A PARTNERSHIP WITH MATEST BLENDS INNOVATION, COMMITMENT AND OUTSTANDING RESULTS.

Joining forces for strategic alliances: at the forefront of technology, innovation and cost effective production.

The ninth edition of Matest general catalog represents for us a major achievement, but also the beginning of a new era.
Commitment and passion led us to make bold, progressive and often courageous decisions that have been acknowledged and rewarded by the market.

The mission and the vision of our company have constantly focused on R&D and manufacturing. As a result, we are the leading manufacturer of material testing equipment, based in Italy, with an emphasis on INNOVATION and QUALITY.
These values and endeavors lead to new and improved products that enhance and broaden our range beyond comparison, worldwide.

All this is evident in our core business: a time proven generation of concrete testing machines capable of satisfying the most demanding applications due to the versatility and competitiveness of our systems. Making them the best selling products across the globe.

Key to the future business is the establishment in 2013 of PAVETEST, a division of Matest committed to developing innovative dynamic testing systems for asphalt with unparalleled performance, ultimate versatility and exceptional reliability; at a price that represents real value for money.
Based in Australia, Pavetest is the brainchild of Australian industry veterans Con Sinadinos, CEO, and Alan Feeley, Technical director, who bring a wealth of experience and talent to the company. The benefits of that experience is evident in the detail and quality of every Pavetest product.

With a proven track record in value engineering, MATEST's asphalt and bitumen testing equipment complements Pavetest's range of pavement testing systems. We can now offer a complete range of static and dynamic products and testing solutions from sample preparation to advanced material research.

A special thank goes to all our customers and partners: the precious link between research and the market, science and application, areas where now, more than ever, quality and reliability are the essential.

Matest management team
Roberto Maestroni - Paola Maestroni - Danilo Guerini

THE WORLDWIDE REFERENCE FOR MATERIAL TESTING EQUIPMENT TO THE CONSTRUCTION INDUSTRY.

OUR CUSTOMERS

- Quality control and geotechnical laboratories
- Educational entities
- Road contractors
- Asphalt manufacturers
- Concrete and cement manufacturers
- Construction companies
- Government authorities and ministries
- Re-sellers, engineers and consultants

THE BENEFIT OF LEADING EDGE TECHNOLOGY, WORLD CLASS MANUFACTURING AND MANY YEARS EXPERIENCE.

DNV BUSINESS ASSURANCE
MANAGEMENT SYSTEM CERTIFICATE
MATEST S.p.A. Unipersonale
UNI EN ISO 9001:2008 (ISO 9001:2008)
ACCREDIA

Matest is the leading manufacturer of testing equipment for the construction industry.

With more than 25 years experience in the field, ISO 9001 accreditation and a proven track record in value engineering, Matest is committed to developing new technology, fulfilling the requirements of existing and emerging International Standards and taking on new market challenges in the material testing field.

Matest invests huge resources in stock availability, ensuring the fastest delivery time of products and spare parts.

Made in Matest, Made in Italy.

PAVETEST

SPECIALIZING IN EXCELLENCE.

WHEN PERFORMANCE MATTERS

Pavetest is the new division of Matest committed to developing a range of innovative, dynamic testing systems for asphalt with:

- Unparalleled performance
- Ultimate versatility
- Exceptional reliability

at a price that represents real value for money.

www.pavetest.com

AMPT / SPT
ASPHALT MIXTURE
PERFORMANCE TESTER

30 kN SERVO-HYDRAULIC
DYNAMIC TESTING SYSTEM

CDAS - CONTROL AND DATA
ACQUISITION SYSTEM

STAND-ALONE SERVO-PNEUMATIC
FOUR POINT BENDING SYSTEM

16 kN SERVO-PNEUMATIC
DYNAMIC TESTING SYSTEM

INTELLIGENT DESIGN AND GREAT LOOK COUPLED WITH PERFORMANCE.

Matest has a strong commitment in developing new products and improving testing solutions. The latest news of our extensive range includes:

- **UNITRONIC 200 kN** Universal electromechanical frame (S206N)
- **ASPHALT SPLITTER** (B007)
- **SHEARTRONIC** Fully automatic shear testing machine (S277-02N)
- **TRAVELLING BEAM DEVICE**, Matest made (B098N)
- **DIGITAL TRIAXIAL LOAD FRAME 50 kN** with touch-screen control unit (S301N)
- **DIGITAL UNIVERSAL MULTISPEED LOAD FRAME** with touch-screen control unit (S215A)
- **EDOTRONIC** Automatic consolidation apparatus (262N)
- **SHEARLAB** (S277N KIT) and **AUTO SHEARLAB** (S277-01N)
- **MIXMATIC** Automatic programmable computerized mortar mixer (E092N KIT)

SmarTracker™
MULTIWHEELS HAMBURG WHEEL TRACKER;
TEST ENVIRONMENT: WET+DRY

ASC - ASPHALT SHEAR BOX COMPACTOR

GYROTRONIC SUPERPAVE GYRATORY COMPACTOR

PaveMix AUTOMATIC ASPHALT LARGE LABORATORY MIXER

Our core business:
A TIME PROVEN GENERATION OF TESTING MACHINES.

- Automatic control of multiple frames
- Modulus of elasticity for concrete, rocks and cement
- Deflection measurement
- “Servo Strain” Stroke and deformation controlled test
- Residual strength and energy absorption

Automatic control unit
THE PILLAR OF YOUR TEST FRAME: POWERFUL AND FLEXIBLE.

MATEST “SERVO-PLUS EVOLUTION”

AUTOMATIC MODULUS OF ELASTICITY

FLEXURAL TEST WITH THE OPEN SIDE FRAME

ENERGY ABSORPTION TEST

THE MATEST COMMUNITY: PERSONALIZED CARE IS A COMPANY VALUE.

- Machine installation and commissioning
- Training courses and specialized instruction at Matest headquarters
- Pre and after sales assistance provided by product specialists
- Calibration certificates issued by Matest accredited Centre

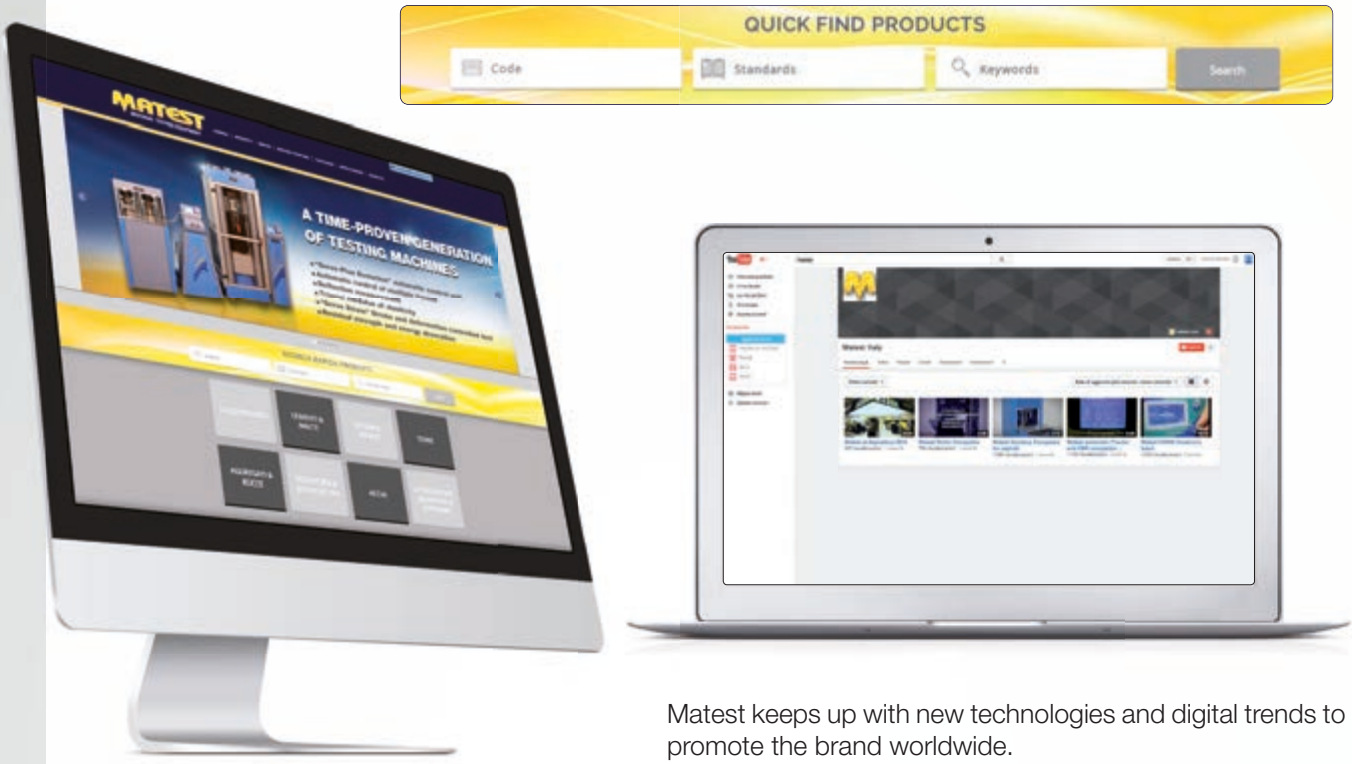
ACCREDIA
L'ENTE ITALIANO DI ACCREDITAMENTO

LAT N. 214

Signatory of EA, IAF, and ILAC
Mutual Recognition Agreements

Only the last above mentioned activity is covered by ACCREDIA

MATEST COMMUNITY



MATEST.COM

Matest keeps up with new technologies and digital trends to promote the brand worldwide.
We have a new **multilingual website** updated daily with all the company latest developments, new products, publications and representation at world trade shows.
Our official videos are posted on **"Matest_Italy" YouTube** channel and we share info on Matest social networks official pages.
Join us on **Facebook**, **Twitter** and **Linkedin**!

EFFECTIVE COMMUNICATION FOR THE WHOLE WORLD

We care about our partners and customers, supporting them as much as possible. Translated promotional materials help us to better convey our products' range and corporate identity. That's why we have a complete General Catalogue and cd-rom available in English, Italian, Spanish, and Russian, and brochures edited in more than 12 languages.
Ask for your copy at **info@matest.com**.

INDEX

SOFTWARE UTM2 14

AGGREGATES – ROCKS 25

BITUMEN – ASPHALT 69

▸ PAVETEST DIVISION 104

CONCRETE 151

CEMENT – MORTAR 307

STEEL 357

SOIL 375

GENERAL EQUIPMENT 467

ANALYTICAL INDEX 493

STANDARD INDEX 505

PRODUCT CODE INDEX 514

UTM2 SOFTWARE (UNIVERSAL TESTING MACHINE 2)

Software developed by Matest allowing operators the management and a "User friendly" control of Matest's digital testing machines.

Software available in different languages
(Italian, English, French, Spanish, German, Polish, Czech, Slovak, Turkish)

The optimal solution of laboratories for its characteristics of versatility with a wide range of customizations, for testing and research.

The ideal Software for the management of an extensive production. It contains preset profile tests according to the specifications of the EN Standards and the most common International Standards.

Flexibility, operating speed, precision and automatic storage are the fundamental characteristics of the Software conceived to facilitate the operator with few computer skills, for the management of the tests and the testing machines too.

By connecting the PC to the testing machine it is possible to perform the most complex tests just by pressing the start button. UTM2 requires a low expertise operators without any specific experience to use the software successfully (with low cost for the company).

It facilitates the printing of certificates suggesting a preset layout but changeable and customizable by the user with its own logo or others.

The software is developed on Windows platform and can be installed on old and new operative systems such as windows 2000, XP, Vista, Windows 7.

UNIVERSAL TESTING MACHINE 2

UTM2 Software – Licenses available:

Rocks

A150N Uniaxial and Triaxial Elastic Modulus of the compression on rocks. Automatic system with pace rate control also when releasing the load.

Bitumen asphalt

B043-01(N) Marshall compression test
B043-02(N) Tensile splitting test
B043-03(N) Leutner and Marshall tests.

Concrete

C109-10(N) Compression test
C109-11(N) Flexure test
C109-12(N) Tensile splitting test on concrete specimens and concrete block pavers
C109-14(N) Flexural strengths (first peak, ultimate and residual) EN 14488-3
C109-15(N) Energy absorpion test on sprayed concrete Specimens EN 14488-5
C109-16(N) Flexural test on clay blocks. UNI 9730-3
C123(N) "Servonet" for the remote control and management by PC of the testing machines.
C104-10N "Servo-Strain" for the automatic servo-control and management of the load, displacement, deformation. Punching tests on plates, measurement of the deflection, crack opening, deformability, ductility etc.
C125N Secant compression Elastic Modulus. Automatic system with pace rate control also when releasing the load.

