**	

Note: Mod. S307 triaxial cell max. 150x300 mm for cyclic tests is described at p. 569

ACCESSORIES

RUBBER MEMBRANE, to isolate the specimen from cell water.

"O" RING, to seal the membrane around the top cap and the base adapter.

MEMBRANE STRETCHER, to stretch the membrane during its positioning, avoiding to disturb the specimen.

SPLIT FORMER, to prepare coarse grain soil specimens. It is made of two aluminium halves.

SPLIT MOULD, to trim the ends of undisturbed specimens. It is made of two aluminium halves. NEW

TOP CAP WITH DRAINAGE, to load the whole cross section area of specimen when drainage is required. It is made of anodized aluminium. Connector is provided.

BASE ADAPTER, used to adapt the triaxial cell to the specimen diameter. It is made of aluminium.

POROUS DISCS, to allow the drainage in or out of the specimen in the whole cross sectional area, toward the top cap and the lower base. Two pieces are required. They are made of phosphor bronze.

PERSPEX PLAIN DISCS, to replace porous discs in undrained tests. Two pieces are required. They are made of 10 mm thick Perspex.

FILTER PAPER FOR LATERAL DRAINAGE, for lateral drainage on low permeability specimens.

FILTER PAPER FOR BASE, to avoid passages of soil particles into the porous stones.

CORE CUTTER, to cut soil cohesive specimens in correct diameters from bigger samples. It is made of stainless steel with a cutting edge.

NEW

DOLLY FOR EXTRACTION, to extrude the specimen from the core cutter.

DRAIN BURETTE, to prepare coarse grain specimens by applying a negative pressure to the base of the specimen and to measure the water volume change in or out the specimen during testing with specimen open to the atmosphere. Two models are available: 10 ml capacity for specimens up to 70 mm ø and 50 ml for specimens up to 100 mm ø It is supplied with cell rod and cell couplings.

"O" RING FOR BASE ADAPTER, to seal the membrane on the base adapter and the top cap.

FLARING TOOL, to cut and prepare the ends of nylon tubes which have to be fixed to the suitable connectors.

S321...S331

MEASURE OF THE AXIAL FORCE APPLIED TO THE SPECIMEN

Three different equipments are available to measure the axial force applied to the specimen:

- **load proving rings (manual readings)**
- **load cells (automatic readings)**
- **submersible load cells (automatic readings and no friction effects)**

LOAD PROVING RINGS

Mechanical equipment for manual reading. In order to avoid any overload damage, an electrical safety device is supplied to stop the loading process when the maximum capacity of the ring is reached.
Technical details, other models and accessories see p. 573

Max Capacity load kN	Dial Gauge 0.01 mm	Dial Gauge 0.001 mm	Height mm	Weight kg
1	**S370-01S**	**S371-01S**	210	1.7
3	**S370-03S**	**S371-03S**	210	1.9
5	**S370-04S**	**S371-04S**	210	2
10	**S370-05S**	**S371-05S**	210	2.2
20	**S370-07S**	**S371-07S**	210	3
50	**S370-10S**	**S371-10S**	210	7.2

ACCESSORY

S374 **STEM MECHANICAL BRAKE DEVICE**
It keeps the max. reached value on the dial gauge and allows the manual zero setting.

ELECTRIC STRAIN GAUGE LOAD CELLS

Electrical equipment for automatic reading. The load cell must be connected to the automatic data acquisition system mod. S334 (see p. 559). Cable, connector and device to fix the load cell to the triaxial frame are supplied.
Rated output: 2 mV/V nominal
Accuracy: 0.1%

Models	Capacity
S337-31	2.5 kN
S337-35	5 kN
S337-32	10 kN
S337-33	25 kN
S337-34	50 kN

S337-34 **S337-32**

S370-03S **S371-07S**

SUBMERSIBLE LOAD CELLS

Submersible electrical equipment for automatic reading.
The submersible load cell must be placed inside the cell and connected to the automatic data acquisition system mod. S334 (see p. 559).
It is made of high quality materials. It is a sealed waterproof device with an excellent resistance to lateral forces.
It guarantees no friction effect of the ram. It is strongly recommended when high accuracy in testing is required.
It must be equipped with the loading ram mod. S337-21.
Rated output: 2 mV/V nominal
Accuracy: 0.1%
Non-linearity: 0.05%

Models	Capacity
S337-02	3 kN
S337-03	5 kN
S337-04	10 kN
S337-05	25 kN

ACCESSORIES

S337-21 LOADING RAM: Loading ram for submersible cells

S337-51 CALIBRATION PROCESS of one device that is combined with the acquisition/processing system mod. S334.
To be chosen among:
- displacement transducer mod.S336-11 to S336-22,
- electric load cell mod. S337-02 to S337-34.
Calibration certificate is supplied.

MEASURE OF THE AXIAL STRAIN

Two different equipments are available to measure the specimen axial displacement:

- Dial gauges (manual readings)

or:

- Displacement transducers (automatic readings)

DIAL GAUGES (manual readings)

S377 Dial gauge, 25x0.01 mm suitable for specimens of max. dimensions 50x100 mm

S379 Dial gauge, 50x0.01 mm suitable for specimens of max. dimensions 70x140 mm

S383 Dial gauge, 25.4x0.001 mm with RS 232 port for PC connection.

Note: For other requirements, dial and digital gauges with different maximum travel and sensibility are also available: see technical details at p. 574.

DISPLACEMENT TRANSDUCERS (automatic readings)

Electrical devices for automatic readings. Calibration certificate is supplied. Cable, connector and signal conditioner are provided.

TYPES OF AVAILABLE TRANSDUCERS:

TYPE "A": Accurate and versatile linear potentiometric displacement transducer,.
Indipendent linearity < 0.3% (0.3x10 mm)
Max. displacement speed: up to 10 m/s.

MODELS

S336-11 10 mm travel
S336-12 25 mm travel
S336-14 50 mm travel
S336-13 100 mm travel

TYPE "B": Linear Strain Gauge Transducer. It guarantees good repeatability and noise reduction.
Full bridge at 350 Ohm
Indipendent linearity < 0.1%
Standard sensitivity: 2 mV/V

MODELS

S336-18 5 mm travel
S336-15 10 mm travel
S336-16 25 mm travel
S336-17 50 mm travel

Note: The displacement transducers must be connected to the automatic data acquisition system mod. S334 (see p. 559) or mod. S301-05 (see p. 544).

ACCESSORIES for DISPLACEMENT TRANSDUCERS

S336-30 Extension cable 2 metres long
S336-31 Extension cable 5 metres long
S336-32 Extension cable 10 metres long

Note: It is recommended to use not more than 10 m of extension cable to avoid noise problems that might occur.

S335-15 Universal coupling pliers to hold the transducer/dial gauge. It fits all Matest displacement transducers and dial gauges (from Ø 8 mm to 20 mm).

S305-05 Mounting device of the universal coupling pliers mod. S335-15 to fix the displacement transducer/dial gauge to the Triaxial Cell mod. S305 or mod. S306

GAUGE BLOCKS. Grade 1
Used to calibrate the linear displacement transducers.

MODELS

S336-41 Nominal length 5 mm
S336-43 Nominal length 10 mm
S336-45 Nominal length 25 mm
S336-47 Nominal length 50 mm

PRESSURE SYSTEMS

Two different solutions are available:
- **Oil/Water motorized constant pressure system**
- **Air/Water interface system with air pressure regulator (to be connected to a pneumatic compressor)**

A144
OIL/WATER CONSTANT PRESSURE SYSTEM

This unit provides a constant pressure from 0 to 3500 kPa by using a motorized hydraulic pump, an oil/water interchange tank, ram/spring, valves and connectors, high viscosity oil.
Test pressure precision gauge, range 0-3500 kPa is supplied. To be noted that the maximum tolerable pressure in the cell is 1700 kPa.

Power supply: 230V 1ph 50Hz
Dimensions: 320x320x410 mm
Weight: 20 kg approx.

A144

S350N
AIR/WATER BLADDER PRESSURE SYSTEM

It provides a water pressure up to 1700 kPa. Simple, practical and extremely accurate system used to select test pressures, it can also offer the possibility to further system expansions.
The use of deaerated water is recommended. It must be connected to a pneumatic compressor as mod. S351N or mod. V207.
The cell set is equipped with an inlet high pressure air valve and 2 outlet valves for pressurized water and water.

Dimensions: 270x300x425 mm
Weight: 9 kg approx.

ACCESSORIES

S350-05N PRESSURE REGULATOR, high accuracy model, to preset and control the work pressure, complete with two outlet air valves.

S355-01 FILTER UNIT (water trap) composed by filtering device and interchangeable cartridge, used to collect moisture.

SPARE

S350-04 Membrane for air/water cell. Pack of 2 pieces.

S355-01 **S350-05N** **S350-04**

S350N

S351N
LABORATORY AIR COMPRESSOR

It reaches a maximum pressure of 15 bar and it must be used with the air/water interface cell.
Sucked air: 84 litre/minute.
Reservoir capacity: 3 litres.

Power supply:
230V 1ph 50Hz 0.75HP
Dimensions:
460x300x470 mm
Weight: 22 kg approx.

S351N

S350-08N
PRESSURE MULTIPLIER NEW

Made in anodized aluminum, this device doubles the hydraulic pressure output from the air/water pressure system (S350N) and it enables confined triaxial tests to be performed up to 20 bar whenever an air compressor capable of maintaining a pressure of 10 bar is used. The amplification factor is guaranteed by special testing and calibration performed in our facilities: output pressure (manometer of the pressure source) is multiplied by this factor. An autonomous digital manometer 0 – 20 bar is available as an option for direct readout of pressure. A bypass valve shuts off the amplification, so there is no need to remove the device from the line when not needed.

Maximum displacement: 400 cm^3
Dimensions: Ø150 x 350 (h) mm
Weight: 8 kg approx.

S350-08N

ACCESSORY

S342-06 Digital manometer scale 0-2000 kPa with battery supply.

S355
DE-AIRING TANK 20 LITRES CAPACITY

It produces de-aired water when connected to the vacuum pump. It is a perspex tank with an inlet water valve and an outlet air valve.
Tank capacity: 20 litres.

Dimensions: 320x320x520 mm
Weight: 15 kg approx.

S355

ACCESSORIES

V205 VACUUM PUMP

V205-10 - V205-12 VACUUM REGULATOR

V230-03 Rubber tube. Suitable for vacuum, 3 m

Note:
Other models of vacuum pumps described at p. 597

PRESSURE SYSTEM

S340
DIAL GAUGE UNITS 4 VALVES
TO MEASURE PRESSURE (0-1700 KPA)

4 inlet/outlet null displacement valves are supplied with the dial gauge. Used to measure water pressure as cell pressure or pore pressures. The dial gauge is set in a metallic support.
Pressure range: 0-1700 kPa.

Dimensions: 410x350x110 mm
Weight: 6 kg approx.

S340

S345
SCREW PUMP

It has to be connected to the pressure dial gauge unit and it is used to control water pressures by means of small screw rotations. It can decrease or decrease pressures as required.

Weight: 3 kg approx.

S345

S348 **S350-01**

S348
DISTRIBUTION UNIT

It is provided with 5 inlet/outlet valves with null variation of volume. All valves are connected to an aluminium support. It is used to deliver pressurized water to different lines.

Dimensions: 200x200x55 mm
Weight: 3 kg approx.

S350-01 Two-way distribution valve for air or water.

S342-01
2 WAYS PRESSURE PANEL

NEW

This pressure panel is designed to distribute the water pressure used in soil laboratory applications, such as automatic triaxial systems. The panel is constituted by two pressure lines fitted with high accurate regulators and pressure valves.

Dimensions: 416x430x181 mm
Weight: 10 Kg approx.

S342-06

S342-01

S342-02
3 WAYS PRESSURE PANEL

NEW

Identical to the S342-02 but fitted with three pressure lines.

Dimensions: 460x430x181 mm
Weight: 13 Kg approx.

S342-06

S342-02

ACCESSORY

S342-06 DIGITAL GAUGE to be fitted on S342-01 and S342-02. Resolution: 1 kPa

SPARES

S342-04 Pressure air regulator, 10 bar
S325 Nylon tube Ø 4x6 mm

PORE PRESSURE TRANSDUCER

It is a good reliability electronic device used to measure pore pressure. It requires a de-airing block. Every transducer must be connected to the automatic data acquisition system mod. S334 (see p. 559) or mod. S301-05 (see p. 544).

- Input voltage: 10 volts dc, Sensitivity range: 2 - 4 mV/V
- Accuracy: 0.15 fs
- Pressure connection: 0.25 BSP
- Protected against corrosive pore water pressure
- 2 metres cable and 5 pin plug included

MODELS

S336-50 Pressure transducer up to 1000 kPa
S336-51 Pressure transducer up to 2000 kPa

ACCESSORIES

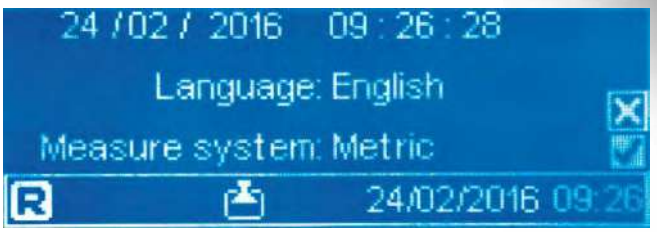
S336-55 De-airing block for pressure transducer

EXTENSION CABLE FOR TRANSDUCERS

MODELS

S336-30 2 metres long
S336-31 5 metres long
S336-32 10 metres long

Note: It is recommended to use not more than 10m of extension cable to avoid noise problems that might occur.



Channel configuration and calibration

S356N
2 CHANNELS UNIT FOR PORE PRESSURE MEASUREMENT

NEW

Based on a high resolution graphic display this instrument allows continuous control and monitoring of pore pressure measurements coming from pressure transducers.
Models like S336-50 or S336-51 supplied along with proper connection cable can be plugged into this new S356N readout so that manual triaxial tests can be performed without need of automatic data acquisition units or outdated mercury manometers.
S356N unit allows real time visualization of the pore pressure measurements and subsequent peak data recording through its dedicated peak function.

Technical specifications

- Measuring units (selectable): mbar, bar, MPa, kPa, psi
- Acquisition and data processing system at 24 bit, effective resolution: 17 bit.
- Operator interface composed by 5 multi-functions pushbuttons; function icons shown on the display
- The two analogue-digital channels accept sensors at 2mV/V
- Languages: see C108N at page 219...221
- Graphic display with high resolution: 192x64 pixels
- Class: 0.5% starting from 10% of maximum value

Power supply: 230V 1ph 50-60Hz
Dimensions: 230x145x240 mm
Weight: 4 kg approx

ACCESSORIES for S356N

- Pressure transducers, available models see p. 549
- De-airing block
- Extension cables for transducers

S356N+S336-50+S336-51

MEASURE OF VOLUME CHANGE

In order to measure volume changes during test, two solutions are proposed:

- **Double burette apparatus**
- **Standard or automatic volume gauge with displacement transducer or dial gauge.**

S358
DOUBLE BURETTE VOLUME CHANGE APPARATUS

It is composed by two measuring burettes which are placed inside a perspex tube and connected directly to a reverse valve system.
A by-pass valve is also included.
Capacity: 200ml
Accuracy: 0.2ml

Dimensions: 230x270x860 mm
Weight: 5 kg approx.

S358

S338N
VOLUME GAUGE

The unit consists of a metallic air/water interface. It measures the water volume changes inside the sample. It has to be used with linear strain transducer, or dial gauge.
Capacity: 100 ml
Accuracy: better than 0.1 ml.

Dimensions: 180x180x240 mm
Weight: 4.7 kg approx.

Easy de-airing of bottom and top chambers. No measuring device and mounting block are included (see accessories).

S338N

S338-01 KIT
AUTOMATIC VOLUME GAUGE

The unit consists of a 100 ml metallic air/water interface. A change valve box provides unlimited capacity.
Easy de-airing of top and bottom chambers. Displacement transducer, coupling pliers and mounting device are not included (see accessories)
Capacity : unlimited
Accuracy: better than 0.1 ml

Dimensions:
360x270x210 mm
Weight:
7.6 kg approx.