Cement and mortar

E163(N) Compression test
E164(N) Flexure test
C123(N) "Servonet" for the remote control and management by PC of the testing machines.
S205-08(N) Tensile test on mortar briquettes.
E190N Compression Elastic Modulus. Automatic system with pace rate control also when releasing the load.

Steel

H009N Tensile tests on metals and other materials
C123-01N Compression tests with H011-01N machine

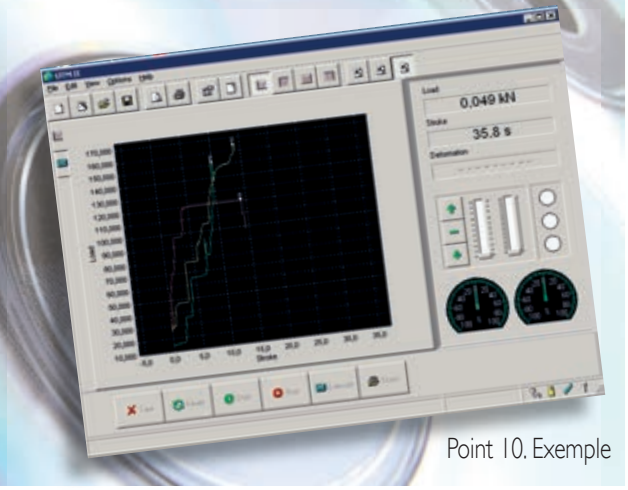
Soil

S218(N) CBR test
S218-01(N) Unconfined Compression tests
S224-21N Rock shear box apparatus

General features of the UTM2

1. Automatic identification of the appliance connected .
2. Easy setting of the sequence of operations concerning the test to be made settable by the operator. The realization of a personalized testing profile savable and reusable allowing to operate following his own needs setting data and cycle test, the analogical measuring channels and the speed charts.
3. Memorization of the test in the database with the possibility to process it again.
4. Remote and interactive control of the machine.
5. Visualization of the instant loads, instant definition of the load/deformation/stroke graph, remote control of the main functions of the machine. It can also visualize the emergencies, the alarms and the eventual errors, it calculates and saves all the parameters of the test made with the possibility to process again, and to manage the test files.
6. The data test can be commented by means of test titles to be reported on the certificate or on the graph desired.
7. The user can select the calculation algorithms and , using them, the SOFTWARE will process all the results required by the Standards.
8. The colors and the graph scales of the activated windows can be freely selected by the user as well as zooming on the main interested graphic points.
9. The test certificate can be personalized with the following variables: name of the company, kind of test, date, kind of graph and number of pages.
10. Possibility to visualize into one graph and register into the archive up to no. 5 test contemporaneously, in order to dispose of a complete and global information about the tests performed for the same production batch.

NEW



Point 10. Exemple

Software: **B043-01(N)** License for Marshall compression tests.
Standards: EN 12697-34 / CNR N. 30 / ASTM D1559
NF P98-251-2 / BS 598 :107

Software: **B043-02(N)** License for Tensile splitting test on bituminous Specimens.
Standards: EN 12697-23 / CNR N. 134 / ASTM D4123

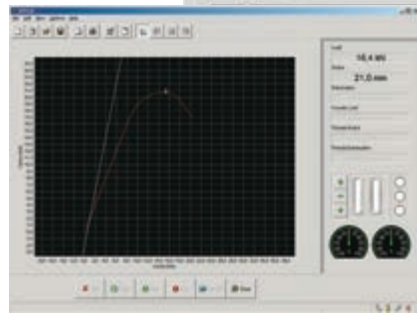
Software: **B043-03(N)** License for Leutner e Marshall tests
Standards: ALP A StB T.4 / EN 12697-34 / CNR N. 30
ASTM D1559 / NF P98-251-2 / BS 598 :107

Machines: **B043 KIT** (pag. 113) Marshall Digital 50 KN testing machine

B044N SET (pag. 122) Digital unit for Marshall tests, CBR tests.

S214N KIT (pag. 409) CBR/Marshall Digital 50 KN testing machine

B043-01(N) Setting of test results



B043-01(N) Load/Deformation graphic with marker selection

S215A
(pag. 410) Universal digital multi-speed load frame

S205
(pag. 414) Unitronic" 50 kN universal frame

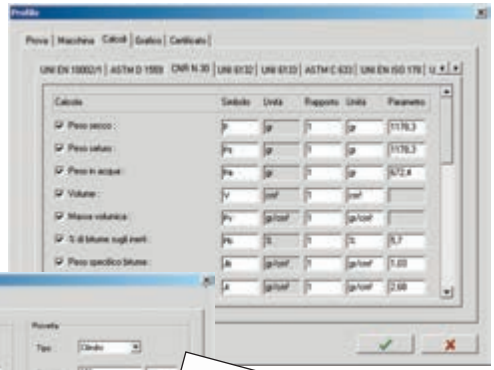
S206N
(pag. 420) Unitronic 200 kN universal frame

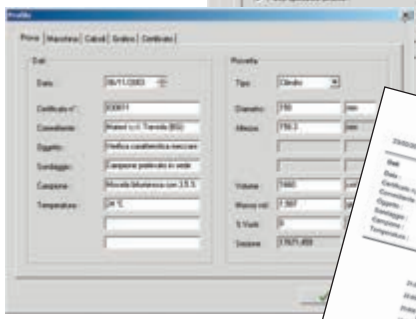
Marshall test

Tensile splitting test

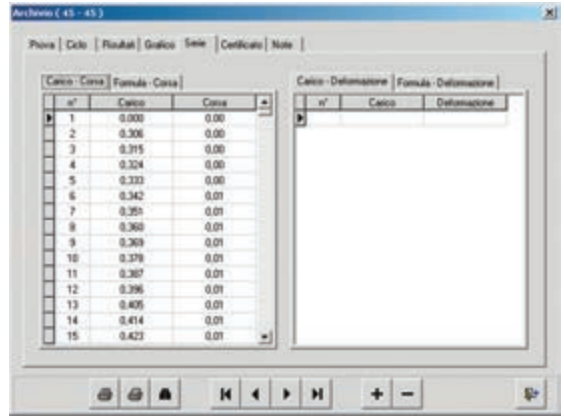
Leutner test

B043-01(N) Selection of the calculation algorithms



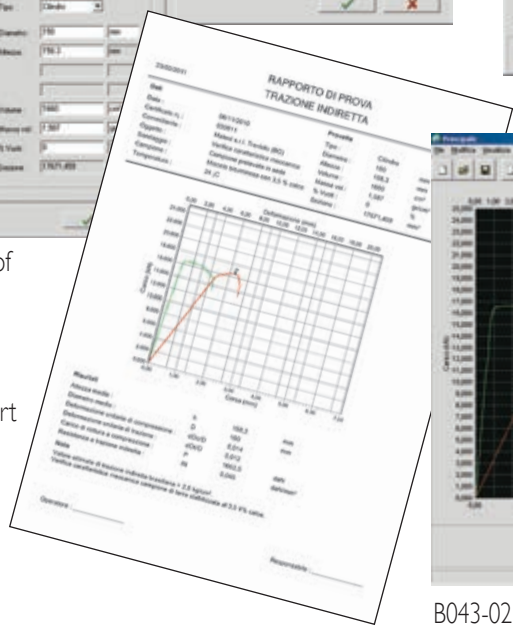


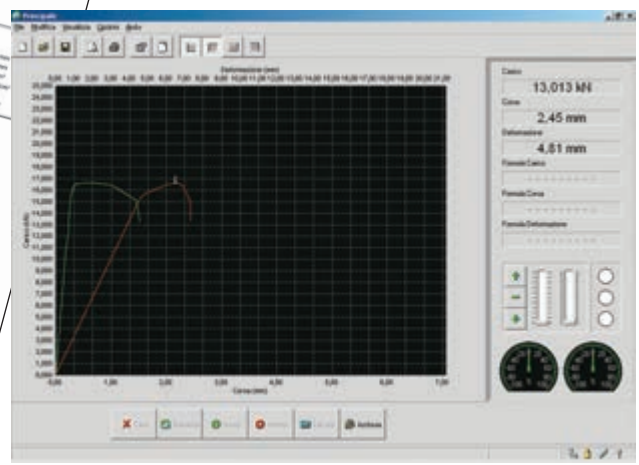
B043-02(N) Attribution of test data



B043-01(N) Set of test samplings

B043-02(N) Test report





B043-02(N) Load/Deformation graphic

Software: **C109-10(N)** License for compression tests on concrete.
Standards: EN 12390-3, EN 679, UNI 6686, 6132, BS 1881
UNE 83304, DIN 51220, ASTM C39, NF P18-411

Software: **C109-11(N)** License for flexure tests on concrete.
Standards: EN 12390-5, EN 1340:4, UNI 6133, BS 1881,
ASTM C78, C293, NF P18-407

Software: **E163(N)** License for compression tests on mortars.
Standards: EN 196,1 / ASTM C109

Software: **E164(N)** License for flexure tests on mortars.
Standards: EN 196,1 / ASTM C348

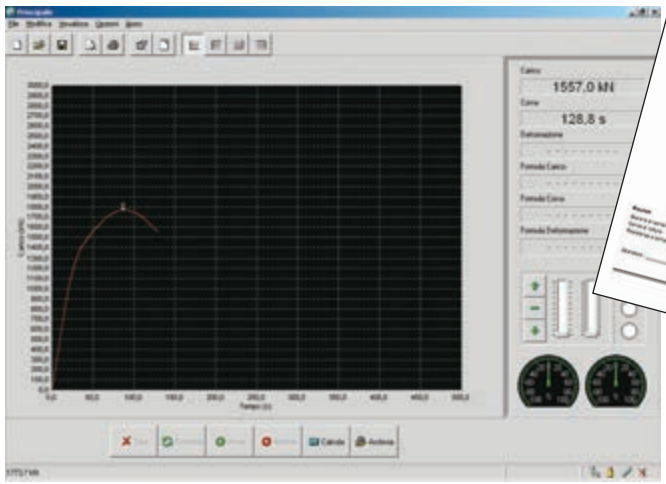
Machines: **C109N** (pag. 158) "Cyber-Plus" 8 Evolution Touch Screen, eight channels digital unit, applied to any compression or flexure testing machine for concrete or mortars.

Machines: **C108N** (pag. 155) Digitec, two channels digital unit, applied to any compression or flexure testing machine for concrete or mortars.

C109N

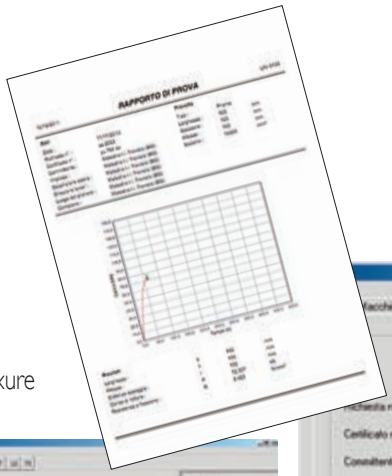
C108N

Concrete compression test



C109-10(N) Graphic of compression test execution

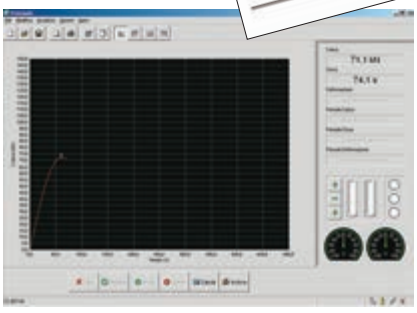
C109-10(N)
Report of compression test

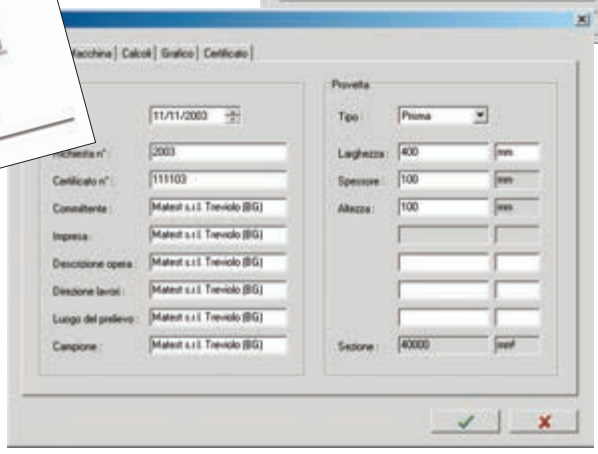


C109-11(N)
Report of flexure test

C109-11(N)
Flexure: Outline of the Standard calculations

C109-11(N)
Graphic of flexure test execution

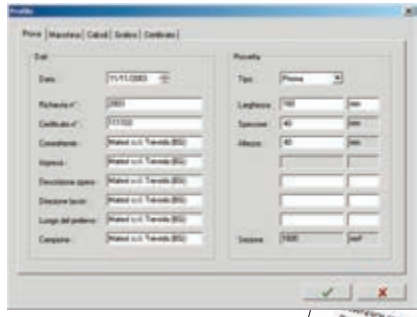




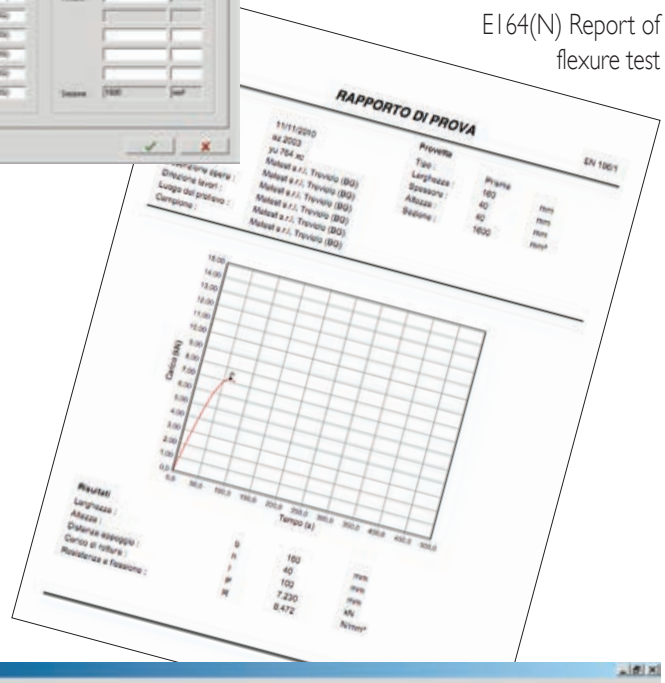
C109-11(N) Flexure: Outline of test data