S338-01 KIT

Note:
The volume gauge has to be used with linear strain transducer which must be connected to the automatic data acquisition system mod. S334 (see p. 559) or mod. S301-05 (see p. 544).

ACCESSORIES for VOLUME GAUGES

S336-12 Displacement transducer 25 mm travel TYPE “A”
S336-16 Displacement transducer 25 mm travel TYPE “B”

Note: Technical data for all transducers: see p. 549

S335-15 Universal coupling pliers to hold the transducer/dial gauge. It fits all Matest displacement transducers and dial gauges (from Ø 8 mm to 20 mm).

S338-05 Mounting device of the universal coupling pliers mod. S335-15 to fix the displacement transducer/dial gauge to the volume gauge.

S359
THREE-CELLS CONSOLIDATION FRAME

It is used to apply a constant axial load to three specimens, at the same time. It performs an anisotropic consolidation stage reducing the consolidation testing times.
It is made of a resistant metallic structure which accepts up to 3 triaxial cells for specimens dia. 38 mm up to 100 mm, and it is provided with centering plate cells.
Load can be applied through an hanger with two different ratios:
- Ratio 1:1 (directly), maximum load for each cell: 50 kg
- Ratio 5:1 (by means of a lever), maximum load for each cell: 250 kg

Dimensions: 2300x400x1800 mm
Weight: 150 kg approx.

ACCESSORIES

S273 KIT Set of slotted weights 50 kg

S377 Dial gauge, 25x0.01 mm suitable for specimens of max. dimensions 50x100 mm
S379 Dial gauge, 50x0.01 mm suitable for specimens of max. dimensions 70x140 mm

As an alternative:

S336-12 Displacement transducer 25 mm travel
S336-14 Displacement transducer 50 mm travel

S359 with accessories

S335-10N
SOFTWARE TRIAXLAB CONNECT & REPORTS

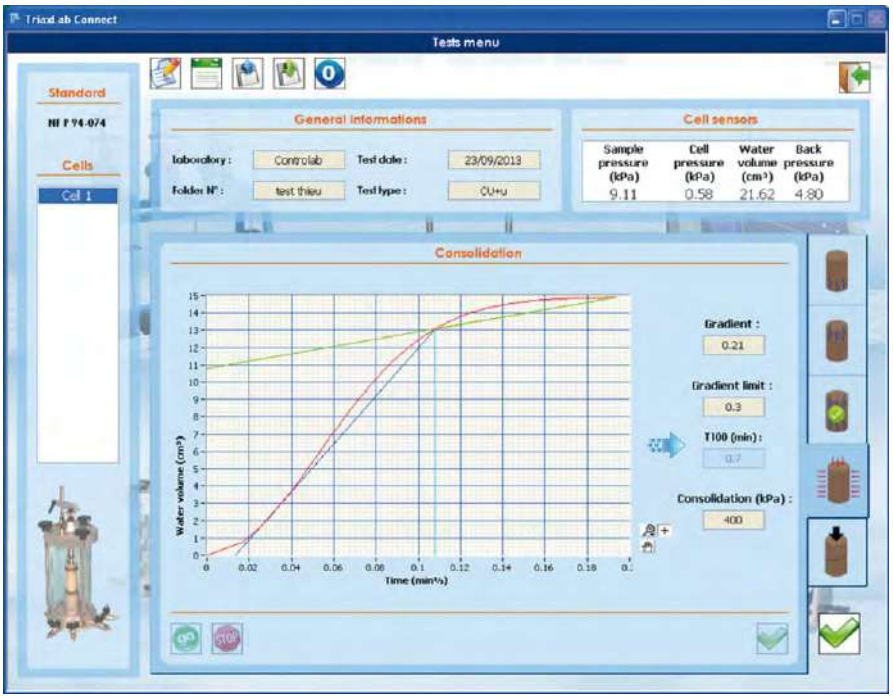
STANDARDS: NF P94-070, P94-074 I ASTM D2850-03a, D4767-95, D7181-11 I BS 1377:8

TriaxLab Connect is the new acquisition software for Matest triaxial systems. This software allows the user to:

- Configure the acquisition parameters necessary to conduct the test
- Perform all of the 3 steps of a triaxial test (saturation, consolidation and shearing)
- Calculate the t100 value used for the shearing speed
- Record data for each calculation step
- Save test data and test parameters

Hence, the files created by this software can be used in TriaxLab Reports to generate a report by selecting the dedicated Standards.

Both Connect and Reports programs can be used in a very simple and intuitive way. Thanks to a suitable window, TriaxLab Reports gives the opportunity to perform calculations for all triaxial tests (UU, CU+u or CD).



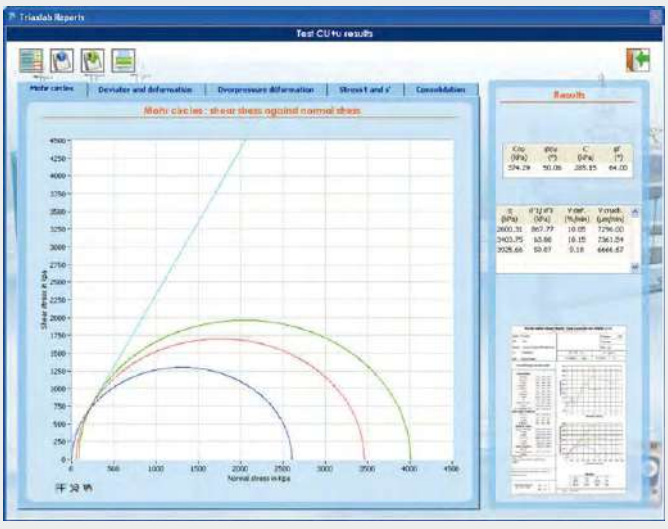
S335-10N Consolidation step in TriaxLab Connect

The software provides the user with a simple and flexible graphical interface, giving the possibility to view, edit and print all the parameters involved in triaxial tests.

Laboratory coefficients of:
- Saturation
- Consolidation
- Shearing

CHARTS:
- Water Volume (cm3) / Square-root Time (min)
- Press Load (kN) / Press Displacement (mm)
- Deviator Stress (kPa) / Axial Strain (%)
- Pore Pressure (kPa) / Axial Strain (%)
- Shear Stress (kPa) / Normal Stress (kPa)
- Volume Deformation (%) / Axial Strain (%)
- Stress t' (kPa) / Stress s' (kPa)
- Effective Principal Stress Ratio / Axial Strain (%)

PC specification:
- Operating system: Windows XP or more recent



S335-10N Test CU+u results in TriaxLab Reports

RECOMMENDED TYPICAL CONFIGURATION OF THE TRIAXIAL SYSTEM WITH ONE CELL IN ANALOGUE, DIGITAL AND DIGITAL WITH SUBMERSIBLE LOAD CELL VERSIONS

APPARATUS SECTION	ITEM CODE	ITEM DESCRIPTION	ALTERNATIVE ITEM	ANALOGUE CELL SET	DIGITAL CELL SET	DIGITAL CELL SET with Submersible Load Cell
Hardware	**S301N**	digital triaxial load frame 50 kN		1	1	1
Software	**S301-05**	acquisition and data processing		-	1	1
	S305	triaxial cell dia max. 70 x 140 mm	S306	1	1	1
	S335-10N	software triaxlab reports - Matest Made		-	1(opt)	1(opt)
Measure of	**S370-05S**	load proving ring 10 kN	S370/1-xxS	1	-	-
Axial force	**S374**	stem mechanical brake device		1(opt)	-	-
	S337-32	electric load cell 10 kN capacity	S377-31..34	-	1	-
	S337-04	submersible load cell 10 kN	S337-02..05	-	-	1
	S337-21	loading ram for submersible cell		-	-	1
	S337-51	calibration process for load cell		-	1(opt)	1(opt)
Measure of	**S377**	dial gauge 25 mm	S379	1	-	-
Axial strain	**S336-12**	displacement transducer 25 mm	S336-16	-	1	1
	S336-31	extension cable 5 m	S336-30..32	-	1	1
	S335-15	universal coupling pliers		1	1	1
	S305-05	mounting device for pliers		1	1	1
	S337-51	calibration process for displacement transducer		-	1(opt)	1(opt)
	S336-45	gauge block 25 mm	S336-41..47	-	1(opt)	1(opt)
De-aired	**S355**	de-airing tank		1	1	1
water system	**V205**	vacuum pump		1	1	1
	V205-10	vacuum regulator		1	1	1
	V205-12	moisture filter		1	1	1
	V230-03	rubber tube 3 m		1	1	1
Pore pressure	**S350N**	air/water interface pressure system	A144	2	2	2
system and	**S351N**	laboratory air compressor 17 bar (only if S350N system is chosen)	V207	1	1	1
measure	**S350-04**	membrane for air/water cell (spare) (only if S350N system is chosen)		1(opt)	1(opt)	1(opt)
	S350-05N	pressure regulator (only if S350N system is chosen)		2	2	2
	S355-01	filter unit		1	1	1
	S340	dial gauge unit 4 valves (only if S350N system is chosen)	S342-01 + S342-06	2	2	2
	S345	screw pump (only if S340 is chosen)		2	2	2
	S348	distribution unit		-	-	-
	S350-01	2-way distribution valve		5	5	5
	S336-51	pore pressure transducer 2000 kPa (cell pressure + pore + back pressure)	S336-50	-	3	3
	S336-55	de-airing block		-	3	3
	S336-31	extension cable 5 m	S336-30..32	-	3	3
	S356N	digital pore pressure readout		1(opt)	-	-

Measure of Volume change	**S358**	double burette system	S338N	1	-	-
	S377	dial gauge 25 mm (only if S338N system is chosen)		1	-	-
	S335-15	universal coupling pliers (only if S338N system is chosen)		1	-	-
	S338-05	mounting device for pliers (only if S338N system is chosen)		1	-	-
	S338-01 KIT	automatic volume gauge	S338N	-	1	1
	S336-12	diplacement transducer 25 mm	S336-16	-	1	1
	S336-31	extension cable 5 m	S336-30..32	-	1	1
	S335-15	universal coupling pliers		-	1	1
	S338-05	mounting device for pliers		-	1	1
	S337-51	calibration process for displacement transducer		-	1(opt)	1(opt)
Specimen preparation and Accessories	**S310**	rubber membrane (10 pcs) (accordingly to specimen dimensions)	S310-01..03	1+	1+	1+
	S311	“O” ring (10 pcs) (accordingly to specimen dimensions)	S311-01..03	1+	1+	1+
	S312	membrane stretcher (accordingly to specimen dimensions)	S312-01..03	1	1	1
	S313	split former (accordingly to specimen dimensions)	S313-01..03	1	1	1
	S313-10	split mould (accordingly to specimen dimensions)	S313-11..13	1	1	1
	S314	top cap with drainage (accordingly to specimen dimensions)	S314-01..03	1	1	1
	S315	base adapter for cell (accordingly to cell model and specimen dimensions)	S315-01..07	1	1	1
	S316	porous disc (2 pcs) for CD/CU/UU tests (accordingly to specimen dimensions)	S316-01..03	1	1	1
	S317	plain disc (2 pcs) for UU test only (accordingly to specimen dimensions)	S317-01..03	1	1	1
	S318	“O” ring for base adapter (accordingly to specimen dimensions)	S318-01..03	1+	1+	1+
	S319	filter paper for lateral drainage (50 pcs) (accordingly to specimen dimensions)	S319-01..03	1+	1+	1+
	S320	filter paper for base (100 pcs) (accordingly to specimen dimensions)	S320-01..03	1+	1+	1+
	S122-13	stainless core cutter (accordingly to specimen dimensions)	S122-14..16	1	1	1
	S123-13	dolly for extraction (accordingly to specimen dimensions)	S123-14..16	1	1	1
	S321	drainage burette 10 ml	S322	1	1	1
	S325	nylon tube Ø 6x4 (20 m)		3	3	3
	S326	terminal for connection tube (10 pcs)		1+	1+	1+
	S327	flaring tool		1	1	1
	S328	vaseline oil (1 kg)		1+	1+	1+
	S329	silicon grease (1 kg)		1+	1+	1+
	S330	grease pump		1	1	1
	S331	null displacement valve (spare)		1(opt)	1(opt)	1(opt)
	S332-02	wearable material and recommended spares (accordingly to cell set)	S332-02..05	1	1	1

RECOMMENDED TYPICAL CONFIGURATION OF THE TRIAXIAL SYSTEM WITH THREE CELL IN ANALOGUE, DIGITAL AND DIGITAL WITH SUBMERSIBLE LOAD CELL VERSIONS

APPARATUS SECTION	ITEM CODE	ITEM DESCRIPTION	ALTERNATIVE ITEM	3 ANALOGUE CELL SET	3 DIGITAL CELL SET	3 DIGITAL CELL SET with Submersible Load Cell
Hardware	**S301N**	digital triaxial load frame 50 kN		1	1	1
Software	**S301-05**	acquisition and data processing		-	1	1
	S334N	Cyber-plus progress touch screen		-	1	1
	S334-01	8-channel internal module, for system expansion to 16 channels		-	1	1
	S334-11	network connection RJ45 cable		-	1	1
	S334-12	switch to connect from 2 up to 7 Cyber-Plus to the Ethernet network		-	1	1
	S305	triaxial cell dia max. 70 x 140 mm	S306	3	3	3
	S359	3 cell consolidation frame		1	1	1
	S273 KIT	set of slotted weights 50 kg		3	3	3
	S335-10N	software triaxlab reports - Matest Made		-	1 (opt)	1 (opt)
Measure of Axial force	**S370-05S**	load proving ring 10 kN	S370/1-xxS	1	-	-
	S374	stem mechanical brake device		1 (opt)	-	-
	S337-32	electric load cell 10 kN capacity	S377-31..34	-	1	-
	S337-04	submersible load cell 10 kN	S337-02..05	-	-	1
	S337-21	loading ram for submersible cell		-	-	1
	S337-51	calibration process for load cell		-	1 (opt)	1 (opt)
Measure of Axial strain	**S377**	dial gauge 25 mm	S379	4	-	-
	S336-12	displacement transducer 25 mm	S336-16	-	4	4
	S336-31	extension cable 5 m	S336-30..32	-	4	4
	S335-15	universal coupling pliers		4	4	4
	S305-05	mounting device for pliers		4	4	4
	S337-51	calibration process for displacement transducer		-	4 (opt)	4 (opt)
	S336-45	gauge block 25 mm	S336-41..47	-	1 (opt)	1 (opt)
De-aired water system	**S355**	de-airing tank		1	1	1
	V205	vacuum pump		1	1	1
	V205-10	vacuum regulator		1	1	1
	V205-12	moisture filter		1	1	1
	V230-03	rubber tube 3 m		1	1	1
Pore pressure system and measure	**S350N**	air/water interface pressure system	A144	6	6	6
	S351N	laboratory air compressor 17 bar (only if S350N system is chosen)	V207	1	1	1
	S350-04	membrane for air/water cell (spare) (only if S350N system is chosen)		1 (opt)	1 (opt)	1 (opt)
	S350-05N	pressure regulator (only if S350N system is chosen)		6	6	6
	S355-01	filter unit		1	1	1
	S340	dial gauge unit 4 valves (only if S350N system is chosen)	S342-02 + S342-06	3	3	3
	S345	screw pump (only if S340 is chosen)		3	3	3
	S348	distribution unit		3	3	3
	S350-01	2-way distribution valve		6	6	6
	S336-51	pore pressure transducer 2000 kPa (cell pressure + pore + back pressure)	S336-50	-	9	9
	S337-51	calibration process for load cell		-	9	9
	S336-55	de-airing block		-	9	9
	S336-31	extension cable 5 m	S336-30..32	-	9	9