Concrete flexure test

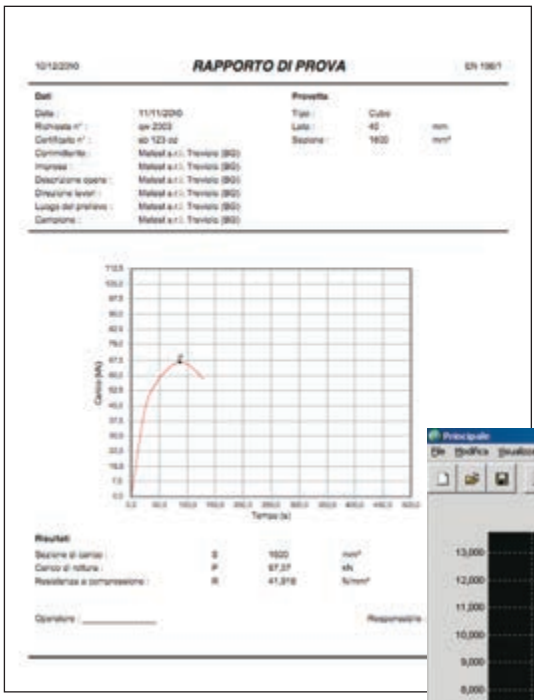
Compression/Flexure test on mortars



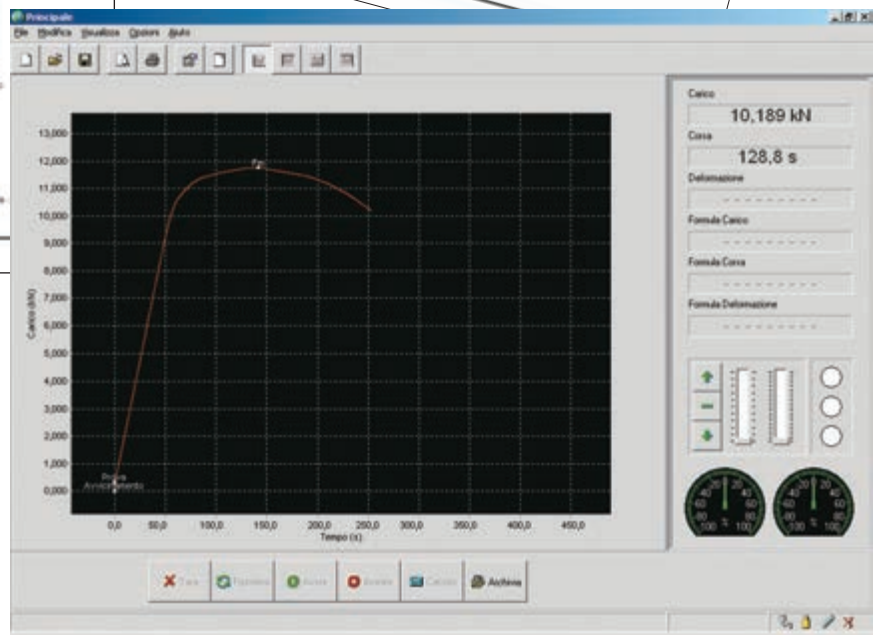
E164(N)
Outline flexure test



E164(N) Report of flexure test



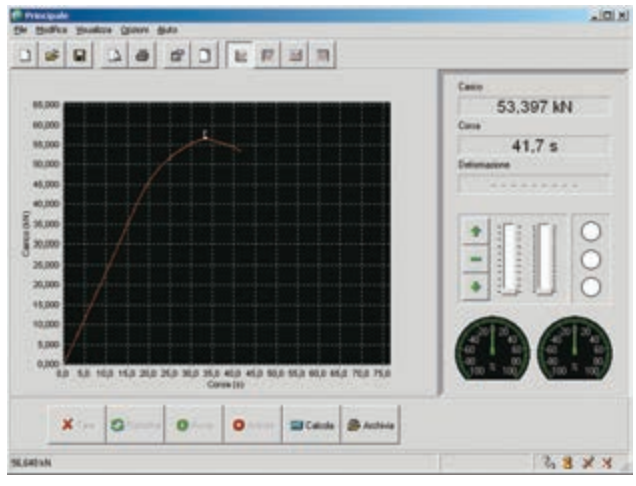
E163(N) Report of compression test



E164(N) Graphic of flexure test execution

Splitting Test

C109-12(N) Graphic of tensile splitting test execution



Software: **C109-12(N)** License for Tensile splitting tests on cylinders, cubes and concrete blocks.
Standards: EN 12390-6, EN 1338, EN 1339, UNI 6135
ASTM C496

Machines: **C101-01** (pag. 241) Device for tensile splitting test on cylinders
C103 (pag. 241) Device for tensile splitting test on cubes and blocks pavers.

Software: **C123(N)** "Servonet" License for automatic servo-controlled and remote control of the machine through PC. The licenses for compression and flexure tests on concrete and mortar specimens are also included in this license.
Standards: EN 12390-3, 12390-5, 679, 196-1, UNI 6686, 6132, BS 1881, ASTM C39, C78, C109, C293, C348, NF P18-411, P18-407, UNE 83304, DIN 51220

Software: **C125N** License for the determination of the secant compression elastic modulus on concrete. Servonet license is included.
Standards: UNI 6556 - ASTM C469 - ISO 6784 - DIN 1048

Software: **A150N** License for the determination of the compression elastic modulus on rocks. Servonet license is included.
Standards: EN 9724-8, ASTM D3148, D2938, D5407, D2664, ISRM.

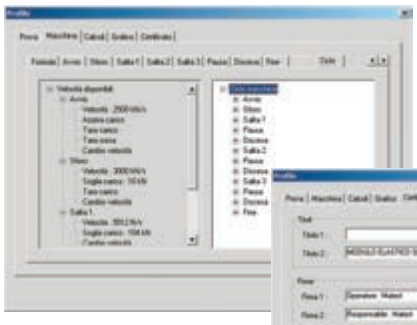
Software: **E190N** License for the the determination of the compression elastic modulus on mortars. Servonet license is included.
Standard: EN 13412

Machines: **C104N** (pag. 158) "Servo-Plus" 8 Evolution Touch Screen. automatic servo-controlled system at 8 channels.
It can be applied on any compression or flexure testing machine for concrete or mortars.

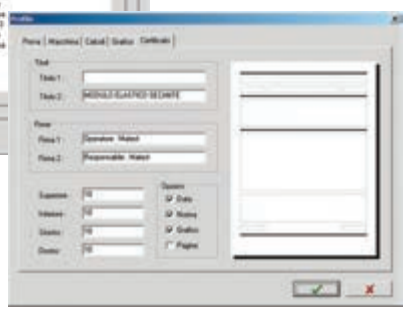
C098N (pag. 155) "Autotec". Automatic Servo-Controlled System at two channels.
It can be applied to any concrete compression and flexure machine, and on single-piston mortar machines.
Not suitable for Elastic Modulus tests.

C104N + C104-04

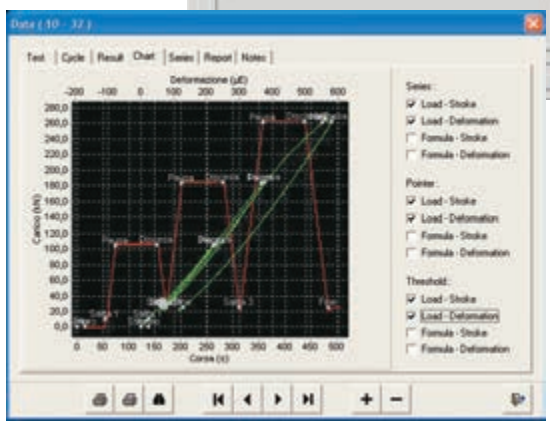
C125N
Selection of the test profile



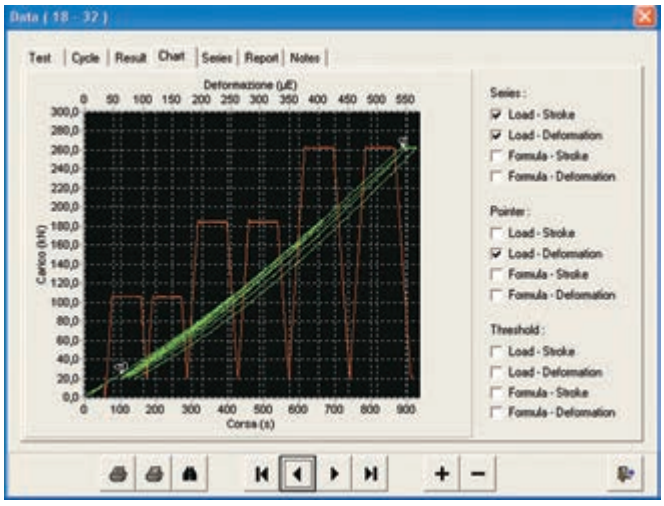
C125N
Personalisation and composition of the test profile



C125N
Personalisation of the test certificate



C125N
Screen during the test with marker at any variation



C125N
Test with two cycles confirmation

Servo-Strain applications:

Software: **C104-10N** (pag. 164, 165)
Strain, ductility, post-breaking behaviour.

Lightweight aggregates crushing resistance determination. Standard: EN 13055-1 method 1

Machines: **C104N** Servo-Plus (pag. 158)
Compression testing machines, servo-controlled, high stability (mod. C089-04N to C089-19N)

Software: **C109-15N** (pag. 164, 165)
Deflection tests on fiber reinforced concrete beams.
Standards: EN 11039-03, 14487-1, 14488-1, 14651-05, ASTM C1018

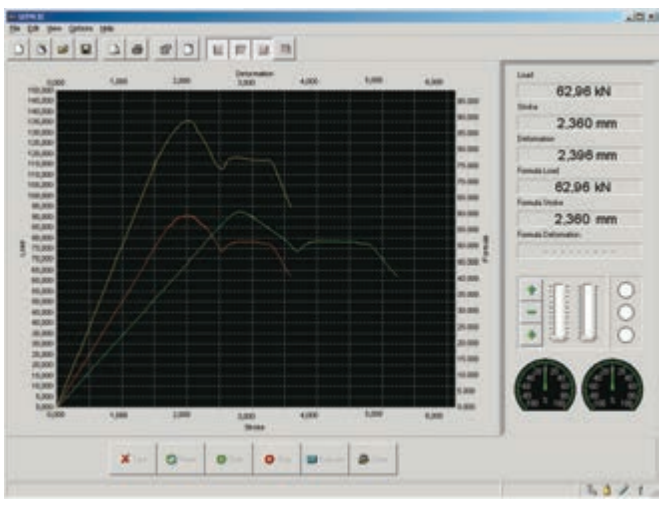
Punching test on sprayed concrete specimens with measurements of the energy absorption.
Standards: EN 10834, 14488-3, 14488-05

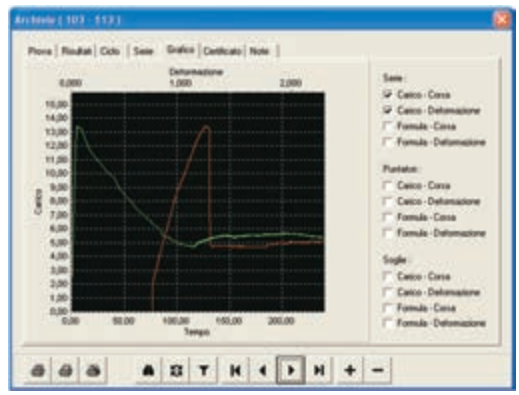
Machines: **C104N** Servo-Plus (pag. 158)
Flexure testing machines, servo-controlled, (mod. C090-07N, C091-03N plus C090-14, C090-15)