	S356N	digital pore pressure readout		2 (opt)	-	-
Measure of	**S358**	double burette system	S338N	3	-	-
Volume change	**S377**	dial gauge 25 mm		3	-	-
		(only if S338N system is chosen)				
	S335-15	universal coupling pliers		3	-	-
		(only if S338N system is chosen)				
	S338-05	mounting device for pliers		3	-	-
		(only if S338N system is chosen)				
	S338-01 KIT	automatic volume gauge	S338N	-	3	3
	S336-12	diplacement transducer 25 mm	S336-16	-	3	3
	S336-31	extension cable 5 m	S336-30..32	-	3	3
	S335-15	universal coupling pliers		-	3	3
	S338-05	mounting device for pliers		-	3	3
	S337-51	calibration process for displacement transducer		-	3 (opt)	3 (opt)
Specimen	**S310**	rubber membrane (10 pcs)	S310-01..03	1+	1+	1+
preparation		(accordingly to specimen dimensions)				
and Accessories	**S311**	“O” ring (10 pcs)	S311-01..03	1+	1+	1+
		(accordingly to specimen dimensions)				
	S312	membrane stretcher	S312-01..03	1	1	1
		(accordingly to specimen dimensions)				
	S313	split former	S313-01..03	1	1	1
		(accordingly to specimen dimensions)				
	S313-10	split mould	S313-11..13	1	1	1
		(accordingly to specimen dimensions)				
	S314	top cap with drainage	S314-01..03	3	3	3
		(accordingly to specimen dimensions)				
	S315	base adapter for cell	S315-01..07	3	3	3
		(accordingly to cell model and specimen dimensions)				
	S316	porous disc (2 pcs) for CD/CU/UU tests	S316-01..03	3	3	3
		(accordingly to specimen dimensions)				
	S317	plain disc (2 pcs) for UU test only	S317-01..03	1	1	1
		(accordingly to specimen dimensions)				
	S318	“O” ring for base adapter	S318-01..03	1+	1+	1+
		(accordingly to specimen dimensions)				
	S319	filter paper for lateral drainage (50 pcs)	S319-01..03	1+	1+	1+
		(accordingly to specimen dimensions)				
	S320	filter paper for base (100 pcs)	S320-01..03	1+	1+	1+
		(accordingly to specimen dimensions)				
	S122-13	stainless core cutter	S122-14..16	1	1	1
		(accordingly to specimen dimensions)				
	S123-13	dolly for extraction	S123-14..16	1	1	1
		(accordingly to specimen dimensions)				
	S321	drainage burette 10 ml	S322	1	1	1
	S325	nylon tube Ø 6x4 (20 m)		9	9	9
	S326	terminal for connection tube (10 pcs)		2+	2+	2+
	S327	flaring tool		1	1	1
	S328	vaseline oil (1 kg)		1+	1+	1+
	S329	silicon grease (1 kg)		1+	1+	1+
	S330	grease pump		1	1	1
	S331	null displacement valve (spare)		1 (opt)	1 (opt)	1 (opt)
	S332-02	wearable material and recommended spares	S332-02..05	1	1	1
		(accordingly to cell set)				

AUTOMATIC DATA ACQUISITION AND PROCESSING SYSTEM FOR GEOTECHNICAL TESTS

S334
DATATRONIC 8 CHANNELS CYBER-PLUS EVOLUTION TOUCH SCREEN EXPANDABLE TO 16 CHANNELS

Controller for MATEST equipment or for other manufacturers machines

S334

S301N Triaxial UU - CU - CD tests

S260 Consolidation test

S276 Direct/Residual shear tests

S290 Consolidation frame for shear boxes and consolidation cells

S359 Consolidation frame for triaxial specimens

S334
DATATRONIC 8 CHANNELS CYBER-PLUS EVOLUTION TOUCH SCREEN
EXPANDABLE TO 16 CHANNELS

This unit is designed and produced to satisfy the requirements of all laboratories, from the small, up to the most complex.
8 channels acquisition and processing data system (expandable to 16 channels, see accessory mod. S334-01), colour "Touch Screen" display, it automatically performs test and data processing. Directly connected to PC via USB, it prints the test certificate. Equipped with slots for external Pendrive or SD Card infinite memory supports. Hardware technical details at p. 18.
One or more cyber-plus (8 or 16 ch) can be connected to create a network multichannel system. A flexible, customizable and infinitely expandable solution.
Data collection is completely automatic, improving considerably the productivity and cost effectiveness.
Windows based program with menu driven command selection, is straightforward and easy to follow and does not require a skilled operator.

The system can be used for:
- Oedometer (consolidation) tests
- Direct and residual shear tests (cycle test)
- Triaxial UU, CU, CD tests
- Automatic data acquisition and processing systems permit the utilization of different channels that can be independently calibrated, zeroed and set up in order to visualize the units being measured;
- The appliances contain a modern high speed - high performing 24 bit conversion device;
- The appliances permit to acquire the signals coming from different types of transducers:
- Strain Gauge Bridge and Potentiometric Wide input range available for the electrical signal:
  ± 40 mV ... ± 3 V
- User interface:
  Full-color display 320×340 pixel – Touchscreen
- Data storage:
  The data test can be stored directly into the appliance on a flash memory and be transferred to the PC at the end of the test by USB pendrive or SD card
- Every channel can be set with different sampling modes (linear form, quadratic form, logarithmic form, etc.). The sampling process can be executed with different frequencies: from 50 ms to infinite
- The calibration data are protected by password and they can be transferred to external supports archives.

Power supply: 230V 1ph 50Hz
Dimensions: 260x260x155 mm
Weight: 5 kg approx.

ACCESSORIES

S334-01 8-CHANNEL INTERNAL MODULE, for system expansion to 16 channels.

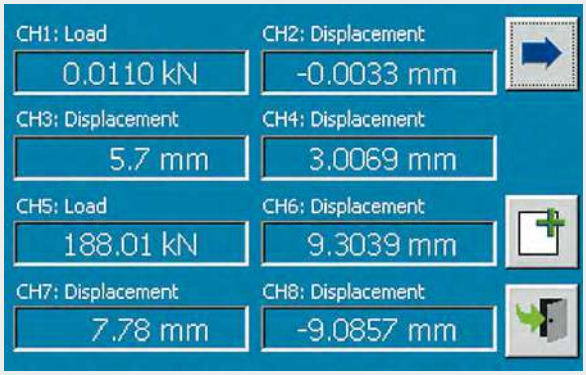
S334-11 NETWORK CONNECTION RJ45 cable.

S334-12 SWITCH to connect from 2 up to 7 Cyber-Plus (mod. S334) to the Ethernet network.

S334-12

S334-11

System expansion to 16 channels. **S334-01**



S334 output channels and readings

TRIAXLAB AUTOMATED SYSTEM

STANDARDS: BS 1377:7, BS 1377:8 | ASTM D2850, D4767, D7181 | NF P94-070, P94-074 | CEN-ISO-TS 17892

NEW

MAIN FEATURES

- Automatic execution of 5 independent triaxial tests from start to finish.
- Type of tests: total and effective stress, standard stress path, optional K0 and optional permeability.
- Servo feedback controlled precision pressure (Pressurematic) generation system.
- Real time graphing and configurable real time transducers.
- Pre-programmed user-friendly “Method files” through the TestLab Software.
- Compact and versatile for improving productivity and cost effectiveness.
- No need of air source.

TriaxLab Automated System

Matest TRIAXLAB is an outstanding system specifically designed for advanced soil testing.
This system can be used from educational to construction engineering laboratories to reduce to the absolute minimum any form of manual intervention.

Based on the unparalleled performance of CDAS and flexibility of TestLab Software, the new MATEST TriaxLab Automated System is the optimized system to perform automatically total and effective triaxial tests such as:

- CD Consolidated Drained test
- CU Consolidated Undrained test
- UU Unconsolidated Undrained test
- Standard stress path
- Optional K0 tests
- Optional Permeability tests

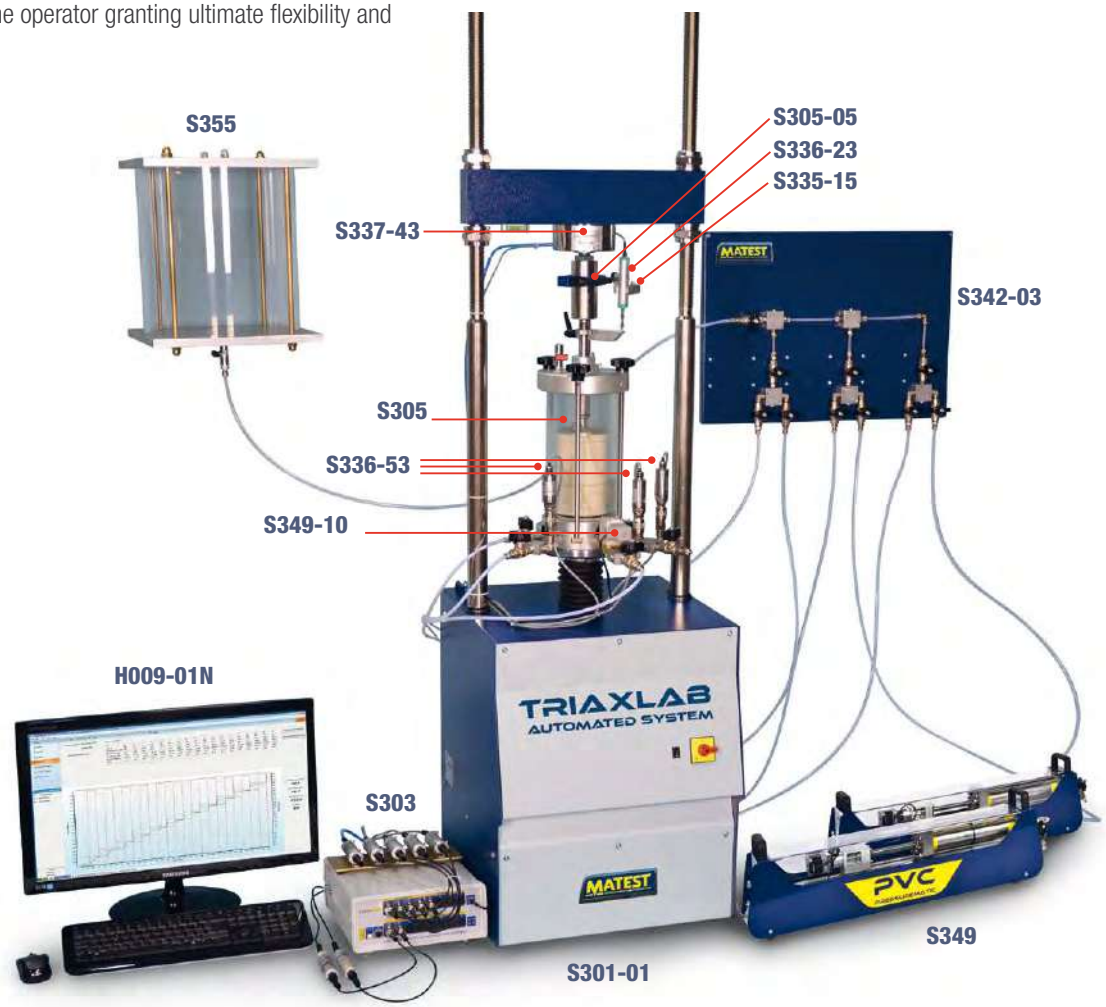
The **TRIAXLAB automated system** basically consists of 3 major groups:

- **Load frame and triaxial cell** with accessories
- **Control system** based on the CDAS Control and Data Acquisition System and TestLab Software controlled by PC
- **Data Acquisition System** comprising:
  - 1 load cell for axial force
  - 1 displacement transducer for axial displacement
  - 2 pressure transducers for cell pressure and back pressure
  - 1 pressure transducer for pore pressure
  - 2 Pressurematic for pressure / volume change

To suit the specific customer's requirements the MATEST TriaxLab Automated System basic configuration can be modified by adding or removing the hardware elements which are controlled and monitored under a closed-loop integrated system with the CDAS and TestLab Software.
Pre-programmed "Method files" offer the operator the unique opportunity to run a range of tests without the need for specific computer programming. The possibility to customize the Method files is also given to the operator granting ultimate flexibility and versatility.

MAIN FEATURES

- POWERFUL
  Equipped with Pavetest's leading edge Control and Data Acquisition System (CDAS) and TestLab Software.
- VERSATILE
  Designed for routine tests, central laboratories and for research purposes.
- GREAT EFFICIENCY
  By working in complete automatic mode, it reduces to absolute minimum the manual intervention.
- EASY TO USE
  The system works via the pre-programmed Method Files.
- FLEXIBLE
  Multiple triaxial tests with no need for compressed air supply.



TRIAXLAB AUTOMATED SYSTEM
ORDERING INFO:

HARDWARE - SOFTWARE

S301-01
DIGITAL TRIAXIAL LOAD FRAME 50 KN

Technical Specifications:
Maximum load capacity: 50 kN
Infinitesimal testing speed:
from 0.00001 to 12 mm/min
Minimum vertical clearance: 400 mm
Maximum vertical clearance: 1100 mm
Horizontal clearance: 380 mm
Platen diameter: 177 mm
Power Supply: 230V 1ph 50/60Hz 600W

S303
CDAS AND TESTLAB SOFTWARE

Technical Specifications:
Acquisition 16 Channels 20 bit resolution
Sampling rate up to 192 kHz
(all channels)
Smoothing up to 64 times over-sampling
Calibration Automatically on power up
Control Axis 4
Communication USB or Ethernet
Power supply:
90-264 V 50/60 Hz 1 ph 240 W
Dimensions: 100(h) x 310(d) x 250(w) mm

S305
TRIAXIAL CELL MAX. Ø 70X140 MM

Technical Specifications:
Max. specimen size: mm Ø 70x140
Max. cell pressure: 1700 kPa
Overall dimensions: mm Ø 280x480
Weight: 8 kg approx.

S306
TRIAXIAL CELL MAX. Ø 100X200 MM

Technical Specifications:
Max. specimen size: mm Ø 100x200
Max. cell pressure: 1700 kPa
Overall dimensions: mm Ø 310x540
Weight: 16 kg approx.

S307
TRIAXIAL CELL MAX. Ø 150X300 MM

Technical Specifications:
Max. specimen size: mm Ø 150x300
Max. cell pressure: 2200 kPa
Overall dimensions: mm Ø 338x648
Weight: 40 kg approx.
See p. 569

MEASURE OF AXIAL FORCE

S337-43
LOAD CELL 25 KN WITH SIGNAL CONDITIONER

Rated output: 2 mV/V nominal
Accuracy: 0.1%

S337-41
LOAD CELL 50 KN WITH SIGNAL CONDITIONER

Rated output: 2 mV/V nominal
Accuracy: 0.1%

MEASURE OF AXIAL STRAIN

S336-23
TRANSDUCER TYPE "A" TRAVEL 25 MM WITH SIGNAL CONDITIONER

Independent linearity: <0.3% (0.3 x 10 mm)
Max. displacement speed: up to 10 m/S

Note: For different requirements load cells capacity and transducers stroke or submersible load cells, see page 548

ACCESSORIES

S305-05
Mounting device of the universal coupling pliers mod. S335-15 to fix the displacement transducer/dial gauge to the Triaxial Cell.

S335-15
Universal coupling pliers to hold the transducer/dial gauge. It fits all Matest displacement transducers and dial gauges (from dia. 8mm to 20mm).

S337-51
Calibration process of one force, strain and pressure device that is combined with the CDAS control and data acquisition system.

S305 with accessories

DEAIRED WATER SYSTEM

S355
DE-AIRING TANK 20 LITRES CAPACITY

It produces de-aired water when connected to the vacuum pump. It is a perspex tank with an inlet water valve and an outlet air valve.
Tank capacity: 20 litres.
Dimensions: 320x320x520 mm
Weight: 15 kg approx.


S355

ACCESSORIES

V205
VACUUM PUMP
To produce vacuum up to of 0,1 mbar
(see p. 597)

V205-10 - V205-12
VACUUM REGULATOR
It is supplied with vacuum gauge, control valve, suction filter and moisture trap.

V230-03
Rubber tube. Suitable for vacuum, 3 m

MEASURE OF PORE PRESSURE SYSTEM AND VOLUME CHANGE

S349
PRESSUREMATIC PVC FOR AUTOMATIC PRESSURE AND VOLUME CONTROL

Technical Specifications:
Output pressure: 3500 kPa
Volume capacity: 250 cc. Details at p. 565

NEEDED ACCESSORIES

S336-53 Pressure transducer 2000 kPa with signal conditioner.
S336-55 De-airing block for pressure transducer
S349-10 Solenoid valve

OPTIONAL ACCESSORIES

S342-03 3 ways water distribution panel

S303
CDAS – CONTROL AND DATA ACQUISITION SYSTEM

NEW

S303 CDAS 16 Channels

MAIN FEATURES

- Directly communicates with the TestLab software, providing automatic test execution and data processing.
- Compact high reliability data acquisition and control.
- Up to 5 kHz data acquisition and feedback control provides excellent waveform fidelity.
- Normalized (±10V) analog data acquisition inputs provide flexibility to use any transducer in any channel.
- Software and test methods expandable for future requirements.