C104-10N + C089-04N

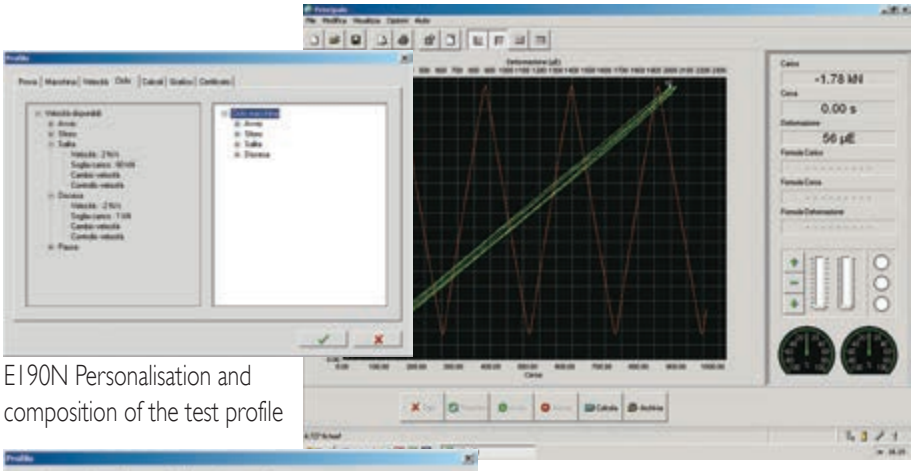
C090-14 + S336-14 + C109-15N
fixed on the flexural machine **C090-07N**

C090-15 + C109-15N
fixed on the flexural machine **C090-07N**

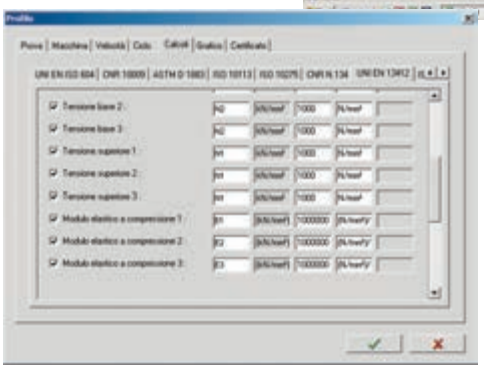




Load / Deformation graphics

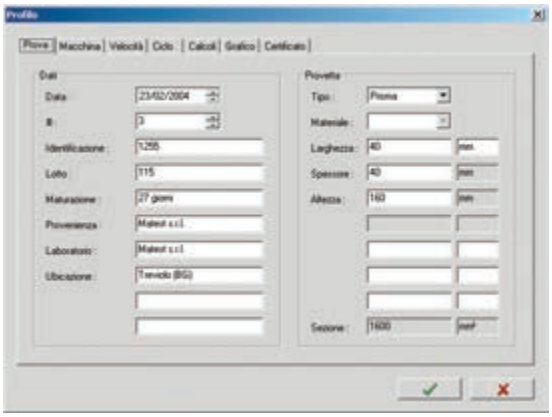


E190N Personalisation and composition of the test profile



E190N Selection of the test Standard with possibility to personalize the calculation algorithm

E190N Screen during the test execution

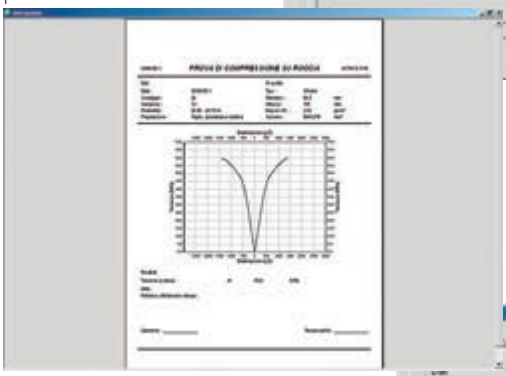


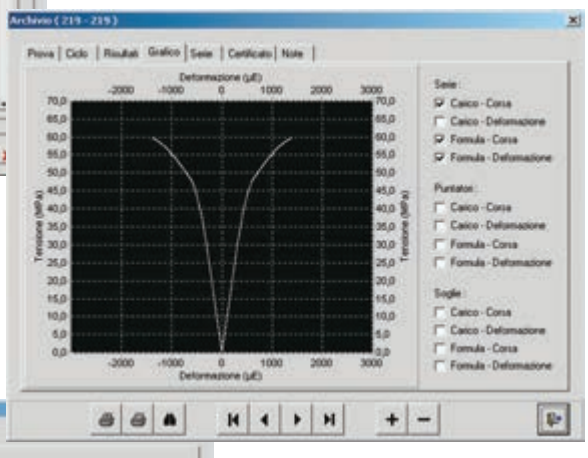
E190N Data attribution and personalization of the test profile

A150N Selection of the test Standard with possibility to personalize the calculation algorithm

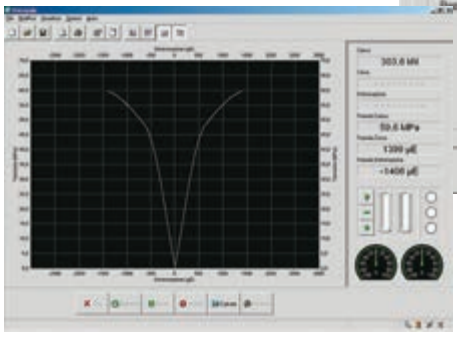
A150N Graphic display with possibility to personalize the ranges and the zooms to visualize

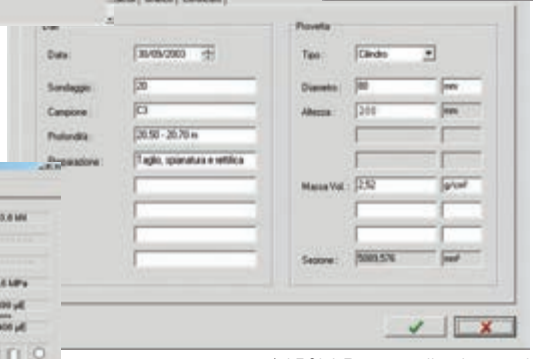
A150N Personalisation and composition of the test profile



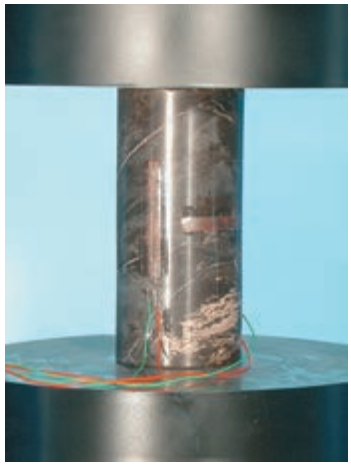


A150N Screen example during the test with display of the longitudinal and transversal deformations





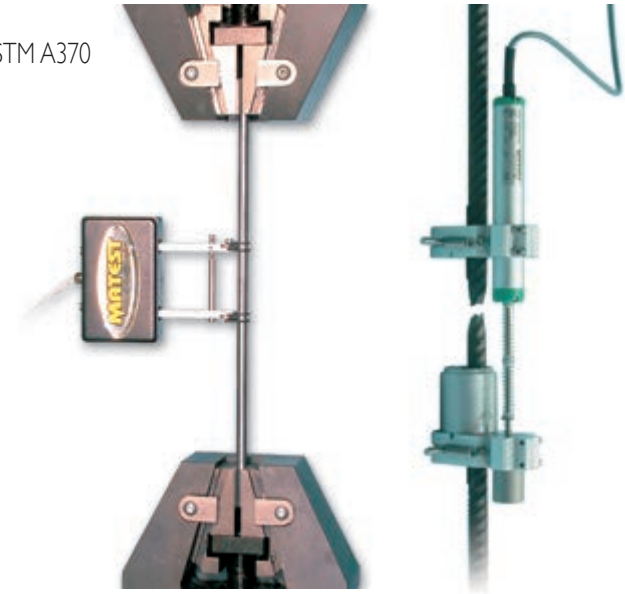
A150N Data attribution and personalization of the test profile



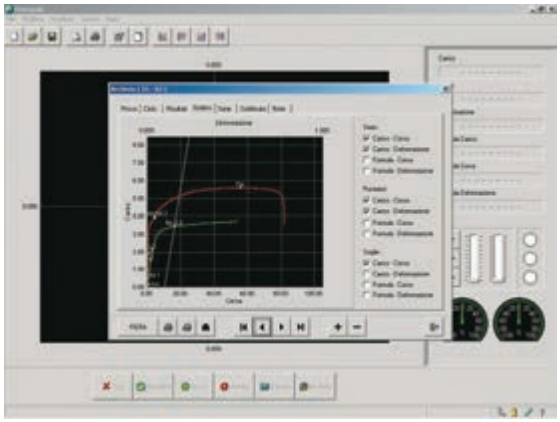
Software: **H009N** License for tensile tests.
Standards: EN 10002 - ISO 527, 178, 604, 10113, 12275, ASTM A370

Machines: **H002N** to **H008** (pag. 358 ÷ 365)
Universal Testing Machines for tensile tests on metals

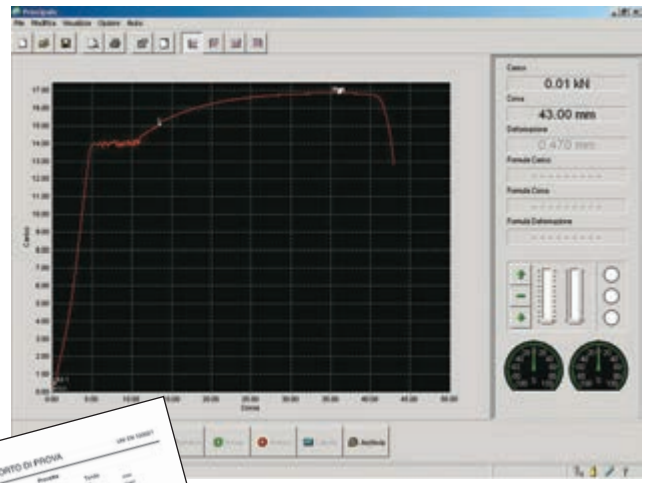
Machines: **H011N** and **H011-01N** (pag. 368)
Universal tensile/compression frame.

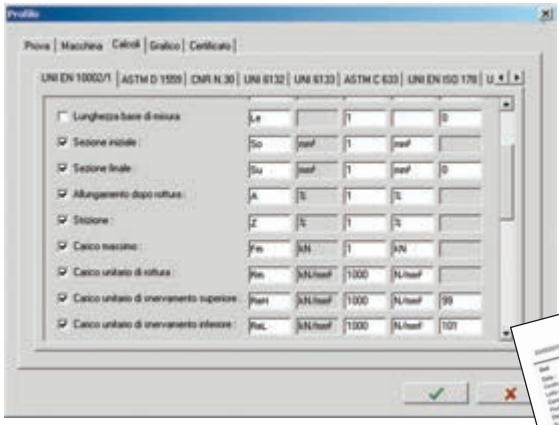


Tensile test on a steel specimen without extensometer; it visualises the starting of the specimen breaking with the possibility to increase the dimensions of the area of the graph by means of the zoom function.



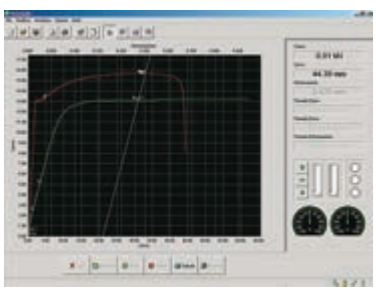
Practical example of saving a test graph where the user can select which traces have to be shown, modify the scales or personalise the colours and give a new name to the axis upgrading.



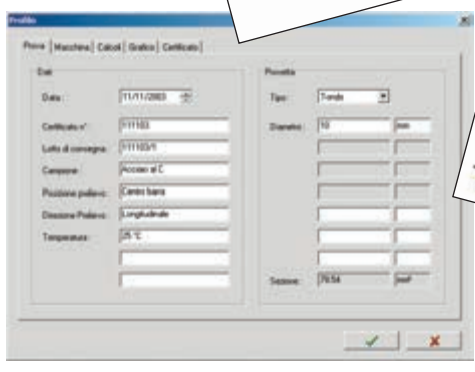


Selection of the test Standards with the possibility to select the dimensions for the personalisation of the calculation algorithm.

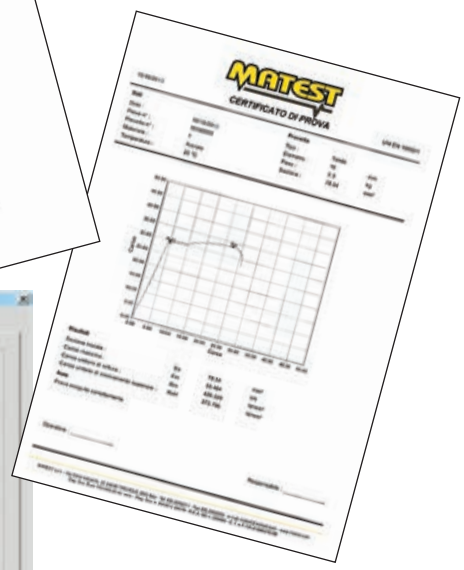
Example of test certificate



Tensile test on a steel specimen using the extensometer, showing the symbols of the considered dimensions and the relative tracing in different colours selectable by the user



Screen example of test data introduction.



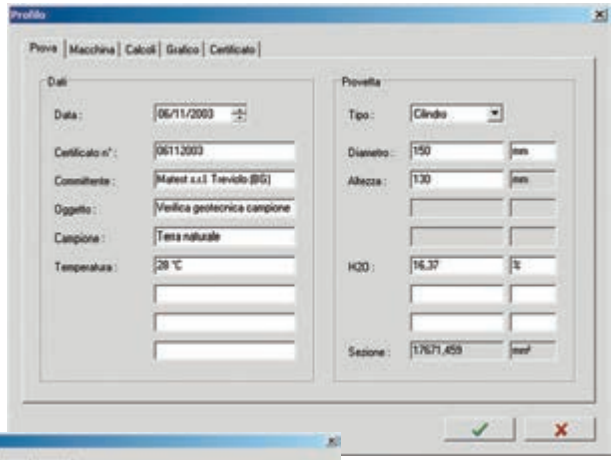
Printing example of the personalised test certificate with the customer logo introduced in the file (JPG, BMP, TIFF etc).

Software: **S218(N)** License for CBR tests.
Standards: EN 13286-47, CNR UNI 10009
ASTM D1883, BS 1377 :4, NF P97-078

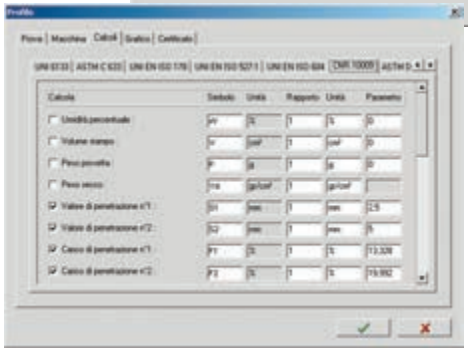
Software: **S218-01(N)** License for Unconfined Compression tests.
Standard: ASTM D2166

Machines: **S216 KIT** (pag. 409) CBR Digital 50 KN testing machine
S214N KIT (pag. 409) CBR/Marshall Digital 50 KN testing machine
S215A (pag. 410) Universal multi-speed frame
S205 (pag. 414) "Unitronic 50 kN", universal frame
S206N (pag. 420) "Unitronic 200 kN", universal frame

B044N-SET (pag. 122) Digital unit for CBR and Marshall tests.



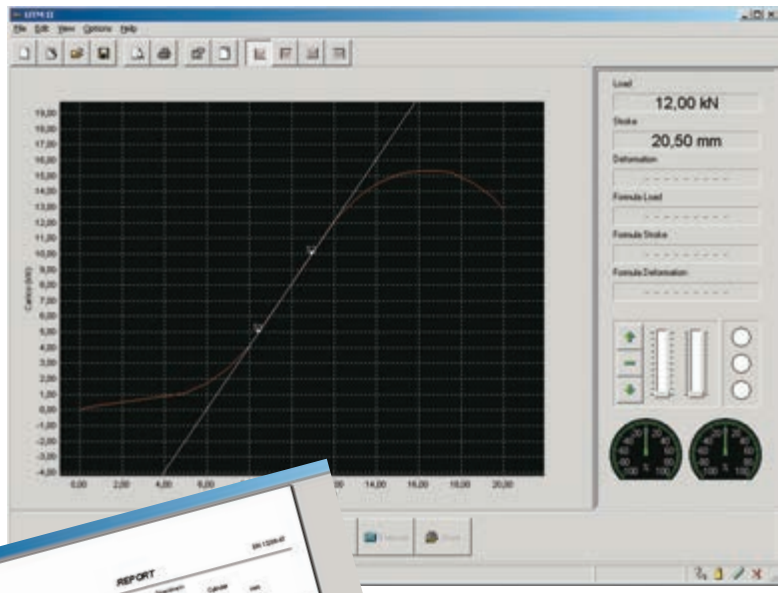
Attribution of test data



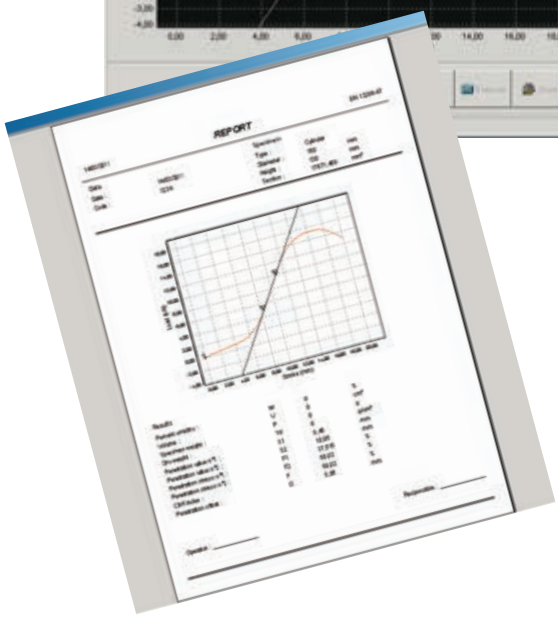
Selection of the calculation algorithms

Software: **S205-08** License for tensile tests on mortar briquettes.
Standards: ASTM C190, C307
AASHTO T132

Machines: **S205-05** (pag. 414)
"Unitronic" universal frame



Load/Deformation graphic



Report of CBR test

The above listed software are fully described and codified in the specific application fields of the catalogue.

The software is protected by a Hardware key that allows the use of the appliance only for the purchased licenses (relative to the activated Standards).

CYBER-PLUS 8 EVOLUTION "TOUCH SCREEN"

DATA ACQUISITION SYSTEM , No. 8 ANALOGICAL CHANNELS, applicable to the following machines:

A131 Rock shear box apparatus
B038A Smartracker, Hamburg + EN methods
B039 Roller Compactor
B041 Gyratory Compactor
B043-KIT Digital Marshall Machine
B044N Data acquisition for Marshall, CBR, Unconfined, etc. tests
B055-10 Ductilometers
B070N1 Automatic ring and ball apparatus
C109N Data acquisition system for compression/flexural machines testing concrete/mortar
C104N Servo-plus for compression/flexural machines testing concrete/mortar
C138N Digital tester for force calibration of testing machines
C155N Digital tester for the verification of force stability and uniformity in compression machines
C405-15N Data acquisition system for: flat jacks / deflectometers for tests on ceilings, bridges, etc. / Plate bearing test
H003N, H002N, H011N, H011-01N Universal testing machines for tensile tests on steel
E092N Mixmatic "high performance"
S206N Unitronic 200 kN
S214N KIT Digital CBR/Marshall Machine (2 speed)
S212N, S215A Digital universal multispeed load frame
S216 KIT Digital CBR Machine
S262N Edotronic, automatic consolidation apparatus
S277N KIT Direct/Residual shear test apparatus
S301N Digital triaxial frame
S334 Data acquisition system for tests with: oedometers, shear machines, triaxial systems.

Technical specifications HARDWARE

- Processor: 312 MHz upgradable till 806 MHz
- Display LCD, QVGA (320x240 pixels) Full-color Touch-screen
- Cross Keyboard. It can completely replace the touch-screen function (for an easy use with gloves, for example)

Hardware – Connectivity

- 1 x SD card
- 2 x USB hosts available for: mouse, keyboard, pen-drive, printer, USB Hub (to expand the number of ports), other peripherals from PC

Hardware - I/O

- 8 Channel ADC Converter (with 2 high resolution channels for use with load cells);
  Sampling frequency: up to 200 Hz (for all the 8 channels)
  Number of bits: up to 24
- 8 digital inputs
- 8 digital outputs
  Motor ignition, Valves activation
- Expansion Connector

Hardware – Control operation

- 2 x stepper motor controllers
  1 x standard controller, 1 x optional controller
- Brushless motor, through the Expansion Connector

Hardware - Storage

- Internal flash memory, dedicated to the software and to the configuration of profiles, machine, channels (including calibrations), etc.
- Unlimited memory using external memory devices
  SD –Card, Pen-Drive

Hardware – Various

- On board thermic graphic printer (Accessory: C127N)
- Clock Calendar, buzzer alarm

Software

- Operating system: "Windows Embedded CE 6.0 R3"
- User-friendly interface
- Easy updating of software and operating system
- International setting configuration
  Multilanguage interface
  Date/time/numbers formatting system
  Measurement systems (S.I.; US System)
- Software modularity
  Reference standards and tests complied through easy to install software modules
- Power calculation
  Superior calculation capacity
  Graphic representation of the test data
  Independent use from the PC

Software - Languages

- Italian, English, French, German, Spanish, Russian, Polish. Additional languages on request

Software - Licenses

- Every machine has an unique specific serial number
- Compliance to specific standards through dedicated license files

Software - Record and report

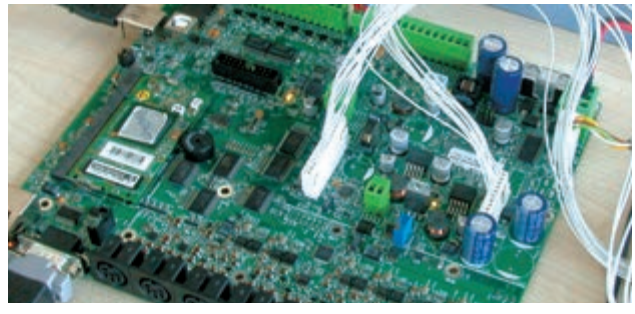
- Test records: Date, Results, Chart
- Printing:
  Through on board printer (Accessory C127N)
  Though PCL printer connected to USB

Software - "Maintenance"

- Available updates: Operating System, Applications, Licenses (backup and restore), Configuration (backup and restore), Software log
- New "UTM": machine control through Ethernet (intranet, internet)
- Internet connection for remote assistance

C104-05

ONLINE REMOTE ASSISTANCE PACKAGE
The machine features a connection to Internet through which Matest Customer Service provides real time support to analyze the problem, to find possible solution, and to carry out a proper test execution.



section A
AGGREGATES - ROCKS

Aggregates represent the mainly used product in the building industry; they are used in concrete, bituminous conglomerates, plasters, road and railways subgrades... etc.
The different International Standards together with the EN European Standards are requiring many different checks on different features as: mechanical, physical, geometrical, kind of density, strength, degradability, etc.

A rock stratum will undergo alterations in the mechanical characteristics when it is exposed to excavations, handlings etc.
For above reasons a study of the mechanical characteristics of an intact rock becomes indispensable in order to analyse the relative characteristics when realising underground or surface structures as galleries, quarries and foundations.