Pavetest's compact Control and Data Acquisition System (CDAS) delivers unparalleled performance, real time control and ultimate versatility in acquisition and provide a flexible and user friendly testing solution for soils when coupled with the Matest TriaxLab Automated System and the Cyclic TriaxLab Automated one.

The CDAS provides excellent waveform fidelity from integrated acquisition and control functions, with low level sampling at speeds of up to 192,000 samples per second simultaneously on all channels (using up to 64x oversampling).

S303 CDAS provides an optimized solution for the TriaxLab Automated Systems. The CDAS works with close synchronization to the TestLab software providing dynamic and precise servo control of the TriaxLab frame, Pressurematic systems. Acquisition and control is provided for:

- Vertical load and displacement
- Confining and back pressure (through the solenoid valve)
- Volume change and water pressures
- Local strain

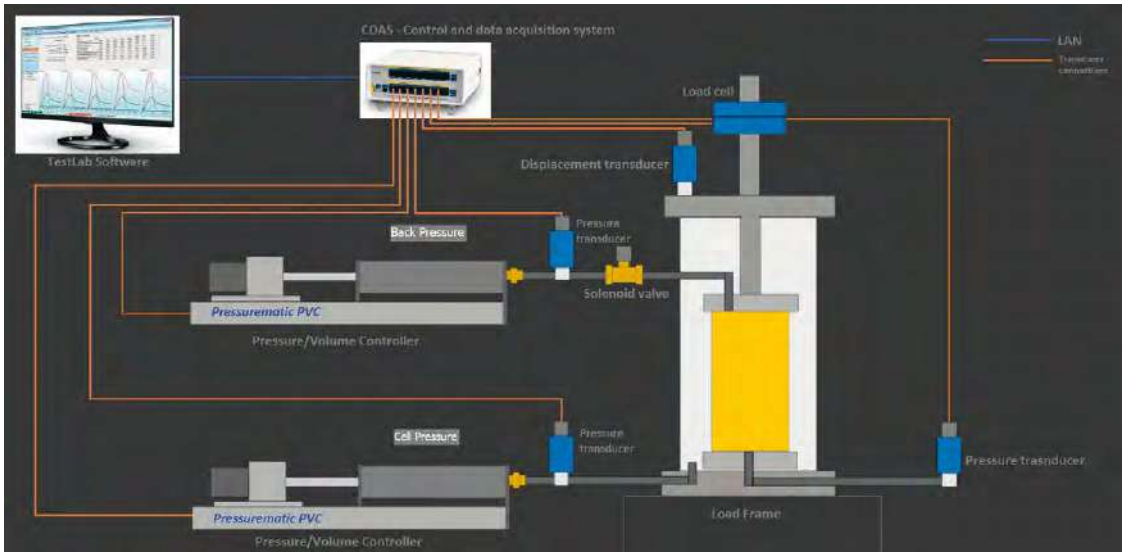
THECNICAL SPECIFICATIONS

S303
16 Channel CDAS

Acquisition 16 CH, 20 bit resolution

- Sampling rate up to 192 kHz (all channels)
- Smoothing up to 64 times over-sampling for low noise performance
- Calibration automatically on power up
- Control Axis 4
- Communication USB or Ethernet

Power supply: 90-264V 50-60Hz 1pPh 240W
Dimensions: 100 (h) x 310 (d) x 250 (w) mm
Weight: 2 kg approx.



TriaxLab conceptual schematic

S349
PRESSUREMATIC PVC

NEW

MAIN FEATURES

- Compact stainless steel construction
- Powered and controlled by the CDAS and TestLab Software
- Closed loop control up to 3500 kPa
- 0.001 kPa pressure and 0.0003 cc volume resolution
- High volume capacity: 250 cc
- Graduated scale for approximate volume change indication
- No need of air source

Pressurematic is the new solution for geotechnical laboratories demanding automatic pressure and volume control. By using a servo stepper motor directly controlled by the TestLab software and CDAS, Pressurematic allows to build confining pressure and back pressure up to 3500 kPa. The unparalleled performance of the CDAS allows to regulate the pressure under a closed loop control regulated to 0.1 kPa.
The operation is continuously monitored by the TestLab software, thus catering to all levels of operator experience.

Standard effective stress tests require 2 Pressurematic units: one for cell pressure and the other for back pressure which can be also used to measure the change in volume of the specimen to 0.0003 cc. The latter is provided with a solenoid valve directly installed on the triaxial cell and used to open and close the pressure line whenever it is needed.

S349

THECNICAL SPECIFICATIONS

- Output pressure: 3500 kPa
- Volume capacity: 250 cc
- Pressure accuracy: 0.25% of full scale
- Pressure resolution: 0.001 kPa
- Volume resolution: 0.0003 cc
- Closed loop control of pressure regulated to 0.1 kPa
- Closed loop control of volume regulated to 0.0003 cc
- Maximum operational speed: 8 cc/s

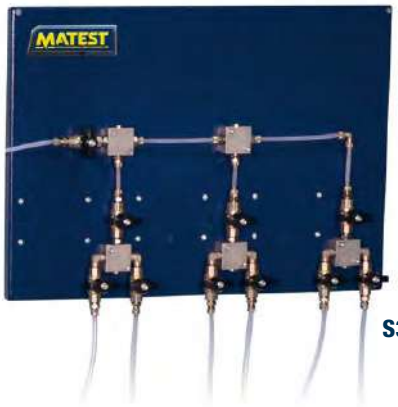
Power supply: 24V DC 1A powered from CDAS
Dimensions: 900x110x230 mm
Weight: 7 Kg approx.

NEEDED ACCESSORIES

S336-53 Pressure transducer up to 2000 kPa
S336-55 De-airing block for pressure transducer
S349-10 Solenoid valve

OPTIONAL ACCESSORIES

S342-03 3 ways water distribution panel



S342-03

TRIAXLAB AUTOMATED SYSTEM: suggested typical configuration

Apparatus Section	Item Code	Item Description	Quantity
Hardware Software	**S301-01**	Triaxial load frame 50kn for triaxlab automated system	1
	S303	16 ch CDAS & testlab software	1
	S305	Triaxial cell max ø 70x140 mm	1
Measure of Axial force	**S337-41**	Load cell 50 kn capacity with signal conditioner	1
	S337-51	Calibration process for load cell	1
Measure of Axial Strain	**S336-23**	Transducer type “a” travel: 25 mm with signal conditioner	1
	S337-51	Calibration process for displacement transducer	1
	S305-05	Mounting device on triaxial cell	1
	S335-15	Universal coupling pliers for transducer	1
De-aired water system	**S355**	De-airing tank	1
	S355-01	Filter group (water trap)	1
	V205	Vacuum pump	1
	V205-10	Vacuum regulator	1
	V205-12	Condensed water trap	1
	V230-03	Rubber tubing for vacuum, 3 metres	1
Measure of pore pressure and volume change	**S349**	Pressurematic PCV	2
	S336-53	Pressure transducer 2000 kpa with signal conditioner	3
	S337-51	Calibration process for pressure transducers	3
	S336-55	De-airing block	3
	S342-03	3 ways water distribution pannel	1
	S349-10	Solenoid valve	1
Specimen preparation and Accessories (also available with Ø 38, 70, 100 mm see page 546)	**S310-01**	Rubber membrane ø 50 mm (10 pcs)	2
	S311-01	Sealing ring ø 50 mm (10 pcs)	1
	S312-01	Membrane stretcher ø 50 mm	1
	S313-01	Split former ø 50 mm	1
	S313-11	Split mould ø 50 mm	1
	S314-01	Top cap with drain ø 50 mm	1
	S315-01	Plinth ø 50 mm for cell mod. s305	1
	S316-01	Porous disc ø 50 mm (2 pcs)	1
	S317-01	Plein disc ø 50 mm (2 pcs)	1
	S318-01	“O” ring for plinth ø 50 mm	1
	S319-01	Filter paper drain ø 50 mm (50 pcs)	1
	S320-01	Filter paper for base ø 50 mm (100 pcs)	1
	S122-14	Hollow punch ø 50 mm - triaxial	1
	S123-14	Tamper ø 50 mm - triaxial	1
	V205-11	Special oil for pumps	1
	S325	Nylon tube ø 4 mm (20 mt)	2
	S326	Terminal for connection tube (10 pcs)	2
	S327	Flaring tool	1
	S329	Water-repellent grease (1000 g)	1
	S330	Grease pump	1
	S328	Vaseline oil 1000 ml	1
	S332-04	Spares and wearable 1 cell automatic	1+

CYCLIC TRIAXLAB AUTOMATED SYSTEM

NEW

STANDARDS: ASTM D7181 | ASTM D2850 | ASTM D3999 | ASTM D4767 | ASTM D5311 | BS 1377:7 | BS 1377:8 | AASHTO T307-9

ALSO AVAILABLE IN VERSION ELECTROMECHANICAL

MAIN FEATURES

- Automatic execution of static and dynamic triaxial tests including effective stress and standard stress path.
- 4 axis control and 16 channel control Data Acquisition System.
- Servo feedback controlled precision pressure (Pressurematic) generation system.
- Digital Servo-Pneumatic Control to provide accurate loading wave shapes up to 70 Hz.
- Real time charting.
- Compact and versatile for improving productivity and cost effectiveness.
- Pre-programmed user friendly “Method files” through the TestLab Software.
- Possibility to upload user-defined wave-shapes (e.g. earthquakes time series) through Replay Editor.
- Fully configurable to suit a large range of testing applications including maximum shear modulus calculation through bender elements option.
- Programmable Dashboard display showing real-time system status and test result.

DTS-9 Cyclic TriaxLab Automated System

The Cyclic TriaxLab automated with its innovative features represents the most ideal solution for modern laboratories that need to investigate the effects of vibration and dynamic loading for soil and unbound granular materials.

Typical applications include:

- Civil engineering including seismic and blasting analysis
- Environmental engineering
- Construction and architectural design
- Advanced research on soils

Based on the 4 axis control and 16 channel control and Data Acquisition CDAS, Matest Cyclic TriaxLab has provision for:

- Vertical load tension/compression up to 9 kN
- Vertical displacement up to 50 mm
- Cell pressure up to 2000 KPa
- Back pressure up to 2000 KPa

The Cyclic TriaxLab automated system is subdivided into 3 major groups similarly to the TriaxLab Automated System:

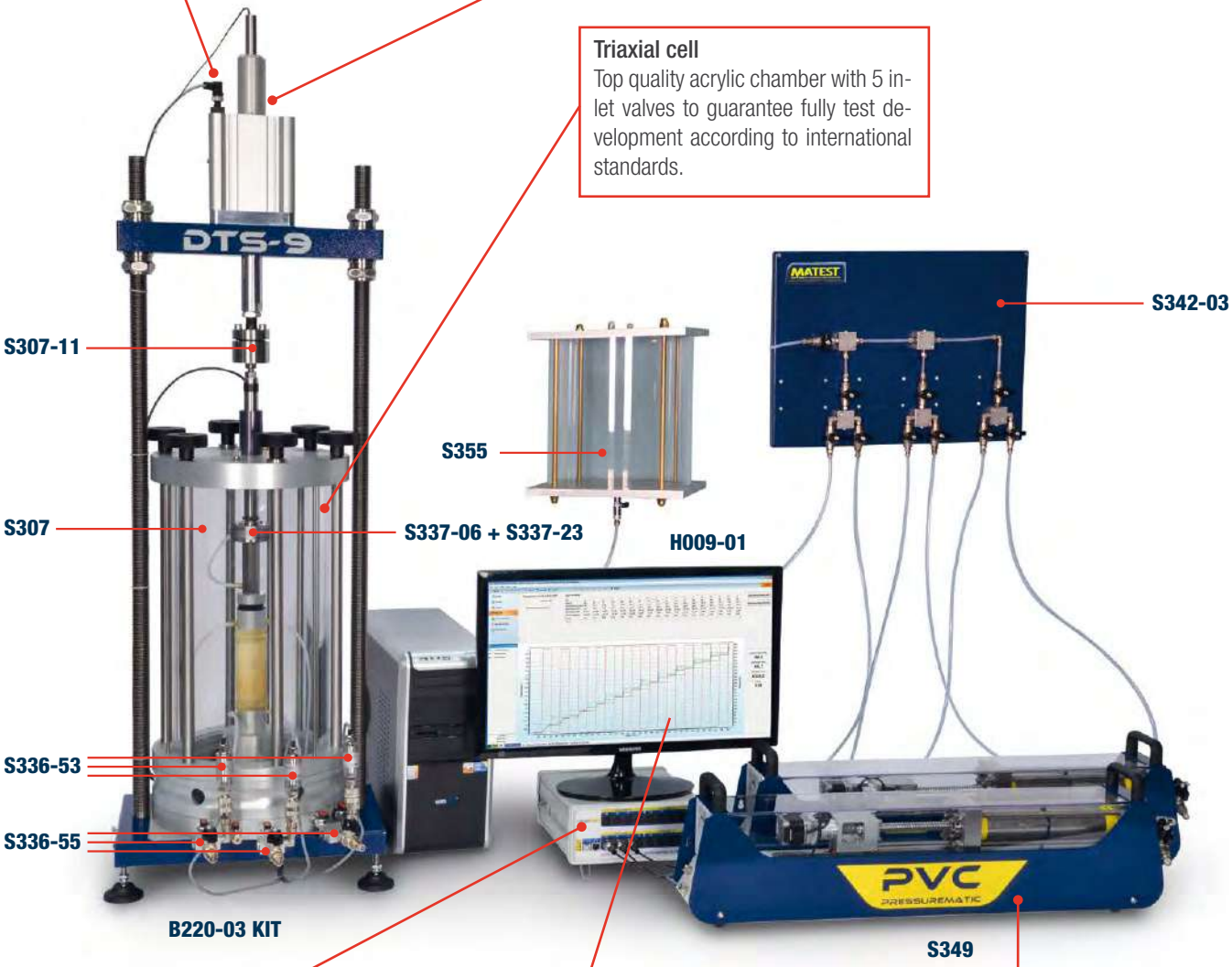
- **Fully digital controlled load frame** and fit for purpose Triaxial cell with accessories
- **Control system** based on the CDAS
- Data Acquisition System comprising:
  - 1 submersible load cell for axial force
  - 3 pressure transducers for cell pressure, back pressure and pore pressure
  - 2 Pressurematic for pressure/volume change

To suit the specific customer's requirements the MATEST Cyclic TriaxLab Automated System basic configuration can be modified by adding or removing the hardware elements which are controlled and monitored under a closed-loop integrated system with the CDAS and TestLab Software.
Pre-programmed "Method files" offer the operator the unique opportunity to run a range of tests without the need for specific computer programming. The possibility to customize the Method files is also given to the operator granting ultimate flexibility and versatility.

Servo-valve
High performance, pneumatic servo-valve

Load frame & actuator
Fully digital control of a high performance pneumatic servo-valve to provide accurate loading wave shapes up to 70 Hz.

Triaxial cell
Top quality acrylic chamber with 5 inlet valves to guarantee fully test development according to international standards.



CDAS
The Compact Control and Data Acquisition System (CDSA) delivers unparalleled performance, real time control and ultimate versatility in acquisition.

TestLab software
TestLab software allows for real time graphing of results and configurable real time transducer levels display with unprecedented clarity of results and analytical power.

Pressurematic
The units are used for cell and back pressure control up to 2000 KPa. Automatic volume changes to 0.001 cc is also provided.

CYCLIC TRIAXLAB AUTOMATED SYSTEM ORDERING INFO:

HARDWARE - SOFTWARE

B220-04 KIT
DTS9 WITH MANUAL CROSSHEAD

The machine includes:

B220-14
20 kN load frame with manual crosshead
9 kN servo-pneumatic actuator with its LVDT, 50mm stroke, 70 Hz frequency.

Power supply: 90-264V 50-60Hz 1ph 240W
Dimensions: 1262(h)x400(d)x470(w)
Weight: 80 kg load frame

S303
16 Channel Control and Data Acquisition System (CDAS) and TestLab software.
For technical specifications, see p. 564

B270-12
Air reservoir assembly with membrane dryer. It requires pressurized air, minimum 7 bar (not included).