LABORATORY DRYING OVENS

Two versions available:

- **Natural convection for general purposes**
- **Forced ventilation for a more uniform temperature with on/off switch of the fan** NEW

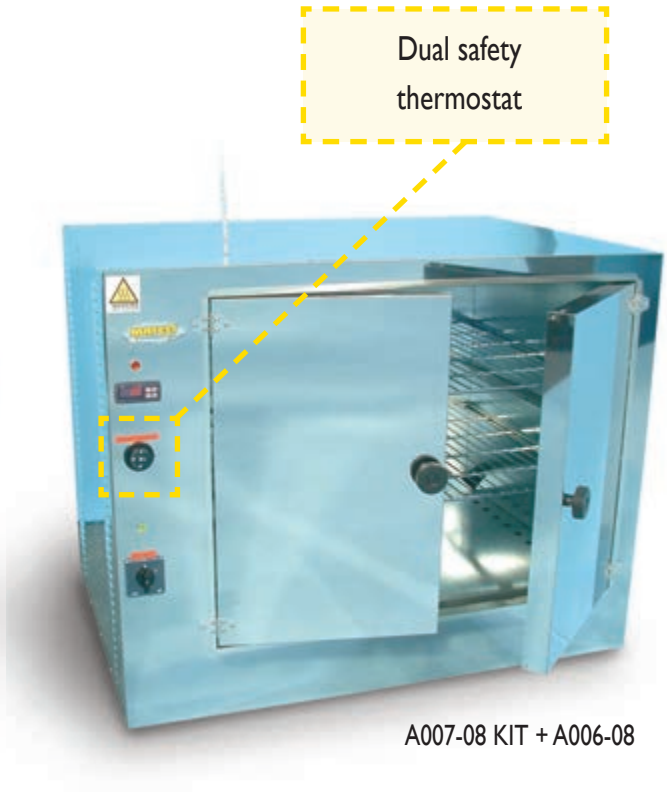
Designed for drying, baking, conditioning and moisture determination.
Sturdy manufacture, double walled with 60 mm thick glass fibre for thermal insulation.
Exterior front part is stainless steel made; while interior chamber, grid shelves and external walls are made from zinc coated steel.
Temperature from ambient to 200°C. is controlled by a **"digital thermoregulator-indicator"**. The ovens are equipped of 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 and that can be positioned at various heights, pilot light, exhaust holes for fast cooling.
Power supply: 230V 50-60Hz 1ph

A007-01 KIT + A006-08

Natural convection Model	Capacity litres	NEW Forced ventilation Model	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**
A007-01 KIT	100	**A005-01 KIT**	400x420x600	640x515x805	1	1200	40	**A007-51**
A007-04 KIT	220	**A005-04 KIT**	600x610x600	840x725x805	1	2000	60	**A007-52**
A007-08 KIT	440	**A005-08 KIT**	900x700x700	1140x760x910	2	3600	85	**A007-53**

A005-04 KIT Detail of the fan

A005-04 KIT



A007-08 KIT + A006-08

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

Especially suitable where high temperature uniformity and precision inside the chamber are required.
The accuracy of the temperature and its uniformity are granted within 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 from 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 of 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 and that can be positioned at various heights, pilot light, 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 stainless 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**

A008-07 KIT

- 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

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

Muffle furnaces 1100°C.

STANDARDS: **EN 12697-1** clause C, **EN 13108**

Designed for high temperature heatings.
Structure made in sheet-steel, furnace frontal in diecasted steel to avoid the aggretion of the acid smokes. The thermic insulation is in ceramic fibre to avoid the smallest heating leakage and so it takes a great energetic saving. Electronic visualized regulation of the temperature obtained by a digital thermostat. This furnace is also used for the determination of residual of mineral matter by incineration of bituminous mixtures to EN 12697-1 clause C Standard.
Max. temperature: 1100° C.
Inside dimensions: 210x320x145 mm
Outside dimensions: 500x750x650 mm
Weight: 88 kg approx.

Models	Temperature max	Power supply	Wattage
A022	1100°C.	230V 50-60 Hz 1ph	3900
A023	1100°C.	400V 50-60 Hz 3ph	3900

A022

A023-01
Muffle Furnace 1100°C. high capacity

Floor mounting furnace, the heating body is composed by 4 panels containing independent radiant resistors.
Thermal insulation realized by microporous refractaries in layers with progressive density.
Automatic regulation given by an electronic visualized pyrometer double intervention with 0-24 hours timer
Max. temperature: 1100°C.
This furnace is also suitable for the **"Determination of resistance to thermal shock of aggregates according to EN 1367-5 Specification"**.
Inside dimensions (wxdxh): 300x500x220 mm
Overall dimensions: 750x1100x1650 mm
Power supply: 400V 3ph 50/60Hz 9Kw
Weight: 400 kg

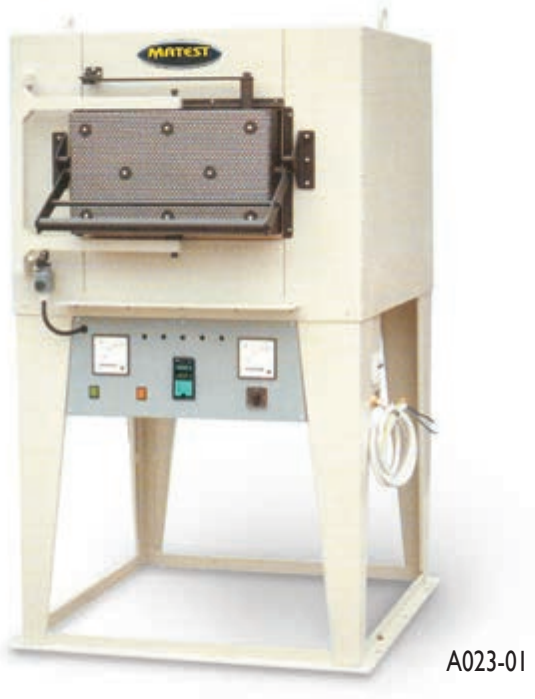
ACCESSORY for Muffle Furnaces:
A023-11 Temperature programmer.

A024
Muffle furnace 1200°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: 1200°C.
The heat insulation is made of ceramic fibre.
Heating muffle, unthreaded from the back, in an only cast of refractory.
Lateral opening door with pressure wedge and with a stop device for electric feeding when it opens.
Control panel is positioned on the furnace bottom containing a digital visualized thermoregulator and magnetic thermic for protection system.
Inside dimensions (wxdxh): 145 x250x100 mm
Overall dimensions: 500x650x650 mm
Power supply: 230V 1ph 50/60Hz 4200W
Weight: 70 kg

A024



A023-01

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

A019-03

A019-02

Hot plates, complete with thermoregulator

Power supply: 230 V 1ph 50/60 Hz

MODELS:

V200 Round dia. 185 mm - 1500 W
V200-02 Round dia. 220 mm - 2000 W
B074 Round dia. 160 mm - 1000 W

NEW
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

V200-05N

V200-01N

V200

B073-01

Magnetic stirrer/heater for titration and stirring of liquid and semi-solid materials. Plate dia. 150 mm.
Variable speed and temperature by electronic regulators.
Supplied complete with magnetic teflon coated follower.
Power supply: 230 V 1 ph 50 Hz 400 W

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:
230 V 50/60 Hz 1ph 800W
Weight: 3 kg

A106

ACCESSORY:

V300-19

PARAFFIN WAX, for general laboratory use, having melting point at 50-54°C. Pack of 4,6 kg

V201

Warm air drier, for general laboratory purposes, to dry soil and aggregate samples.
Power supply:
230V 1 ph 50 Hz 1200 W

V201

B074

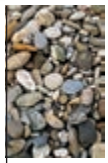
B073-01

A009

Microwave oven

Used for speed drying purposes, moisture determination, conditioning.
Power supply:
230 V 50 Hz 1ph 700W
Weight: 12 kg approx

A009



A028

Universal carbide meter

STANDARDS: BS 6576 / AASHTO T217 / ASTM D4944 / UNE 7804
For the 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) - 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

A028 SP

Universal carbide meter

Same to mod. A028, but with a larger bottle to be able to use 20 g sample weight with a moisture content up to 25%..

A028-01

Digital universal carbide meter

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

A028-02

A028-02

Digital universal carbide meter

Same to mod. A028-01, with protocol printer to obtain test certificate with up to 7 pressure / time logs.
Weight: 8 kg

SPARE-PART:

A028-11
Carbide Ampoules
(pack of 100)

A028-11

"Speedy" Moisture Testers

STANDARDS: ASTM D4944 / AASHTO T217 / UNE 7804 / BS 6576

For accurate moisture reading on site of soil, sand, aggregates. The test system arrives by 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

A025 KIT

A026 KIT SPEEDY Moisture tester 20 grams capacity.
Moisture range: 0 - 20%
Weight: 8 kg

SPARE PART:

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

ACCESSORY:

A027-11
Speedy calibration kit

A026 KIT

A028-01

A021-10

Moisture, digital microwave portable meter

For accurate, fast and easy determination of moisture content in sand, fine and coarse aggregates up to 25 mm diameter.
By utilizing the latest microwave and microprocessor technology, and simply insert the 5 prongs into the material to be measured, the unit display the percentage of moisture content.
Measuring range: 0 - 20% with +/- 0,2% accuracy.
Frequency: 50 Mhz; RS232 data link; over 150 readings storage.
Power: 4 AA batteries
Weight: 1800 g

A021

Moisture meter "Microlance"

This electronic tester measures and visualizes directly on the display the moisture percentage and temperature of sand and fine aggregates **up to max. dia. of 10 mm** by simply 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

A021-01

Moisture meter "Microlance"

Similar to mod. A021, but with measuring deep up to 2000 mm
Dimensions: 120x120x2200 mm
Weight: 3 kg

Desiccators borosilicate glass

Complete with perforated porcelain plate.

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

ACCESSORY:

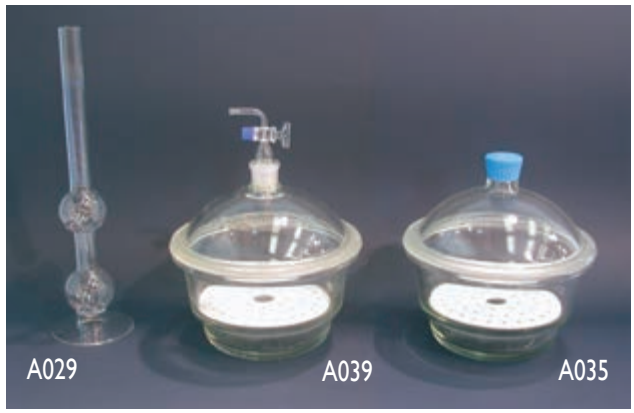
V300-15 Desiccators salts Silica gel box 1000 g

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



A030

Reaction container

STANDARDS: ASTM C289 / NF P94-048 / UNI 8520-22
UNE 146507-1

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

V023-01

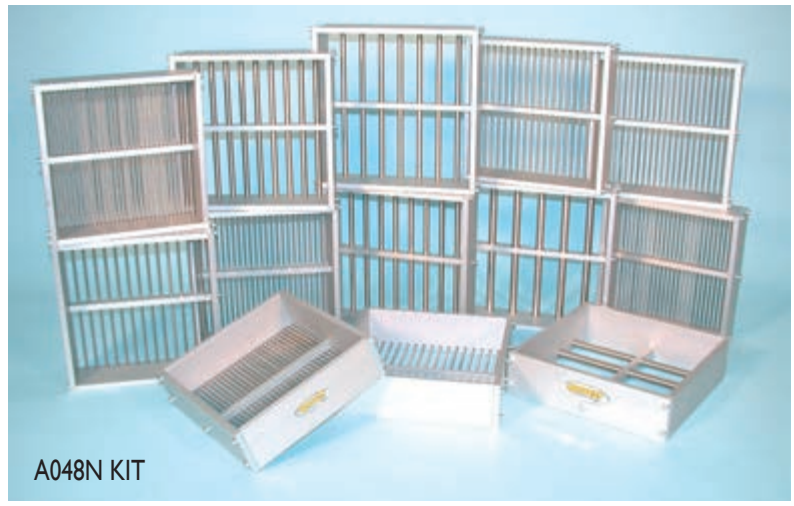
Moisture determination balance

See section "V" General Equipment pag. 469

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 from **"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.
Weight: 4 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 NEW

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 and 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 / A059-03 / A059-04 / A060-01

A048-21

A048-21

A048-22

A048-20

A048-15
Gauge for aggregate Flatness index
STANDARD: UNI 8520 part. 18
Used to determine the volume of each circumscribed sphere.
Made in heavy brass sheet.

A048-15

Flakiness sieves

STANDARD: BS 812

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
Complete set of n°7 flakiness sieves.
Weight: 15 kg

A049 KIT

Test sieves

STANDARDS: **EN 933-1, EN 933-2** / ISO 3310-1, ISO 3310-2, ISO 565 / ASTM E 11 / AASTHO T27 / BS410
UNI 2331, UNI 2333 / DIN 4187-1 / UNE 7050

All Sieves are made with stainless steel woven wire and frame and meet International Specifications.
The Sieves are available in the following diameters: 200 - 250 - 300 - 315 - 400 - 450 mm and 8" - 12".
The sieve aperture is clearly marked on the metallic label, comprising the serial number for the identification and traceability of the sieve.
Each sieve is supplied complete with certificate of conformity.

A052-...

HOW TO BUY WOVEN WIRE MESH SIEVES

STANDARDS: ISO 3310-1 / **EN 933-1, 933-2,** / BS410
UNE 7050 / DIN 4187-1
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° 01 to 77.
The buyer has to add to this number:

A052-... for the frame dia. 200 mm
A051-... for the frame dia. 250 mm
A053-... for the frame dia. 300 mm
A054-... for the frame dia. 315 mm
A055-... for the frame dia. 400 mm
A044-... for the frame dia. 450 mm
A050-... for the frame dia. 8"
A043-... for the frame dia. 12"

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

A031-...

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 dia. 200 mm
A032-... for the frame dia. 300 mm
A033-... for the frame dia. 400 mm
A034-... for the frame dia. 450 mm

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.

A037-...

HOW TO BUY PERFORATED PLATE SIEVES, **"Round Hole"**
STANDARD: 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 40
The buyer has to add to this number:

A037-... for the frame dia. 200 mm
A038-... for the frame dia. 300 mm

A041 "UKAS" certificate for "MASTER" Sieves.
All Sieves can be supplied with UKAS certificate so to be classified "MASTER SIEVE".

Table for the woven wire mesh sieves.

STANDARDS: **EN 933-1, EN 933-2** / ISO 3310-1 / ASTM E11 / UNI 2331, UNI 2333 / UNE 7050 / BS 410 / DIN 4187-1

Aperture Size mm	ASTM Number	Frame Dia. 200 mm	Frame Dia. 300 mm
0,025	-	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 Dia. 200 mm	Frame Dia. 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 / **EN 933-2** / BS 410 / DIN 4187-1

Aperture mm	Frame Dia. 200 mm	Frame Dia. 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 Dia. 200 mm	Frame Dia. 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

STANDARD: ASTM E 11

Used for wet testing of fine granuled materials.
Frame and woven wire cloth are stainless steel made.
Frame dimensions: Dia. 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

Wet sieving pan+lid stainless steel

The water enters through the spray nozzle mounted on top of the lid and comes out with fines from the pan. Supplied complete with two watertight seals.

Model		Set of10 watertight seals
A046	Pan + Lid, dia. 200 mm	**A046-11**
A046-02	Pan + Lid, dia. 8"	**A046-11**
A047	Pan + Lid, dia. 300 mm	**A047-11**
A047-02	Pan + Lid, dia. 400 mm	**A047-12**

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

	Dia 200 mm	Dia 300 mm	Dia 250 mm	Dia 315 mm	Dia 8"	Dia 450 mm	Dia 400 mm	Dia 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**

A104N

Ultrasonic cleansing bath

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
Capacity: 10 litres
Stainless steel made, with incorporated electronic generator, frequency 35 KHz.
Supplied complete with lid and discharge cock.
Power supply: 230V 50/60 Hz 1ph 200W
Dimensions: dia. 274 x 370 mm
Weight. 8 kg approx.

A104-01

Ultrasonic cleansing bath

Similar to mod. A104N but with inside dimensions:
dia. 410xh 200 mm.
It accept sieves up to 350 mm diameter.
Capacity: 25 litres
Power supply: 230 V 50/60 Hz 1ph 600W
Weight: 16 kg

ACCESSORY:

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

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

A058-05N

Air Jet Sieving Machine

STANDARD: **EN 933-10**

The Air Jet Machine is suitable for sieving powder and dry grain products by obtaining sieving results between 5 to 4000 microns, by using appropriate test sieves 200 mm dia. Its working foundation is based on the use of air that tug thin particles to make them go through the sieve.
This effect is made through a vacuum machine that provokes a controlled decrease of pressure. This vacuum machine is equipped with an automatic cleaning system of the filter cartridge allowing **to perform many tests** (some tens) before being replaced.
The digital electronic microprocessor panel can adjust:
- The sieving time from 0 to 99 minutes
- The vacuum range from 0 to 65 mbar
- The calibration function

The unit is supplied complete with aspirator device, plexiglass cover, filter cartridge, 5 collecting plastic bags, accessories.
Power supply: 230V 1ph 50/60 Hz
Dimensions: 450 x 600 x 400 mm
Weight:
25 kg approx

A058-14

A058-15

A058-05N with sieve

A058-53

SPARE PARTS:
A058-14 FILTER CARTRIDGE.
A058-15 PLASTIC BAGS (pack of 5 pcs).

TABLE OF THE SIEVES 200 MM DIAMETER FOR THE AIR JET SIEVING MACHINE.
Openings from 5 to 71 microns have "nylon mesh"
Openings from 75 to 4000 microns have "stainless steel mesh"
The sieves include airproof rubber seal.
Note: sieves with stainless steel mesh from 20 to 71 microns and nylon mesh from 75 to 4000 microns are available on request.

CODE	APERTURE micron
A058-20	5
A058-21	10
A058-22	15
A058-23	20
A058-24	25
A058-25	28
A058-26	30
A058-27	37
A058-28	41
A058-97	45
A058-29	48
A058-30	50
A058-31	53
A058-32	55
A058-33	58
A058-34	60
A058-35	63

CODE	APERTURE micron
A058-36	65
A058-37	70
A058-38	71
A058-50	75
A058-51	80
A058-52	90
A058-53	100
A058-54	106
A058-55	112
A058-56	125
A058-57	140
A058-58	150
A058-59	160
A058-60	180
A058-61	200
A058-62	212
A058-63	224

CODE	APERTURE micron
A058-64	250
A058-65	280
A058-66	300
A058-67	315
A058-68	355
A058-69	400
A058-70	425
A058-71	450
A058-72	500
A058-73	560
A058-74	600
A058-75	630
A058-76	710
A058-77	800
A058-78	850
A058-79	900
A058-80	1000

CODE	APERTURE micron
A058-81	1120
A058-82	1180
A058-83	1250
A058-84	1400
A058-85	1600
A058-86	1700
A058-87	1800
A058-88	2000
A058-89	2240
A058-90	2360
A058-91	2500
A058-92	2800
A058-93	3150
A058-94	3350
A058-95	3550
A058-96	4000

Electromagnetic sieve shakers

STANDARDS: **EN 932-5 /** ISO 3310-1

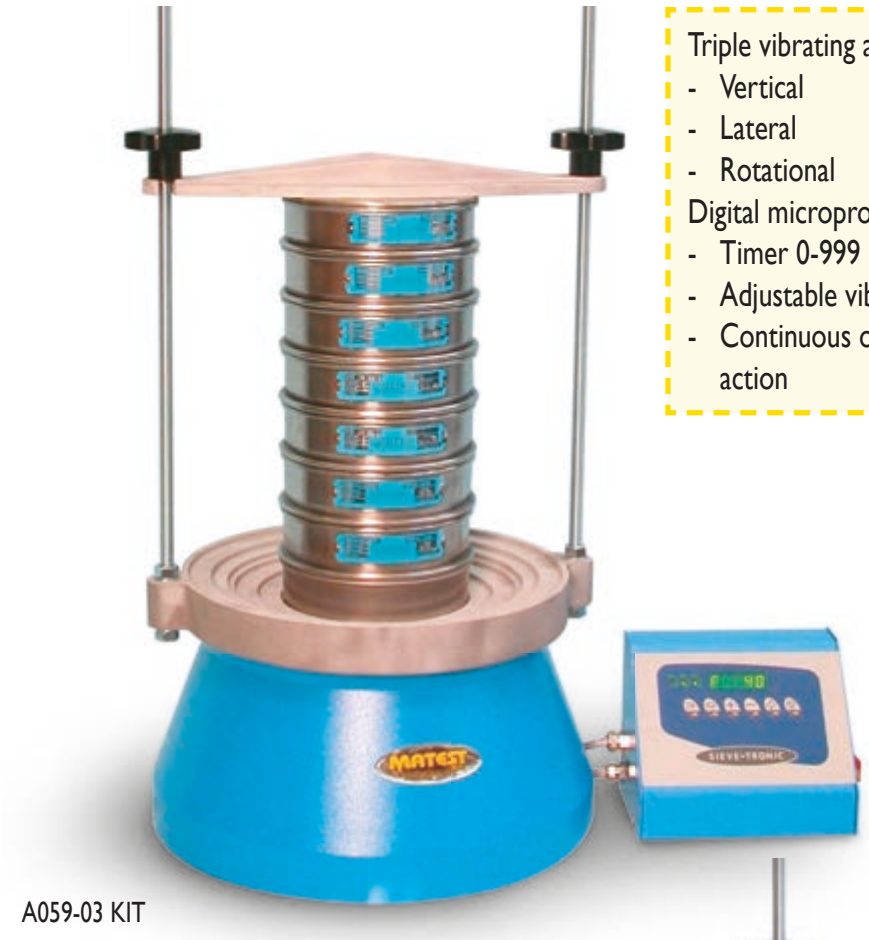
These Sieve Shakers are activated by electromagnetic impulses and thanks to the triple vibrating action (vertical, lateral and rotational) they are recommended to perform sieving tests where high precision and performance are important, and where continual and intense uses are required. They are therefore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

The separate digital control panel can adjust:
- The sieving time from 1 to 999 minutes
- The vibrating intensity
- The pauses between one vibration and the following one (this is especially indicated for fine material sieving).
  Power supply: 230 V 50Hz 1ph 450/750W

A059-01 KIT

A059-02 KIT

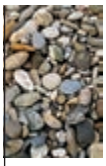
Model	Dimensions sieves dia.	Dimensions mm.	Weight kg.
A059-01 KIT	200 mm - 8"	320 x 380 x 850	40
A059-02 KIT	200 - 250 - 300 - 315 mm - 8" - 12"	380 x 440 x 1080	65
A059-03 KIT	200 - 250 - 300 - 315 - 350 - 400 mm - 8" - 12"	430 x 460 x 1150	80
A059-04 KIT	200 - 250 - 300 - 315 - 400 - 450 mm - 8" - 12" - 18"	480 x 500 x 1150	85



A059-03 KIT

Triple vibrating action:
- Vertical
- Lateral
- Rotational

Digital microprocessor control panel with functions:
- Timer 0-999 minutes
- Adjustable vibration intensity
- Continuous or intermittent adjustable vibrating action



A058

Noise reduction cabinet

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

A058 + A059-03 KIT

A059-04 KIT

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

A059-21

A061N

High capacity sieve shaker

Designed for sieving considerable quantities of any material. The screen shaker accepts up to 30 litres (60 ÷ 70 kg) of sample. Sturdy made, the machine 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: 230 V 50 Hz 1ph 750 W
Dimensions: 585x790x850 mm
Weight: 180 kg approx.

A061N
with Screen Trays

ACCESSORIES:

A061-97
SAFETY DOORS, upper and frontal, complete with micro-switch, complying 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: 900 x 900 xh 1350 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.

A061N + A061-98

A061N + A061-97

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 933-1, 933-2** / ASTM E11 / ISO 3310-1 / BS 410

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
6,350	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

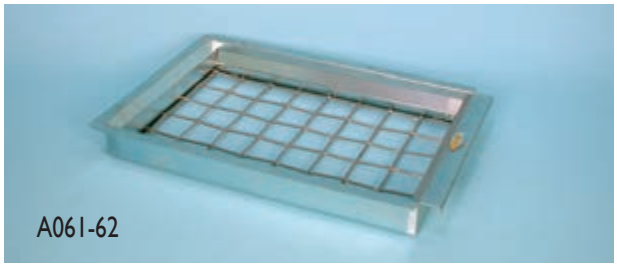
A061-96 SPARE collecting pan

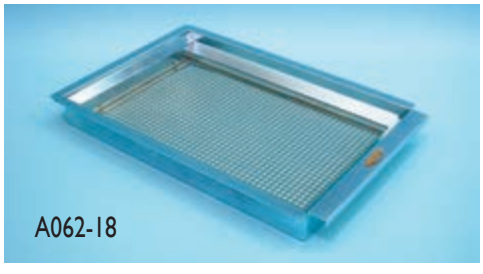
SCREEN TRAYS WITH PERFORATED PLATE, **"SQUARE HOLES"** STANDARDS: **EN 933-2** / ISO 3310-2 / BS 410

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

Aperture mm	Model
13,20	A062-24
14,00	A062-25
16,00	A062-26
18,00	A062-27
19,00	A062-29
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

Aperture mm	Model
45,00	A062-38
50,00	A062-39
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


A061-62


A062-18

A060-01

Sieve shaker motor operated

It accepts Sieves having dia. 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 dia. 200 mm or 7 Sieves dia. 300 mm plus pan and lid. It is possible to perform also 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.

A060-01

A058-01

Sieve shaker hand operated for sieves dia. 200 mm and 8"

Designed for site tests or yard laboratory analysis where electricity is not available. By rotating the crank the shaker applies a vertical and rotational vibration action.
It can hold up to 6 sieves dia. 200 mm or 8" plus pan and lid.
Dimensions: 300x450x600 mm
Weight: 16 kg approx.

A058-01

A057-31 ÷ A057-44

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 bottle.

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 sieve's sizes not listed in the table can be supplied upon request.

CALIBRATION GLASS BEADS

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

Models	Dia. range in mm of bead
A060-41	0.750 a 1.000
A060-42	1.000 a 1.250
A060-43	1.250 a 1.550
A060-44	1.550 a 1.850
A060-45	1.700 a 2.000
A060-46	2.000 a 2.300
A060-47	2.300 a 2.600
A060-48	2.500 a 2.850
A060-49	2.850 a 3.300
A060-50	3.300 a 3.600

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

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 the precise division into two representative portions of materials such as: aggregates, sand, gravel and similar. Painted or stainless steel made, they are supplied with two collecting pans.