S307
TRIAXIAL CELL MAX Ø 150X300 MM

Technical specifications:

- Max specimen mm Ø 150x300
- Max cell pressure 2200 kPa
- Overall dimensions mm Ø 338x648
- Weight 40 kg approx.

Accessories listed at p. 546

Note: Triaxial cell for cyclic tests max. 100x200 mm available on request.

S307 with accessories

MEASURE OF AXIAL FORCE

S337-06
SUBMERSIBLE LOAD CELL 10 KN WITH SIGNAL CONDITIONER

- Rated output 2 mV/V nominal
- Accuracy 0.1%

Note: For different requirements load cells capacity and transducers stroke or submersible load cells, see p. 548

ACCESSORIES FOR TRIAXIAL CELL

S337-23 Loading ram for the submersible load cell
S307-05 Transducers holder ring
S307-10 Vacuum generator
S307-19 Vacuum adaptor
S307-11 Alignment coupler assembly
S307-12 Spherical exclusion
S307-13 Base pedestal spacer

OPTIONAL ACCESSORIES

BENDER ELEMENTS KIT for the evaluation of the stiffness of a soil starting from the measurement of the maximum shear modulus (Gmax). The Kit includes:

S307-08 Picoscope
S307-07 T-4001 waveforms transformer
S307-03 Kit of upper and lower bender holders
S307-22 | 32 | 42 | 52
Base pedestal for bender element
Ø 38 | 50 | 70 | 100 mm
S307-23 | 33 | 43 | 53
Top platen for bender element
Ø 38 | 50 | 70 | 100 mm
S307-24 | 34 | 44 | 54
Pair of porous disc
Ø 38 | 50 | 70 | 100 mm

Bender elements KIT

DEAIRED WATER SYSTEM

S355
DE-AIRING TANK 20 LITRES CAPACITY

It produces de-aired water when connected to the vacuum pump. It is a Perspex tank with an inlet water valve and an outlet air valve. Tank capacity: 20 litres.

Dimensions: 320x320x520 mm
Weight: 15 kg approx.

ACCESSORIES

V205
VACUUM PUMP
To produce vacuum up to of 0.1 mbar
(see p. 597)

V205-10 - V205-12
VACUUM REGULATOR
It is supplied with vacuum gauge, control valve, suction filter and moisture trap.

V230-03
Rubber tube. Suitable for vacuum, 3 m

MEASURE OF PORE PRESSURE SYSTEM AND VOLUME CHANGE

S349
PRESSUREMATIC PVC FOR AUTOMATIC PRESSURE AND VOLUME CONTROL

Output pressure: 3500 kPa
Volume capacity: 250 cc
For Technical Specifications, see p. 565

NEEDED ACCESSORIES

S336-53 Pressure transducer 2000 kPa with signal conditioner.
S336-55 De-airing block for pressure transducer
S349-10 Solenoid valve

OPTIONAL ACCESSORIES

S342-03 3 ways water distribution panel

TESTLAB SOFTWARE NEW

Developed with ultimate flexibility in mind, TestLab test and control software caters to all levels of operator experience. By using pre-programmed **Method files**, an inexperienced operator can run a range of international test methods without the need for any programming.
Moreover, a test **Wizard**, available with popular tests, can guide the operator step by step based on a "recipe book" approach.
Most importantly, the experienced engineer and/or researcher need not be constrained by the functions and analysis in the method files provided. The operator may clone, modify and/or generate his/her own method file to suit their specific requirements. The Excel based data analysis offers the operator the flexibility to implement alternative analysis and customize reporting facilities.
TestLab allows for real time graphing of results and configurable real time transducer levels display with unprecedented clarity of results and analytical power. These features make the TestLab software the optimized solution for the new Matest Triaxlab Automated and Cyclic Systems.
It is provided with CDAS mod. S303 see p. 564.

MAIN FEATURES

- Pre-programmed Method files based on international test methods for complete control of triaxial testing for saturation, consolidation and shearing phases.
- Integrated data results post processing feature with MS Excel.
- Standard and user customizable test reporting.
- Real time graphing of results and configurable real time transducer.
- Flexible and user-friendly with unprecedented clarity of results and analytical power.
- Automatic B value measurement.
- Automatic backpressure solenoid valve control.

TESTLAB, A NEW APPROACH

TestLab is an open architecture user programmable software application. Our engineers have taken the time to review all the relevant international test standards and used TestLab "Test Designer" to program method files according to these standards. Basically, any of these tests can be designed, cloned and/or modified by the user within TestLab. The user is no longer restricted to the test applications provided at time of purchase the possibilities are only limited by the skill and imagination of the user.

TESTLAB MANAGER

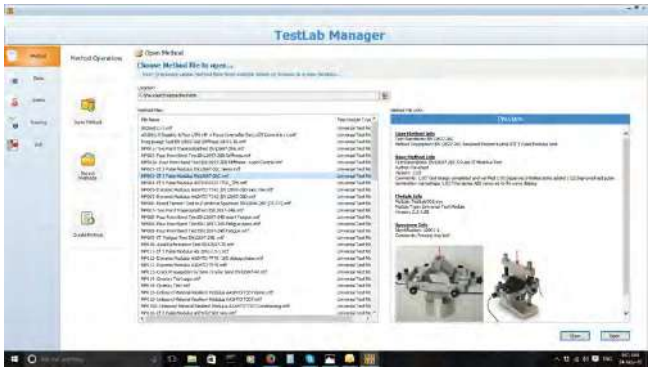
The TestLab materials testing software is designed to interface with the CDAS and a wide range of Pavetest machines including Automatic TriaxLab system. A TestLab Manager interface allows users to easily and efficiently locate the necessary method files to load and execute.
The method files for soil testing include: saturation, consolidation, CU compression test, CD compression test, UU compression test in accordance with:

- ASTM 04767, ASTM D7181, BS 1377: part 8
- ASTM D2850, BS 1377: part 7

TestLab Manager

TEST METHOD SELECTION

The operator can run pre-programmed Method files, in accordance to the requested Standards, or configure an application test and then save that configuration to a customised Method file. This includes the real-time transducer and calibration allocations, comprising all the stresses, strain and volume changes for automatic triaxial testing; control parameters for the Pressurematic; solenoid valves and triaxial frames; terminal conditions as for instance end of stroke or maximum capacity limits, test pause features for the Pressurematic live control, additional options to hold the stress and strain applied to the specimen.



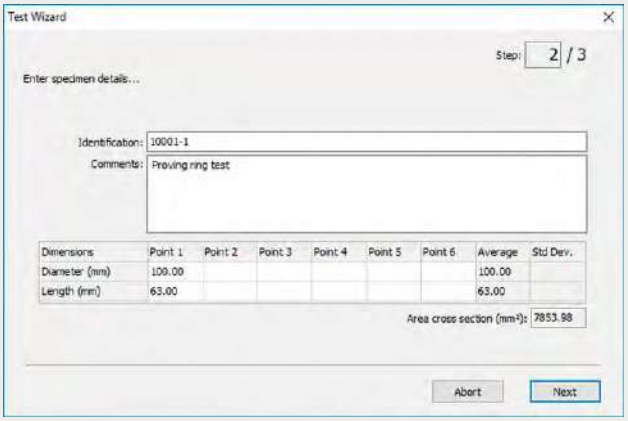
Selection of Method Files

TESTLAB, USER FRIENDLY INTERFACE FOR SOIL TESTING NEW

TEST WIZARD

The wizard section provides a prompted menu approach to running a test. The user is driven to enter information throughout a series of easy steps. Examples of input information for consolidated drained compression test include:

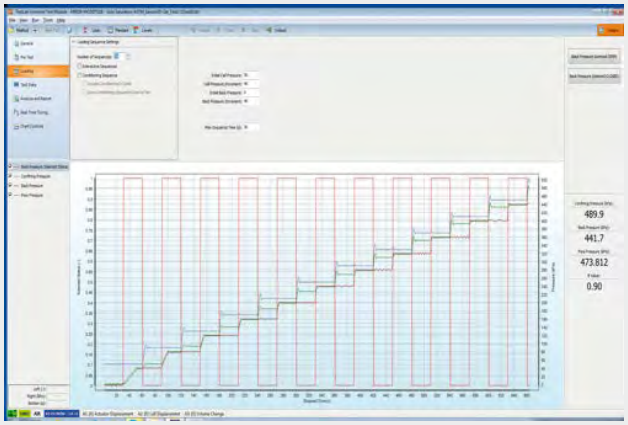
- Specimen Information: axial gauge length (mm), Consolidated Height (mm), Consolidated Area (mm^2), Membrane Modulus (MPa), Membrane thickness (mm), Filter Paper Kfp (kN/mm), Filter Paper Perimeter Pfp (mm), Axial Strain Limit (%), Break Detect (% drop)
- Loading sequences settings: confining pressure (kPa), Road Seal Diameter (mm), back pressure valve, Loading rate (%/min)
- Test data: Axial Load (kN), Axial Deformation (mm), Total and Effective Stress (kPa), Back and Pore Pressure (kPa), Volume Change (cc) and Axial Strain (%)
- Real time tuning (PID control increments) and chart controls (Corrected Deviator Stress, Axial Stress, Radial Stress, Induced Pore Pressure, Effective Radial Stress)



User guided Test wizard

TESTLAB UNIVERSAL TEST

The Test Data section displays run-time information, such as the loading time, cycle count, transducer readings (force, displacement, pressure), stress calculations.
Volume changes, B valve, consolidation parameters (t100), stress path, optional K0 and permeability coefficients.



ASTM D4767, D7181-11 Automatic Saturation

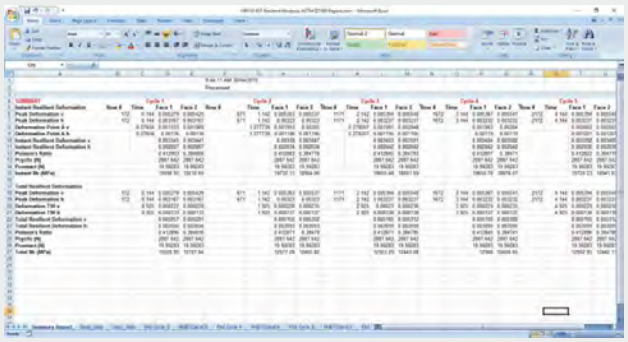
REAL TIME DASHBOARD DISPLAY

For the automatic and cyclic triaxial tests, Pavetest provides the user with an alternative, simpler and more intuitive representation of the current status of both machine and test method. This dashboard display feature of TestLab shows real time transducer levels, computed data and charted data before, during and after the test has completed.

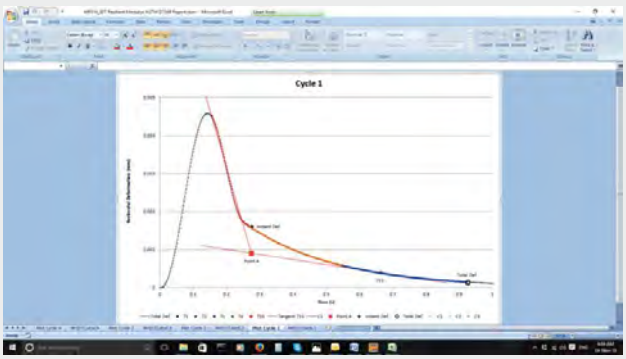
Typical dashboard screen

POST PROCESSING

All TestLab Method file tests provide the facility to send the data directly to an Excel workbook including test input and results data. This facility provides a means of efficiently post processing raw data results and customizing reports from within Excel and optionally displaying summary result in TestLab.



Post processing summary results



Excel post processing report

CYCLIC TRIAXLAB AUTOMATED SYSTEM: suggested typical configuration

Apparatus Section	Item Code	Item Description	Quantity
Stretcher, actuator and controller	B220-04-KIT	Loading frame	1
		Triple axis control & data acquisition system (CDAS)	1
		9 KN Servo-Pneumatic actuator assembly, 50 mm stroke, LVDT ± 50 mm calibrated over ± 37.5 mm	1
Trixial cells with accessories	S307	Triaxial cell for specimens up to 150x300 mm	1
	S337-06	Submersible load cell calibrated to -5/+5 kn	1
	S337-23	Loading ram for the submersible load cell (for S307)	1
	S307-05	Transducers holder ring	1
	S307-10	Vacuum generator	1
	S307-19	Vacuum adaptor	1
	S307-11	Alignment coupler assembly	1
	S307-12	Spherical extension	1
	S307-13	Base pedestal spacer	1
	S337-51	Calibration process for load cell	1
Water pressure system, measure of pressure and measure of volume	S342-03	3 Ways distribution panel w/out regulators	1
	S349	Pressurematic PVC	2
	S349-10	Solenoid valve	1
	S336-53	Pressure transducer 2000 kpa with ILC	3
	S336-55	De-airing block	3
	S355	De-airing tank	1
	S355-01	Filter group (water trap)	1
	V205	Vacuum pump 1 stage air: 4.5 m^3/h	1
	S337-51	Calibration process for pressure transducers	3
	V205-10	Vacuum regulator	1
	V205-12	Condensed water trap	1
	V230-03	Rubber tubing for vacuum, 3 meters	1
Bendel elements kit	S307-08	Picoscope	1
	S307-07	T-4001 waveforms transformer	1
	S307-03	Kit of upper and lower bender holders	1
	S307-22/32/42/52	Base pedestal for bender element ø 38/50/70/100 mm	1
	S307-23/33/43/53	Top platen for bender element ø 38/50/70/100 mm	1
	S307-24/34/44/54	Pair of porous disc ø 38/50/70/100 mm	1
Accessories for specimen preparation, Ø 38 mm | Ø 50 mm Ø 70 mm | Ø 100 mm Ø 150 mm	S307-20/30/40/50/60	Vacuum plate 38/50/70/100/150 mm specimen	1
	S307-21/31/41/51/61	Vacuum top platen 38/50/70/100/150 mm specimen	1
	S310, S310-01/02/03/04	Rubber membrane ø 38/50/70/100/150 mm (10 pcs)	1
	S311, S311-01/02/03/04	Sealing ring ø 38/50/70/100/150 mm (10 pcs)	1
	S312, S312-01/02/03/05	Membrane stretcher ø 38/50/70/100/150 mm	1
	S313, S313-01/02/03/04	Split former ø 38/50/70/100/150 mm	1
	S313-10/11/12/13/14	Two -part split mould ø 38/50/70/100/150 mm	1
	S315-10/11/12/13/14	Plinth ø 38/50/70/100/150 mm for cell mod. s307	1
	S316, S316-01/02/03/04	Porous disc ø 38/50/70/100/150 mm (2 pcs)	1
	S317, S317-01/02/03/04	Plein disc ø 38/50/70/100/150 mm (2 pcs)	1
	S318, S318-01/02/03/04	"O" Ring tool for plinth ø 38/50/70/100/150 mm	1
	S319, S319-01/02/03/04	Filter paper drain ø 38/50/70/100/150 mm (50 pcs)	1
	S320, S320-01/02/03/04	Filter paper for base ø 38/50/70/100/150 mm (100 pcs)	1
	S122-13/14/15/16	Hollow punch ø 38/50/70/100 mm - triaxial	1
	S123-13/14/15/16	Tamper ø 38/50/70/100 mm - triaxial	1
Other elements	S325	Nylon tube 4 mm ø (20 mt)	1
	S326	Terminal for connection tube (10 pcs)	1
	S327	Flaring tool	1
	S328	Vaseline oil, 1000 ml	1
	S329	Water-repellent grease (1000 g)	1
	S330	Grease pump	1
	S332-04	Spares and wearable 1 cell automatic	1

LOAD PROVING RINGS

Used for load compression measurement applied by the testing machine.
Made from hardened alloy steel, they are chrome-coated and complete with upper and lower coupling blocks having M10 female gas thread.
The accuracy is ± 1% of applied load and repeatability is within 0.2%
Each ring is supplied complete with calibration chart made by PC
Large range from 0.5 kN to 100 kN in the following versions:

S370 Serie with dial gauge 0.01 mm graduation

S371 Serie with dial gauge 0.001 mm graduations

S372 Serie with digital gauge 0.001 mm graduation, including battery and RS232 port to PC connection.

Max. Capacity kN	Dial gauge 0.01 mm	Dial gauge 0.001 mm	Digital gauge 0.001 mm - RS232	Height mm	Weight kg
0.5	**S370**	**S371**	**S372**	210	1.6
1	**S370-01**	**S371-01**	**S372-01**	210	1.7
2	**S370-02**	**S371-02**	**S372-02**	210	1.8
3	**S370-03**	**S371-03**	**S372-03**	210	1.9
5	**S370-04**	**S371-04**	**S372-04**	210	2
10	**S370-05**	**S371-05**	**S372-05**	210	2.2
15	**S370-06**	**S371-06**	**S372-06**	210	2.5
20	**S370-07**	**S371-07**	**S372-07**	210	3
30	**S370-08**	**S371-08**	**S372-08**	210	3.5
40	**S370-09**	**S371-09**	**S372-09**	210	3.9
50	**S370-10**	**S371-10**	**S372-10**	210	7.2
60	**S370-11**	**S371-11**	**S372-11**	210	7.7
100	**S370-12**	**S371-12**	**S372-12**	210	10.2

ACCESSORIES

Stop electrical safety device to stop the machine when reaching the max. capacity of the ring, to prevent any overload damage.
For ordering you have to add the letter **"S"** at the end of the load ring code.
Ex.: S370-09S

S374 Stem mechanical brake device, it holds the max. reached value on the dial gauge, with manual zero setting.

S374-02 Ball seat, complete with connector, for an articulated coupling to the testing machine.

SPARE

S373-05 COUPLING DEVICE between the dial indicator and the load ring.

DIAL INDICATORS

Foreseen on different machines and equipments described in this catalogue.
Diameter of the dial: 60 mm, 80 mm mod. S379-01 with clockwise rotation.

Model	Travel mm	Division mm
S375	5	0.001
S375-01	12	0.002
S376	10	0.01
S377	25	0.01
S378	30	0.01
S379	50	0.01
S379-01	100	0:01

DIGITAL DIAL INDICATORS

Including battery and RS 232 port for PC connection.

Model	Travel mm	Division mm
S382-01	12.7	0.001
S383	25.4	0.001

ACCESSORY

S382-13 CABLE to connect S382-01 and S383 to PC through USB port for direct visualization and recording of the measurement.

ACCESSORIES

S380 MAGNETIC DIAL HOLDER, comprising a fix rod and an adjustable rod.
MAGNETIC BASE FORCE 25 kg approx.

S374 STEM BRAKE DEVICE to hold the max. reached value on the dial gauge.

S380-01 REAR MOUNT of the dial indicator.

S390
CALIBRATION UNIT FOR EXTENSOMETERS AND DIAL GAUGES

This Appliance can be used to check the displacement calibration of extensometers, dial gauges, transducers etc.
Composed by:
Aluminium frame,
Delicate moving saddle,
Digital micrometric head 50 mm travel, resolution 0.001 mm,
error limit ± 0.003 mm
Sample holder to fit dial gauges with stem having 8 mm diameter
(different sample holders are available on demand).

Weight: 18 kg approx.

S390

S390N + S336-12

S390N
CALIBRATION UNIT FOR TRANSDUCERS AND DIAL GAUGES

Simple model, stainless steel and aluminium made, complete with mechanical micrometer with friction 50 mm travel and 0.001 mm resolution. Sample holders to fit dial gauges with stem having 8 mm diameter and transducers having 19 mm diameter.

Weight: 2 kg approx.

OUR CLIENTS ARE OUR BEST ADVERTISEMENT.


HANNA
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HI 145

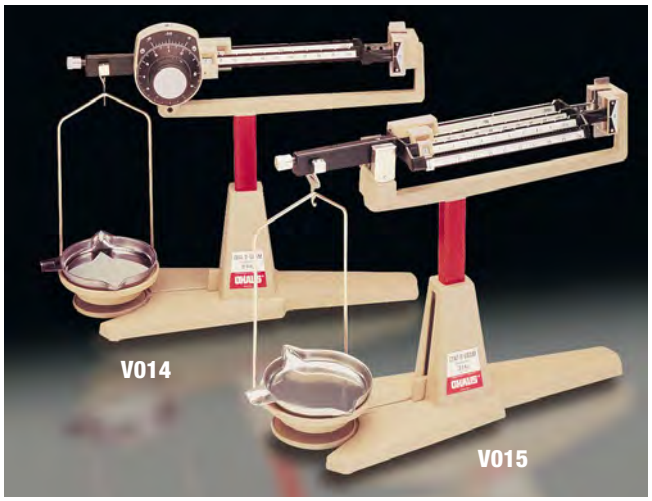
SECTION V
GENERAL EQUIPMENT

This section proposes a wide range of laboratory equipment and accessories that cannot be located in a specific application, but they are used for general purposes and are suitable to perform properly different measuring procedures of liquids and solids, weighing, temperature, containers, still, pH, chemicals, reagents etc. from scales to pumps, from thermometers to laboratory glassware, Matest complete its range of equipment for testing building materials.

MECHANICAL BALANCES ORIGINAL OHAUS

AVAILABLE MODELS

V014
DIAL-O-GRAM Balance 310 g capacity x 0.01g sensitivity, triple beam with vernier. Includes stainless steel pan, zero adjustement. **Weight:** 3 kg



V015
CENT-O-GRAM Balance 311 g capacity x 0.01 g. sensitivity, four beams. Includes stainless steel pan, zero adjustment. **Weight:** 3 kg

V016
TRIPLE BEAM Balance 2610 capacity x 0.1 g sensitivity. Includes stainless steel pan, set of weights. **Weight:** 4 kg

V017
HEAVY DUTY SOLUTION Balance 20 kg capacity x 1 g sensitivity. Complete with set of weights, sliding weight for tare up to 2270 g, holding plate 280 mm diameter. **Weight:** 20 kg approx.

ROTARY AUTOMATIC SCALES

Five pointer turns allowig a larger amplitude of the subdivision.
Double quadrant and under quadrant sicking for multiples.
Oil oscillation shock-absorber, with exterior adjustment.
Displacement of the head in all positions without angulation limit.
Pan, mass-produced, stainless steel.

Models	Capacity	Sensitivity
V057	60 kg	20 g
V059	150 kg	50 g

V051
BATCHING SCALE

Capacity: 200 kg
Sens. 100 g
Completely produced in painted metal, double oscillation, case in strong profiled, platform in reinforced steel.
The sliding weight and accessories are brass made while the rod is from chromed steel.
Supplied complete with set of weights.

SEMI-AUTOMATIC ZERO-CENTERING BALANCE

This scale with central zero is particularly suitable for predetermined weights. It has two pans; the sample is placed on the main pan and the weights are placed on the other until the pointer indicates the dial. Weights are not included and should be ordered separately.

MODELS

V031
Capacity 10 kg sens. 1 g
Dial -100 +100 g

V034
Capacity 30 kg sens. 5 g
Dial -250 +250 g

WEIGHTS FOR BALANCES

V036

SET OF BRASS WEIGHTS comprised in a wooden box.
Total weight reaching 1000 g. The set is formed by: 1x500 g, 1x200 g, 2x100 g, 1x50 g, 1x20 g, 2x10 g, 1x5 g, 2x2 g, 1x1 g

E066-02	Weight	100 g, brass calibrated
V036-02	Weight	0.5 kg, cast iron, calibrated
V037	Weight	1 kg, cast iron, calibrated
V038	Weight	2 kg, cast iron, calibrated
V039	Weight	5 kg, cast iron, calibrated
V040	Weight	10 kg, cast iron, calibrated
V040-01	Weight	20 kg, cast iron, calibrated

V036-02...V040-01

STANDARD CALIBRATION WEIGHTS

Used for the periodic verification of the balance readings. CLASS: M1
Made in Italy
The weights are also available with ACCREDIA Calibration Certificate.

V035-03

Code	Weight	Plastic box
V035-01	50 g	yes
V035-02	100 g	yes
V035-03	200 g	yes
V035-04	500 g	yes
V035-05	1 kg	yes
V035-06	2 kg	yes
V035-07	5 kg	yes
V035-08	10 kg	yes

MOISTURE DETERMINATION BALANCES

AVAILABLE MODELS

V023-01
MOISTURE BALANCE, 160 g capacity x 0.001/0.01 g sensitivity with tare up to 10 g
Samples are dried by a infrared lamp with adjustable heat control.
A built-in-timer 0-61 min. switches off the heater at the end of the drying cycle which is signaled by a bell.
Moisture loss percentage and residual mass are read directly from the lighted scale.

Power supply: 230V 1ph 50-60Hz

V023-02
MOISTURE BALANCE, as above, but 120 g capacity x 0.001/0.01 g sensitivity.

V023-03
MOISTURE BALANCE, as above, but 60 g capacity x 0.001/0.01 g sensitivity.

V023-01...V023-03

ELECTRONIC ANALYTICAL BALANCES

AVAILABLE MODELS

V065-02
ELECTRONIC ANALYTICAL BALANCE
Capacity: 250 g Readability: 0.1 mg
Tolerance: ± 0.2 mg
Outer keyboard with direct reading on a wide LCD display.
Data interface: RS 232
Single pan Ø 80 mm
Tare range: by subtraction up to full capacity.
Dust proof plexiglass cover. Ideal for very accurate weightings and for heat of hydration cement tests.

Power supply: 230V 50-60Hz 1ph
Dimensions: 315x225x330 mm
Weight: 10 kg approx.

V065-02...V065-03

V065-03
ELECTRONIC ANALYTICAL BALANCE, as above, but 220 g capacity x 0.1 mg readability.

ELECTRONIC PRECISION TOP LOADING AND PLATFORM BALANCES

Designed for laboratory general purposes, most of them are fitted with under balance weighting facility for specific gravity tests, and RS232 for PC or printer connection.
Sturdy and precise, they are fitted with strain gauge cells and large backlighted display.
Immediate and automatic zeroing and tare, automatic changeover of scale sensitivity (dual range models only).
Power supply and standard - optional accessories are listed for each model of balance and described in the legend.

V070-02...V070-06

V071-10...V072-02

V072-06N, V075-11...V075-13

V072-09, V073-04

V073-01

V075-02...V075-04

V075-06

V073-06

V075-20...V075-22

Model	Capacity	Readability	Pan dimensions mm	Standard accessories	Optional accessories
V070-02	210 g	0.001 g	Ø 110	A + F + G	H
V070-05	310 g	0.001 g	Ø 110	E + F + G	H
V070-06	500 g	0.001 g	Ø 110	A + F + G	H
V071-10	2200 g	0.01 g	Ø 160	A + F + G	H
V071-07	3100 g	0.01 g	Ø 160	A + F + G	H
V071-11	4200 g	0.01 g	Ø 160	A + F + G	H
V072-02	800/5500 g	0.01/0.1 g	Ø 160	A + F + G	H
V072-06N	15 kg	0.1 g	320x210	E + F + G	H
V072-09	4500/16000 g	0.1/1 g	320x210	A + F + G	H
V073-01	16 kg	0.1 g	320x360	E + F	H
V073-04	4500/32000 g	0.1/1 g	320x210	A + F + G	H
V073-06	60 kg	1 g	425x600	E + G	H
V075-02	300 g	0.005 g	Ø 120	E + G	H
V075-03	600 g	0.01 g	Ø 120	E + G	H
V075-04	1500 g	0.01 g	Ø 120	E + G	H
V075-06	3000 g	0.05 g	125x145	E + G	H
V075-11	6 kg	0.1 g	225x300	E + F + G	H
V075-12	15 kg	0.2 g	225x300	E + F + G	H
V075-13	30 kg	0.5 g	225x300	E + F + G	H
V075-20	60 kg	2 g	450x600	E	
V075-21	150 kg	5 g	450x600	E	
V075-22	300 kg	10 g	450x600	E	

LEGEND

STANDARD ACCESSORIES

A = Power supply only 230V 1ph 50-60Hz

E = Power supply: rechargeable batteries and also 230V 1ph 50-60Hz

F = Under balance weighting facility for specific gravity tests

G = RS 232 port

OPTIONAL ACCESSORIES

H = **V074-12** Printer complete with connection cable

V074-13 Traceable calibration certificate

V085
SPECIFIC GRAVITY FRAME
(BOUYANCY BALANCE SYSTEM)

STANDARDS: EN 12697, EN 1097-6 | EN 12390:7
ASTM C127, C128 | AASHTO T84 | BS 812:2, 1881:114

Used for specific gravity determination of concrete, aggregates etc.
To be used with a suitable electronic balance fitted with an under - hook facility.
Robust steel frame made, it incorporates on its lower part a platform adjustable in height, holding a water container, and allowing the specific gravity test. The balance is not included and must be ordered separately.

Dimensions: 510x510x1150 mm
Weight: 50 kg approx.

ACCESSORIES

V085-01 CRADDLE for holding concrete cube and cylinder specimens
V041 DENSITY BASKET, stainless steel, Ø 200x200 mm, mesh 3.35 mm

V085

V086 KIT
SPECIFIC GRAVITY KIT

Used for specific gravity determination of solid materials.
Simplified and economical solution.
The kit is composed of:
V086 Support bridge frame with hook rod.
V042 Density tank, plastic, 370x370x330 mm
V041 Density basket, stainless steel, Ø 200x200 mm, mesh size 3.35 mm
To be used with a suitable electronic balance fitted with under-hook facility.

ACCESSORY

V085-01 CRADDLE for holding concrete cube and cylinder specimens.

V086-KIT

DENSITY BASKETS
STAINLESS STEEL MADE

AVAILABLE MODELS

V041 DENSITY BASKET
STANDARDS: ASTM C127 | AASHTO T85 | BS 812:2
Used for specific gravity tests, Ø 200x200 mm, mesh size 3.35 mm (N° 6 ASTM). Weight 1.5 kg approx.
B017-01 Ø 130x135 mm, mesh size 0.063 mm
B017-02 Ø 130x135 mm, mesh size 0.4 mm
B017-04 Ø 130x135 mm, dual mesh size 0.063 and 0.4 mm
A103 Ø 120x160 mm, mesh size 3.35 mm
A103-01 Ø 95x120 mm, mesh size 1.18 mm
A103-02 Ø 95x120 mm, mesh size 0.600 mm
A103-03 Ø 65x80 mm, mesh size 0.150 mm


V041... A103-03

V042
DENSITY TANK PLASTIC,
dimensions 370x370x330 mm
Weight: 3 kg approx.


V042

LABORATORY GLASSWARE

MEASURING CYLINDERS

available in the following models:

Capacity	transparent plastic spouted	glass with stopper	opaque plastic spouted	transparent glass spouted
10 ml	**V098**	**V099**	**V100**	**V101**
25 ml	**V098-01**	**V099-01**	**V100-01**	**V101-01**
50 ml	**V098-02**	**V099-02**	**V100-02**	**V101-02**
100 ml	**V098-03**	**V099-03**	**V100-03**	**V101-03**
250 ml	**V098-04**	**V099-04**	**V100-04**	**V101-04**
500 ml	**V098-05**	**V099-05**	**V100-05**	**V101-05**
1000 ml	**V098-06**	**V099-06**	**V100-06**	**V101-06**
2000 ml	**V098-07**	**V099-07**	**V100-07**	**V101-07**

BEAKERS

pyrex glass with spout. Squat form.

Model	Capacity
V104	25 ml
V104-01	50 ml
V104-02	100 ml
V104-03	250 ml
V104-04	600 ml
V104-05	1000 ml
V104-06	2000 ml
V104-07	5000 ml

PYKNOMETERS

STANDARD: EN 1097-6

Borosilicate glass, complete with capillary tube, stopper and funnel, used to determine the voids and bulk density of aggregates.

Model	Capacity
V103	500 ml
V103-01	1000 ml
V103-02	2000 ml

PYKNOMETERS

Pyrex glass, with ground-in-perforated stopper.

Capacity	Mouth 29 mm	Wide Mouth 50 mm
250 ml	**V105-03**	=
500 ml	**V105**	**V105-04**
1000 ml	**V105-01**	**V105-05**
2000 ml	**V105-02**	**V105-06**
3000 ml	=	**V105-08**

CONICAL FLASKS, ERLENMEYER

Pyrex glass wide mouth.

Model	Capacity
V106	100 ml
V106-01	250 ml
V106-02	500 ml
V106-03	1000 ml
V106-04	2000 ml

FILTER FLASKS

Pyrex glass, for Vacuum filtering.

Model	Capacity	Perforated bung with glass tube
V107	250 ml	**V107-11**
V107-01	500 ml	**V107-12**
V107-02	1000 ml	**V107-13**
V107-03	2000 ml	**V107-14**

VOLUMETRIC FLASK

Borosilicate glass, with plastic stopper
STANDARDS: BS-ISO 1042 I ASTM D854

Model	Capacity
V109	100 ml
V109-01	250 ml
V109-02	500 ml
V109-03	1000 ml
V109-08	2000 ml

VOLUMETRIC FLASK

Unstoppered, borosilicate glass.

Model	Capacity
V109-04	100 ml
V109-05	250 ml
V109-06	500 ml
V109-07	1000 ml
V109-09	2000 ml

SPECIFIC GRAVITY GAY-LUSSAC BOTTLES

Model	Capacity
V108	25 ml
V108-01	50 ml
V108-02	100 ml
V108-03	250 ml

REAGENT BOTTLES

Model	Capacity
V108-10	250 ml
V108-11	500 ml
V108-12	1000 ml

GRADUATED IMPURITIES TEST BOTTLES

Stoppered, pyrex glass

Model	Capacity	Standard
S132-01	500 ml	ASTM C40
S132-02	500 ml	UNI 8020-14
S132-03	1000 ml	ASTM C40

WEIGHTING BOTTLES

Glass, with cover

Model	Dimensions
V110	Ø 50 x 30 mm
V110-01	Ø 25 x 40 mm
V110-02	Ø 70 x 50 mm
V110-03	Ø 40 x 60 mm

GLASS FUNNELS

Model	Diameter
V119	25 mm
V119-01	50 mm
V119-02	100 mm
V119-03	150 mm

V111
HUBBARD SPECIFIC GRAVITY BOTTLE

STANDARD: ASTM D70 I EN ISO 3838

Capacity: 24 ml

V111-01
HUBBARD-CARMICK SPECIFIC GRAVITY BOTTLE

STANDARD: ASTM D70 I EN ISO 3838

Capacity: 25 ml

V124
DROPPING BOTTLE

Capacity: 100 ml

WATCH GLASS (beaker cover)

Model	Diameter
V115	100 mm
V115-01	130 mm

PETRI DISH with cover, pyrex glass

Model	Diameter
V123	100 mm
V123-01	60 mm

MEASURING PIPETTES, MOHR type, graduated

Model	Capacity	Sub-divisions
V142	1 ml	0.01 ml
V142-01	5 ml	0.1 ml
V142-02	10 ml	0.1 ml
V142-03	25 ml	0.1 ml
V142-04	50 ml	0.1 ml
V142-05	100 ml	0.2 ml

GRADUATED BURETTES, BENT

Soda glass with stopcock

Model	Capacity	Sub-divisions
V143	25 ml	0.1 ml
V143-01	50 ml	0.1 ml
V143-02	100 ml	0.2 ml

GRADUATED BURETTES, STRAIGHT

Soda glass with stopcock

Model	Capacity	Sub-divisions
V143-05	10 ml	0.02 ml
V143-06	25 ml	0.1 ml
V143-07	50 ml	0.1 ml
V143-08	100 ml	0.2 ml

V138
FILTER FUNNEL, PYREX GLASS

Ø 90 mm for particle analysis tests to BS 1377

V300-15
DISSICATORS SALTS, SILICA GEL

Box of 1000 g

V147
STIRRING ROD, glass, Ø 8 mm x 250 mm long. Pack of 10

V147-01
MARKING PENCIL, glass. Pack of 12

DESICCATORS BOROSILICATE GLASS

Complete with perforated porcelain plate.

Without vacuum		With vacuum	
A035	Ø 200 mm	**A039**	Ø 200 mm
A036	Ø. 250 mm	**A040**	Ø 250 mm
A036-01	Ø 300 mm	**A040-01**	Ø 300 mm

PLASTIC PRODUCTS

DECANTERS, polypropylene made

Model	Capacity
V102-01	500 ml
V102-02	1000 ml
V102-03	2000 ml
V102-04	3000 ml

S157-05
BEAKER, graduated, plastic, 2000 ml capacity.
STANDARD: EN 933-9

WASH BOTTLES, plastic

Model	Capacity
V120	100 ml
V120-01	250 ml
V120-02	500 ml
V120-03	1000 ml

FUNNELS, plastic

Model	Diameter
V135	100 mm
V135-01	140 mm
V135-02	210 mm

FUNNELS, wide mouth, plastic

Model	Diameter	
V136	max. 80 mm	min. 15 mm
V136-01	max. 120 mm	min. 30 mm
V136-02	max. 150 mm	min. 35 mm

BOTTLES, plastic, wide mouth stoppered

Model	Capacity
V118	250 ml
V118-01	500 ml
V118-02	1000 ml
V118-03	2000 ml
V121	5 litri
V121-01	10 litri

V128
BUCKET plastic, with handle
capacity 12 litres

BOXES plastic, stacking

Model	Dimensions	Capacity
V127	380x280x200 mm	20 litri
V127-01	560x330x280 mm	50 litri
V127-02	650x380x320 mm	80 litri

SAMPLE BAGS

Heavy plastic, pack of 100 pcs

Model	Dimensions
V145-10	25x35 cm
V145-11	40x60 cm

PORCELAIN PRODUCTS

MORTAR AND PESTLE, porcelain

Model	Diameter	Height
V112	100 mm	60 mm
V112-01	125 mm	65 mm
V112-02	150 mm	76 mm
V112-03	180 mm	92 mm
V112-04	200 mm	100 mm

V113
RUBBER HEADED PESTLE
For soil mortar conforming to ASTM D421, BS 1377:2, BS 1924:1

EVAPORATING DISHES, porcelain, with spout

Model	Diameter
V114-01	80 mm
V114-02	100 mm
V114-03	120 mm
V114-04	160 mm
V114-05	210 mm
V114-06	254 mm

V117 POCELAIN CRUCIBLE, 30 ml squat form
V117-01 PORCELAIN LID for V117
V117-02 PORCELAIN CRUCIBLE, 50 ml squat form
V117-03 PORCELAIN LID for V117-02

V117-04 PLATINUM CRUCIBLE 25 ml capacity, Ø 35x38 mm weight 19 g, thickness 0.25 mm

V117-05 PLATINUM CRUCIBLE 25 ml capacity, Ø 35x40 mm, weight 30 g, thickness 0.39 mm

V114-10
SILICA EVAPORATING DISH
Ø 130 mm x 30 mm high.
Capacity: 160 ml

V140
BUCHNER FUNNEL, porcelain, 115 mm diameter for use with Ø 110 mm filter paper.

V148
WEATHER STATION for external use.
Comprising: aneroid barometer, min/max thermometer, hair hygrometer.

V148-01
ANEMOMETER DIGITAL CUPS, PORTABLE
for direct reading of wind speed.

Data logger: 100 points.

Cups system, highly sensible.

Functions: MIN, MAX and HOLD.

Large LCD display with Auto Power Off.

Measuring range: 0.9 to 35 m/s; resolution: 0.1 m/s; precision: ± 2%

Measuring systems: m/s, km/h, knots, mp/h, ft/min, knots.

Feeding: 4 batteries AAA, 1.5V

Weight: 180g

V148

V148-01

V167
RAIN GAUGE, for measuring rain fall. Simple model in plastic material

V167-01
RAIN GAUGE, for measuring rain fall; professional model, brass made. Capacity 250 cc corresponding to 25 ml of rain with 1 mm resolution.

V167

V167-01

V168
THERMOHYGROGRAPH, for external use.
Simultaneous recording of temperature and humidity on the same chart.
Temperature range: -35 °C +45 °C
Humidity range: 0 - 100%
Time scale: 24 hours or 7 days.
Spring operated. Supplied complete

Dimensions: 280x150x250 mm
Weight: 3 kg

V168

V168-01
THERMOHYGROGRAPH, internal use, same to mod. V168 but with temperature range 0 +40 °C.
Battery operated

SPARES

V168-02 Diagrams for thermohygrograph mod. V168. Pack of 55

V168-03 Diagrams for thermohygrograph mod. V168-01. Pack of 55

V168-04 Writing pen for thermohygrograph. Pack of 4

V169
HAIR HYGROMETER, range 0 to 100%

V169

DIGITAL THERMOMETERS

Complete with depth stainless steel probe, for temperature measurements of liquid, fluid, semisolid, granular materials, air.
The probe is directly connected to the digital unit.

Model	Temp. range °C	Resolution °C	Accuracy °C	Probe dimensions Ø x lenght
V150	-50 +150	0.1	± 0.3	3x105 mm
V151	-50 +220	0.1	± 0.3	5x125 mm
V152	-40 +550	1	± 2	3x130 mm

V153
DIGITAL THERMOMETER, including remote probe connected to the instrument with a cable 1 metre long.

Temperature range: -50 +150 °C
Resolution: 0.1 °C. Accuracy: ± 0.3 °C
Stainless steel probe Ø 3x160 mm

V154N
DIGITAL MICROPROCESSOR THERMOMETER

Handy and versatile, it uses a type K thermocouple sensor to take measurements on the highest scales. It is a watertight thermometer with advanced features such as a self-diagnosis system when switching-on, battery charge indicator and automatic switch-off.

Measurement range: -50 to + 1350 °C resol. 0.1 °C
Probe accuracy: ± 1 °C
Battery: 1.5V AAA (3) duration 3500 hours
Supplied with a penetration probe Ø 3x120 mm, 1 metre long. (V154-01)

C216
FOUR CHANNELS THERMOMETER k-type

thermocouple with SD card data recorder for precast concrete.
Technical data and accessories: see p. 338

V155
INFRARED THERMOMETER

To measure surface temperatures without touching the object.
Measuring range: -50 °C +750 °C
Resolution: 0.1 °C up to 200 °C
Functions: Hold and autoswitch-off.
Battery type: 9V

ACCESSORIES

Stainless steel probes, complete with 1 metre cable and connector

V154-02 SURFACE PROBE, Ø 16x260 mm
Max temperature: 650 °C
V154-03 AIR PROBE, Ø 3x245 mm. Max temperature: 300 °C
V154-04 GENERAL PURPOSE PENETRATION PROBE, Ø 5x220 mm
Max temperature: 900 °C
V154-05 K-TYPE THERMOCOUPLE 5 m long
V154-06 COUPLING UNIT

SPARES

V154-01 PENETRATION PROBE Ø 3x120 mm
Max temperature: 1350 °C

DIAL THERMOMETERS

For temperature measurement of freshly mixed concrete, bituminous mixtures and general purpose use. Stainless steel made, the terminal part of the stem in **pointed** to get easier the penetration into the material.

Model	Range °C	Sub-divisions °C	Dial Ø	Stem lenght mm
V160	-40 +40	1	50 mm	250
V160-01	0 +60	1	50 mm	250
V160-02	0 +100	2	50 mm	250
V160-03	0 +250	5	50 mm	250
V160-04	0 +300	5	50 mm	250
V160-06	0 +250	5	75 mm	600

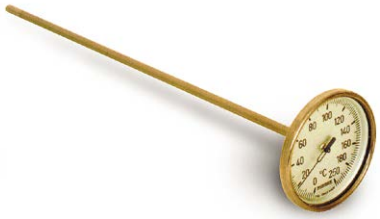
ASTM, IP, NF THERMOMETERS

Model	Range °C	Graduation °C	ASTM	IP
B057-08	23 / 27	0.1		38C
B063-01	-2 / 300	1	7C	5C
B064-03	150 / 175	0.5	13C	47C
B069-11	-2 / 400	1	8C	6C
B072-01	-2 / 80	0.2	15C	60C
B072-02	30 / 200	0.5	16C	61C
B077-02	-38 / 30	0.5		42C
B082-01	18 / 28	0.2	23C	
B082-02	39 / 54	0.2	24C	
B082-03	95 / 105	0.2	25C	
B082-04	0 / 55	0.2	NF T66-020	
B083-07	0 / 44	0.2		8C
B086-10	-6 / 400	2.0	11C	28C
B088-12	58.5 / 61.5	0.1	47C	
B088-13	133.5/136.5	0.1	110C	
B089	19 / 27	0.1	17C	
B089-01	34 / 42	0.1	18C	23C
B089-02	49 / 57	0.1	19C	
B089-03	57 / 65	0.1	20C	
B089-04	79 / 87	0.1	21C	
B089-05	95 / 103	0.1	22C	
B092-10	-5 / 110	0.5	9C	15C
B092-11	-20 / 50	0.5	57C	
B094-10	90 / 370	2.0	10C	16C

B057-08...B094-10

V160...V160-04

V161-01



V160-06

V161-01

DIAL THERMOMETER, range 0+200 °C for surface measurements.

ARMOURED THERMOMETERS, pocket size

Model	Range °C	Graduation °C
V162	0...100	1
V162-01	0...200	2

V163

Max./Min. Thermometer
range -30 °C +50 °C

V163

THERMOMETERS glass stem and alcool system, for general laboratory use.

Model	Range °C	Graduation °C
V164A	-5 + 50	0.5
V164-01A	-10 + 100	1
V164-02A	-10 + 200	1
V164-03A	-10 + 300	1

V164... **V162**

V170
STOP WATCH
Digital, non magnetic, having also watch functions.
Precision 0.1 second.

V170-01
STOP WATCH
Mechanical dial type, non magnetic. Precision 0.1 second.

V171
TIMING DEVICE
From 0 to 60 minutes, with alarm.

V171

V170

V170-01

SOIL HYDROMETERS

V172	Range 0.995 - 1.038 g/ml, div. 0.001 - 151 H
V172-02	Range -5 + 60 g/litre - 152 H
V172-03N	Range 0.995 - 1.030 g/ml - BS 1377 - **long stem**
V172-04	Range 1.000 to 1.200 g/ml for additives
V172-05	Range 1200 to 1300 g/ml for aggregates. EN 1367-2

V172...

V165
THERMO-HYGROMETER
Digital, portable, with detacheable probe, it measures and displays in a short time both relative humidity and temperature.
Range: R.H. 20.0 to 95.0% - resolution 0.1% - accuracy ± 4%
°C 0.0 to 60.0 - resolution 0.1 °C - accuracy ± 0.5%
Battery: 1x9 V

Dimensions: 185x82x45 mm
Weight: 400 g

V166-01N
CONDUCTIVITY METER – THERMOMETER
Digital, portable. Used for site and laboratory measurements of the conductivity in soils.
Measuring scale: 0 - 4000 uS/cm - resolution 1 uS/cm - accuracy 1%
Temperature in °C and °F., range 0 – 50 °C resolution 0.1 °C
Calibration and temperature compensation: automatic.
Use conditions: 0 to 50 °C, R.H. 95%
Feeding: battery

Dimensions: 50x196x21 mm
Weight: 74g

V166-01N

V165

V173-01
BUNSEN BURNER, universal, with air control.
IT CANNOT BE SOLD IN the european community.

As an alternative:

V173-01CE
BUNSEN BURNER, universal, with air control. Complete with gas-stop valve controlled by a flame sensor and maximum thermostat with reset button.
It can be sold in the european market, but not usable in closed spaces.

V173-02 Tripod Ø 100 x 150 mm
V173-05 Tripod Ø 120 x 220 mm
V173-06 Tripod Ø 150 x 230 mm
V173-03 Iron wire gauze, 150 mm square with ceramic centre
V173-04 Iron wire gauze, 200 mm square with ceramic centre

V174 CRUCIBLE TONGS

V175 VERNIER CALIPER, 0-150 mm x 0.02 mm
V175-01 VERNIER CALIPER, 0-205 mm x 0.02 mm

V175-02 DIGITAL VERNIER CALIPER, 0-200 mm x 0.01 mm
Readings in mm and inch.
V175-03 DIGITAL VERNIER CALIPER, 0-153 mm x 0.01 mm
V175-04 DIGITAL VERNIER CALIPER, 0-300 mm x 0.01 mm

V176 STEEL FOLDING RULE, 2 metres long
V176-01 STEEL RULE, 300 mm long, 0.5 mm grad.
V176-02 STEEL RULE, 500 mm long, 0.5 mm grad.


V173-03

V173-02


V173-01


V173-01 CE


V174


V176-02

V175-02

V175

V176

V177 WORKING SAFETY GLOVES
V177-01 NEOPRENE GLOVES


V177

V177-01

V178 SOFT BRUSH, for cleaning sieves etc.
V178-01 FINE WIRE BRUSH
V178-03 BOTTLE BRUSH Ø 50 mm

V179 BRISTLE, round, Ø 35 mm soft hair
V179-01 BRISTLE, flat 62 mm soft hair
V179-02 SIEVE BRUSH, double-ended, brass/nylon
V179-03 SIEVE BRUSH, double-ended, soft/hard nylon
V179-04 SIEVE BRUSH, fine brass
V179-05 SOFT HAIR BRUSH, Ø 3 mm - BS812
V179-06 BRISTLE, flat, 60 mm, nylon

METAL CONTAINERS AND PRODUCTS

MIXING BOWLS, stainless steel

Model	Diameter
V116-03	160 mm
V116	240 mm
V116-01	290 mm
V116-02	340 mm

V112-05
MORTAR AND PESTLE, stainless steel, Ø 135 mm

TINS, with or without cover

V122 Ø 55 x 36 mm aluminum, with cover
V122-01 Ø 55 x 65 mm aluminum, with cover
V122-02 Ø 75 x 50 mm aluminum, with cover
V122-03 Ø 57 x 32 mm aluminum, without cover
V122-04 Ø 45 x 13 mm aluminum, without cover
V122-05 Ø 55 x 35 mm brass, without cover
V122-06 Ø 70 x 45 mm brass, without cover
V122-07 Ø 90 x 20 mm aluminum, with cover
V122-08 Ø 55 x 40 mm aluminum, without cover
V122-11 Ø 55 x 36 mm aluminum, without cover

PLASTIC CONTAINERS WITH AIRTIGHT LID

Pack o1 10 pieces

Model	Capacity	Handle	Quantity
V125-12	1 litres	no	10 pcs
V125-16	6.1 litres	yes	10 pcs
V125-18	12.5 litres	yes	10 pcs

SAMPLE CONTAINERS, TINNED STEEL, AIRTIGHT LID

Model	Capacity
V125	0.5 litre
V125-01	1 litre
V125-02	3 litres
V125-03	5 litres
V125-04	11 litres

PANS aluminum, galvanized and stainless steel made

Model	Dimensions mm	Material
V182	600x600x80	galvanized steel
V182-03	500x400x120	galvanized steel
V182-04	250x120x80	galvanized steel
V182-06	306x306x38	galvanized steel
V182-07	460x460x50	galvanized steel
V182-08	910x910x76	galvanized steel
V182-01	370x260x50	alluminum
V182-02	330x220x50	alluminum
V182-05	270x180x50	alluminum
V182-10	265x195x47	stainless steel
V182-11	315x240x50	stainless steel
V182-12	370x270x57	stainless steel
V182-13	420x305x60	stainless steel

SCOOPS

ROUND ALUMINIUM

Model	Dimensions mm	Capacity ml
V183	245x80	325
V184	260x90	500
V184-01	335x120	1000
V184-02	380x145	1550
V184-03	420x160	2600

FLAT ALUMINIUM

Model	Dimensions mm	Capacity ml
V184-04	210x70	165
V184-05	310x110	450

ROUND STAINLESS STEEL

Model	Dimensions mm	Capacity ml
V185	100x185	500 ml
V185-01	120x200	1000 ml
V185-02	150x270	2000 ml
V185-03	125x250	5 kg of concrete

STANDARDS: EN 12350-1 | UNI 9416
BS 1881:101

A068-05

V185...V185-02

V187

V189

V188

V185-03

V183...V184-03

V184-04

V194

V195

V193

V199

V198

A068-05 SCOOP steel made, 700x300x100 mm
V186 SAMPLING SPOON, large sized
V186-01 LADLE, stainless steel
V187 RECTANGULAR TROWEL 120x260 mm stainless steel
V188 TROWEL 100x200 mm - stainless steel
V189 TROWEL 60x140 mm - stainless steel
V193 STEEL HAMMER, 300 g
V194 STEEL MALLET, 1000 g
V194-01 STEEL MALLET, 2000 g
V195 RUBBER MALLET, head Ø 55 mm
V196 SHOVEL, with handle
V197 PICK MATTOCK, with handle
V198 DENSITY CHISEL, 300 mm long x 25 mm wide
V199 DENSITY PICK, small sized
S124 WIRE SAW
S125 TRIMMING KNIFE

SPATULAS

FLEXIBLE, STAINLESS STEEL

Model	Blade length mm
V192	100
V192-01	150
V192-02	200
V192-03	300

RIGID, STAINLESS STEEL

Model	Blade width mm
V192-04	20
V192-05	50
V192-06	70
V192-07	100


V186-01

V186


V197

V196

V192...V192-07

V192-08

V192-08 CHATTAWAY SPATULA 120 mm long.

HOT PLATES

Laboratory general utility hot plates, used to dry soil and aggregate samples, and for other general heating applications.

Power supply: 230V 1ph 50-60Hz

AVAILABLE MODELS

ROUND PLATES

Cast iron plate, with temperature control by a multiposition thermostat.

V200 PLATE DIAMETER 185 mm - 1500 W

V200-02 PLATE DIAMETER 220 mm - 2000 W

B074

V200

RECTANGULAR AND SQUARE PLATES

- aluminium alloy plate
- max. temperature: 350 °C
- thermostat range 0-350 °C with fluid expansion probe
- insulation class: 1
- two fuses to ensure electrical protection
- bipolar main luminous switch
- pilot light to signal active status of the heating element

V200-01N RECTANGULAR PLATE 200x300 mm - 1500 W

V200-03N SQUARE HOT PLATE 380x380 mm - 2000 W

V200-05N RECTANGULAR PLATE 400x500 mm - 2000 W

V200-06N RECTANGULAR PLATE 400x600 mm - 2000 W

V200-05

V200-01

HOT PLATES

(They can be used also for the determination of the softening point of bitumen, see p. 150)

B074 ROUND PLATE Ø 160 mm - 1000 W

B073-01

HOT PLATE WITH MAGNETIC STIRRER

Complete with thermoregulator for temperature adjustment and magnetic stirrer with electronic adjustment from 100 to 1200 rpm. Suitable for tests in distilled water with softening point between +30 °C to +80 °C.

Power supply: 230V 1ph 50-60Hz 700W

Weight: 4 kg approx.

B073-01

B073-02

HOT PLATE WITH MAGNETIC STIRRER

Same to mod. B073-01, but with more powerful electric heating resistance, suitable **also** for tests in glycerine with softening point over +80 °C up to +150 °C.

V203
VACUUM PUMP

Portable, one stage type, it produces an ultimate vacuum of 650 mm Hg (150 mbar)
Volume sucked: 2 Cu.m/h
Supplied complete with water trap and electric cable

Power supply: 230V 1ph 50 Hz
Dimensions: 180x180x220 mm
Weight: 5 kg approx.

V204
VACUUM PUMP

Portable, volume sucked: 5 Cu.m/h
Ultimate vacuum 730 mm/Hg (40 mbar)
Supplied complete with water trap and electric cable

Power supply: 230V 1ph 50Hz
Dimensions: 220x260x190 mm
Weight: 12 kg approx.

VACUUM PUMP

Lubrified, paddle rotatory type.
Supplied compete with:
Thermal protection with automatic resetting, assembled inside the motor.
On/Off luminous switch, cable, carrying handle, base, bottle of special oil.
CE labelled with certificate of conformity.
Ideal for laboratory and site use to produce vacuum
Rotation speed: 2800 rpm

Power supply: 230V 1ph 50-60Hz

AVAILABLE MODELS

Models		V205	V205-01	V205-02
Free air displacement	litres/min.	75	75	150
Ultimate vacuum	mbar	0.1	0.01	0.01
Stages		1	2	2
Motor power	W	180	240	370
Dimensions	mm	300x150x240	300x150x280	350x150x275
Weight	kg	8.4	9.8	11

SPARES

V205-11 Special oil for vacuum pumps. Bottle of 500 cc.

ACCESSORIES

V205-10 VACUUM REGULATOR, complete with vacuum gauge Ø 80 mm, regulation cock, suction filter.

V230-03 RUBBER TUBE, lined for vacuum, 3 m long

V205-12 CONDENSED WATER TRAP

V202
ASPIRATOR PUMP, used with current water having approx. pressure of 0.7 kg/cm^2 to create a moderate vacuum.

V201
WARM AIR DRIER
For general laboratory purposes, to dry soil and aggregate samples.

Power supply: 230V 1ph 50Hz 1200W

V201

V201-01
BUTANE THREE-BURNER
field heater, to be used with a common butane cylinder.
Dimensions: 600x320x90 mm approx
Weight: 5 kg approx.

V201-01

V208-05
UNINTERRUPTIBLE POWER SUPPLY
Used to protect electrical devices from fluctuations in the power supply and to provide emergency power for a limited time
- Imput voltage: 230V
- 50-60Hz 1ph
- Output voltage 230V

Dimensions: 150x240x360 mm
Weight: 16 kg approx.


V208-05

V208-10
VOLTAGE STABILIZER
It maintains the voltage stable, by adjusting and linearizing the tension variations.
Advantages: high quality of the tension, better load protection against electromagnetic disturbances.
Recommended when electronic, informatic, PC devices are used.
Power: 4 kVA
Accuracy: ± 3%

Nominal output voltage:
18A 230V 1ph 50Hz
Weight: 25 kg approx.

V208-10

S351N
LABORATORY AIR COMPRESSOR
It reaches a maximum pressure of 15 bar and it is normally used with the air/water interface system (see p. 550).
Sucked air: 84 litre/minute.
Reservoir capacity: 3 litres.

Power supply: 230V 1ph 50Hz 0.75HP
Dimensions: 460x300x470 mm
Weight: 22 kg approx.


S351N

V207
LABORATORY AIR COMPRESSOR
Max. pressure: 10 bar
Air delivery: 240 litre/minute.
Reservoir capacity: 50 litres

Power supply: 230V 1ph 50Hz 1.5KW
Weight: 40 kg approx.

V207

V206
AIR COMPRESSOR
Max pressure: 8 bar
Air delivery: 222 litre/minute
Reservoir capacity: 24 litres

Power supply: 230V 1ph 50 Hz 1.5 KW
Weight: 30 kg approx.

V206

V206-01
AIR COMPRESSOR
Max pressure: 10 bar
Air delivery : 260 litre/minute
Air reservoir: 90 litres capacity

V206-02
AIR COMPRESSOR
Max pressure: 10 bar
Air delivery: 320 litres/minute
Air reservoir: 200 litres capacity

WATER STILLS

Stainless steel manufactured, they are used to produce distilled water for laboratory purposes, they are equipped with an automatic device to keep the water at a constant level and to cut off the current in case of shortage of water, overheating.

Power supply: 230V 1ph 50-60Hz

V211

AVAILABLE MODELS

V211
WATER STILL 4 LITRES/H CAPACITY

Power: 3000W
Dimensions: 250x222x542 mm.
Weight: 13 kg approx.

V211-01
WATER STILL 8 LITRES/H CAPACITY

Power: 6000W
Dimensions: 260x260x610 mm.
Weight: 16.5 kg approx.

PH METERS, DIGITAL

STANDARDS: ASTM D1067 | BS 1377:3

AVAILABLE MODELS

V215
pH METER, POCKET, battery operated, with replaceable electrode
Range: 0.00 to 14.00 pH - Resolution 0.01 pH
Manual 2 points calibration.
Power supply: standard battery, 3000 hours use.
Supplied complete with: electrode, batteries, 5+5 kit of pH 4 and 7 calibration solutions

Weight: 70 g

V215

V215-01N

PH / MV / °C METER, PORTABLE, WATERPROOF

Range pH: 0.00 to 14.00 - Resolut. 0.01 pH
mV: ± 1999 - Resolut. 0.1mV - 1mV
Temperature: 0 to 100 °C
Manual 2 points calibration.
Automatic temperature compensation.
Power supply: 9V battery, 100 hours use.
Supplied complete with: electrode, temperature probe, battery, calibration solutions, case.

Weight: 180 g

V215-01N

V215-02N

PH / °C ORP (OXIDATION REDUCTION POTENTIAL) METER LABORATORY MODEL

Range pH: -2.00 to 16.00 - Resolut. 0,01pH
Temperature: -20 to 120.0 °C - Resolut. 0.1 °C
Automatic 1 or 5 points calibration with 7 memorised buffers.
Automatic temperature compensation.
Digital electrodes with mini-jack connector.
Power supply: SVdc (230V adapter included)
Supplied complete with: electrode, temperature probe, electrode-holder, adaptor, calibration solutions, dual USB port

Dimensions: 202x140x13 mm
Weight: 250 g

V215-02N

ACCESSORIES (for all pH models)

V215-11 BUFFER SOLUTION, pH 4.01
V215-12 BUFFER SOLUTION, pH 7.01
V215-13 BUFFER SOLUTION, pH 10.1
V215-14 ELECTRODES MAINTENANCE SOLUTION

METAL STANDS, with rod

V219 Metal stand, base 165x140.
Rod Ø 10x500 mm
Weight: 3 kg approx.

V219-01 Metal stand, base 200x260.
Rod Ø. 12x800 mm
Weight: 5 kg approx.

V219...

V220...

V220 Hoffman screw clamp, max opening 25 mm
V220-01 Mohr clamp
V220-02 Double sleeve metal/metal. Ø 10...25 mm
V220-03 Double sleeve metal/metal. Ø 10...20 mm
V220-04 Simple clamp. Ø 10...20 mm
V220-05 Simple clamp. Ø 20...30 mm

V222
TOOL KIT

For general purpose uses and normal maintenance of laboratory equipment.

Weight: 7 kg approx.

V222

LABORATORY TROLLEY

Used for laboratory displacement of heavy pieces like moulds, soil and concrete samples etc.
Steel made, mounted on rubber wheels.

V224 Trolley platform size 735x475 mm
Weight: 9 kg approx.

V224-01 Trolley platform size 910x610 mm
Weight: 17 kg approx.

V225 Trolley at double shelf size 790x480 mm
Weight: 21 kg approx.

V225

V224

V226
WHEEL BARROW, pneumatic type

V226

RUBBER TUBING

Model	Inside diameter	Length
V230	5 mm	5 metre
V230-01	6 mm	5 metre
V230-02	8 mm	5 metre

V230-03
SPECIAL TUBING FOR VACUUM

Applications 8 mm inside diameter by 3 metre length.

V230...

V241
SAND BATH

For the homogeneous heating or evaporation of the content of beakers flasks et.

Inside dimensions: 300x240x90 mm Volume: 7 litres
Overall dimensions: 420x400x280 mm
Power supply: 230V 1 ph 50/60 Hz
Weight: 17 kg approx.

V241

V218...

FILTER PAPER, pack of 100 pieces

Model	Whatman n° x Ø	Degree of filtration
V218-01	1 x 110 mm	Fast
V218-02	1 x 150 mm	Fast
S200-14	5 x 150 mm	Slow
V218-05	40 x 150 mm	Middle
V218-06	44 x 150 mm	Slow
V218-07	44 x 110 mm	Slow
V218-08	50 x 110 mm	Slow
V218-09	54 x 150 mm	Fast
V218-10	540 x 150 mm	Middle
V218-11	541 x 110 mm	Slow
V218-12	54 x 400 mm	Fast

THERMOSTATIC WATER BATHS

See Sections: Ashpalt/Bitumen p. 74
Cement/Mortars p. 382
Soils p. 458

B052

CHEMICALS

Model	Description	Q.ty
V300-05	Distilled water	2000 ml
V300-15	Silica gel	1000 g
V300-16	Glycerine	1000 ml
S328	Vaseline oil	1000 ml
V300-19	Paraffin wax	5000 g
V300-23	Sodium hexametaphosphate	1000 g

Model	Description	Q.ty
V300-24	Sodium hydroxide	1000 g
V300-25	Sodium sulfate	1000 g
V300-28	Blue of mathylene	100 g
V300-29	Kaolinite	500 g
V300-30	Ion exchange resin	500 g

Note: Several chemicals classified as dangerous, cannot be supplied for shipping safety problems.

V300...

INDEX