Model	Material Steel	Slot width	Max. Size Sample mm	Slot Number	Weight kg	Spare collecting pan
A062 NEW	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**
A066	"	2" - 50,8 mm	40	8	13	**A066-02**
A067	"	2 1-2" - 63,5 mm	50	8	18	**A067-02**

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. It handles any material from sand sizes up to dia. 108 mm. Each chute bar is 12 mm wide so that openings of 12 - 24 - 36 - 48 - 60 - 72 - 84 - 96 - 108 mm are possible. Complete with two collecting pans.
Clam shell hopper: 30 litres capacity.
Very sturdily constructed, it is totally galvanized for rust protection.
Weight: 55 kg

ACCESSORY:

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

SPARE-PART:

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
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.

A070

Flakiness/thickness gauge

STANDARD: BS 812

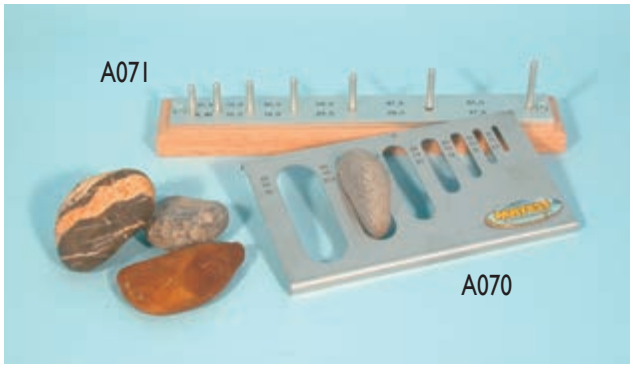
To verify if aggregate is flaky; i.e. if its thickness is less than 0,6 of its nominal size. Constructed of heavy gauge stainless steel sheet.
Weight: 600 g

A072

Shape gauge - Shape index

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

For measuring the length/thickness ratio of individual particles.
Weight 500 g.



A071

Length gauge

STANDARD: BS 812

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

Lightweight aggregates Crushing resistance determination

STANDARD: **EN 13055-1 method 1 and 2**

MODELS:

A081-01 method 1

Apparatus for the determination of the crushing resistance of lightweight aggregates having diameter from 4 to 22 mm, and volumic mass over 150kg/m3, composed by: upper and lower cylinder inside diameter 113 mm, ring with adjustable height, piston, base.
Made of steel, plated against corrosion.
Dimensions: 180 mm dia. 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/m3, composed by: upper and lower cylinder inside diameter 76 mm, piston, base.
Made of steel, plated against corrosion.
Dimensions: 100 mm dia. by 200 mm height.
Weight: 6 kg approx.

NOTE:
To carry out this test a Servotronic testing machine equipped with Servostrain (see pag. 165) is needed.

A081-01

Geometrical properties of aggregates Determination of the efflux index of fine aggregates.

STANDARDS: **EN 933-6** / NF P18-564 / CNR No. 113
ASTM C1252

A073

Efflux index apparatus

Used to measure the efflux index of fine aggregates (shape and angularity), having dimensions up to 4 mm. 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 a container, two polycarbonate funnels having 85 mm height, 60° conical part, which end has dia. 12 or 16 mm., base support, valve, decanter.
Dimensions: 200 x 240 xh 600 mm. Weight : 8 kg approx.

A073

A075

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 UNE 83116 / AASHTO T96 / CNR N° 34 / NLT 325

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 31÷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.
Supplied "**without**" abrasive charges to be ordered separately according to the Standards the machine has to comply. It cannot be sold in the CE markets without protection (see accessories).
Power supply: 230 V 50 Hz 1ph 750W
Dimensions: 1000x800x1000 mm
Weight: 370 kg

A075

NEEDED ACCESSORY:

A076-01 Set of 12 ABRASIVE CHARGES, conforming to ASTM AASHTO/CNR/UNI/UNE/NLT Standards.

A076-02 Set of 12 ABRASIVE CHARGES, conforming to EN NF Standards.

UPGRADING ACCESSORIES:

A075-11
SECURITY CABINET, manufactured from sheet steel, 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: 1100x1180x1250 mm
Weight: 150 kg approx.

A075+A075-11

A075+A075-12

A076-01

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: 1100x1180x1250 mm
Weight: 160 kg approx.

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

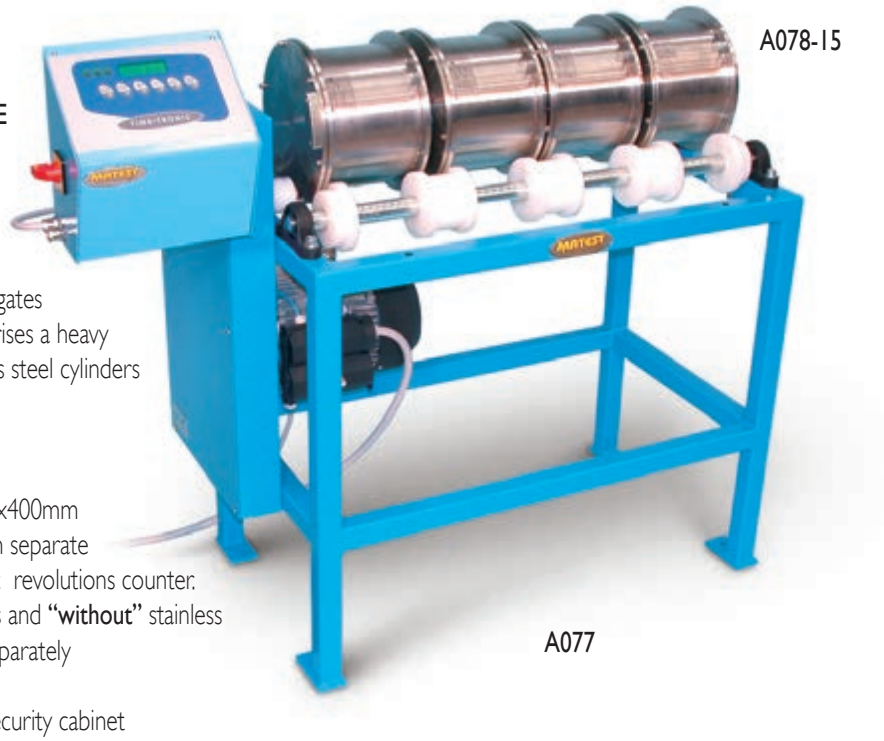
A077

Micro-Deval testing machine

DETERMINATION OF THE RESISTANCE TO WEAR

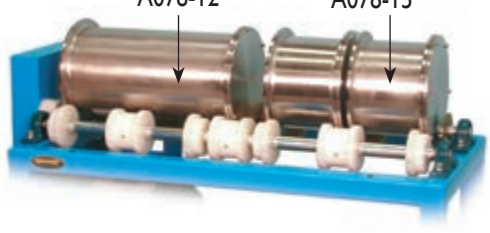
STANDARDS: **EN1097-1 / EN 13450**
NF P18-572 / NF P18-576
UNE 83115 / CNR N° 109

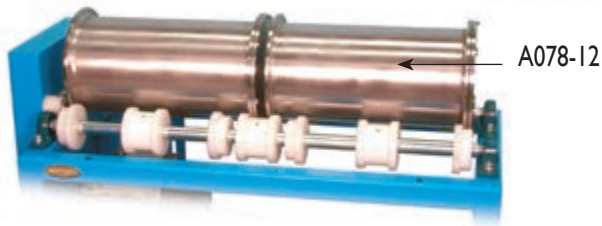
Used to determine the resistance of aggregates by abrasion. The machine essentially comprises a heavy steel frame on which the following stainless steel cylinders can be mounted:
4 cylinders dia 200x154mm, or
2 cylinders dia 200x400mm, or
2 cylinders dia 200x154mm and 1 dia 200x400mm
The Micro-Deval is supplied complete with separate control panel fitted with a digital automatic revolutions counter.
Supplied **"without"** stainless steel cylinders and **"without"** stainless steel spheres which have to be ordered separately (see needed accessories).
It cannot be sold in CE markets without security cabinet (see mod. A077-01)
Power supply: 230V 50Hz 1ph 1100W
Dimensions: 1000x450x920mm
Weight: 150 kg approx.



A078-15

A077





A077-01

Micro-Deval Testing Machine

Same to mod. A077, but equipped with 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:

A078-15 CYLINDER, standard, stainless steel, 200 mm dia. x 154 mm length (4 needed) EN 1097-1

A078-11 SPHERES, stainless steel, 10 mm dia. Pack of 20 kg EN 1097-1

A078-11 + A048-14

UPGRADING ACCESSORIES:

A078-12 CYLINDER, stainless steel, 200 mm dia. x 400 mm length. Conforming to EN 13450, NF P18-572

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

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

A078-16 CYLINDER, "HIGH PERFORMANCE", stainless steel, 200 mm dia. x 152 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 Micro-Deval having nominal size 10 mm.

A077-01 + A078-15

A079

Deval testing machine

STANDARDS: NF P18-577 / ASTM D2-33

Used to determine the quality of aggregates by 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 separate control panel fitted with a digital automatic revolution counter, two collecting pans.
It cannot be sold in CE markets without security cabinet (see mod. A079-02).
Power supply: 230 V 50 Hz 1ph 750W
Dimensions: 1500x520x1280 mm
Weight: 140 kg

A079

A079-02

Deval Testing Machine

Same to mod. A079, but equipped with 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 Deval working, a micro-switch automatically stops the machine.
Dimensions: 1650x650x1400 mm
Weight: 180 kg approx.

A079-02

A080 KIT

A087

A087

Scratch hardness test apparatus

STANDARD: ASTM C235

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: 160x200xh350 mm. Weight: 8 kg

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: 445x300x880mm
Weight: 60kg 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, dia. 102x50 mm, cylindrical measure dia. 75x50 mm, tamping rod.

A080-01KIT
AGGREGATE IMPACT VALUE APPARATUS. NF P18-574
Consisting of:
A080-04 TEST FRAME ASSEMBLY
A080-03 CYLINDRICAL MOULD, dia 102x52 mm.

S158-20 KIT

Sand equivalent test set (complete)

ASSESSMENT OF FINE AGGREGATES

STANDARDS: **EN 933-8** / NF XP18-598 / CNR N.27
UNI 8520-15 / UNE 83131

The set comprises:

S158-03 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 EN/ASTM
S158-13 Weighted foot assembly for sand level
A052-37 Sieve, dia. 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

S158-20 KIT

S158-08

S158 KIT

Sand equivalent test set (complete)

STANDARDS: ASTM D2419 / AASHTO T176

The set is identical to mod. S158-20 KIT except:

S158-01 Plexiglass measuring cylinder, engraved at 100 and 380 mm, with transparent adhesive label, graduated in mm and inch.
S158-04 Mesuring can 88 ml capacity
S158-07 Weighted foot assembly for sand level
A052-44 Sieve dia. 200 mm, opening 4,75 mm

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

S159-01 KIT

Sandequivalent testset(simple)

STANDARDS:

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

S159-01 KIT S159-11

The set comprises:

S158-03 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 EN/ASTM
S158-13 Weighted foot assembly for sand level
S158-09 Concentrated stock solution, 1000 ml
Total Weight: 5 kg

S159 KIT Sand equivalent test set (simple)

STANDARDS: ASTM D2419 / AASHTO T176
The set comprises the same items of mod. S159-01 KIT, but it conforms to the above Specifications.

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.

S160 N
+ S158-03 +S158-02

S160 N

Motorized sand equivalent shaker

STANDARDS: **EN 933-8** / ASTM D2419 / AASHTO T176
NF XP18-598 / UNE 83131 / 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 50 Hz 250 W
Dimensions: 700x360x350 mm. Weight: 30 kg

S160-01 N

Motorized sand equivalent shaker

As described, 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.

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 70 mm dia. propeller. 230 V 1ph 50 Hz
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 90 mm dia. (pack of 100)
S157-04 Glass rod dia. 8x300 mm
S157-05 2000 ml capacity plastic beaker
V300-28 Methylene blue, 100 g
V300-29 Kaolinite, 500 g
Total Weight: 10 kg

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: 300x400x350mm approx.
Weight: 10 kg about

Test for geometrical properties of aggregates. Classification test for the constituents of coarse recycled aggregate.

STANDARD: **EN 933-11:2009**

S156-20

Plunger, for the graduated cylinder. The test consists of hand sorting particles from a test portion of coarse recycled aggregate into a list of constituents. The proportion of each constituent in the test portion is then determined and expressed as a percentage by mass, except for the proportion of floating particles which is expressed as a volume by mass.
Stainless steel made
Weight: 500 g approx.

ACCESSORY:

V101-07 GLASS GRADUATED CYLINDER, 2000 ml capacity

B022

Bottle roller

FOR THE 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 0-6 hours
Power supply: 230V 50/60 Hz 1ph
Dimensions: 385x295x160 mm
Weight: 10 kg approx.

B022 SP

Bottle Roller

NEW

Same to mod. B022, but equipped with timer range 0-99 hours

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.

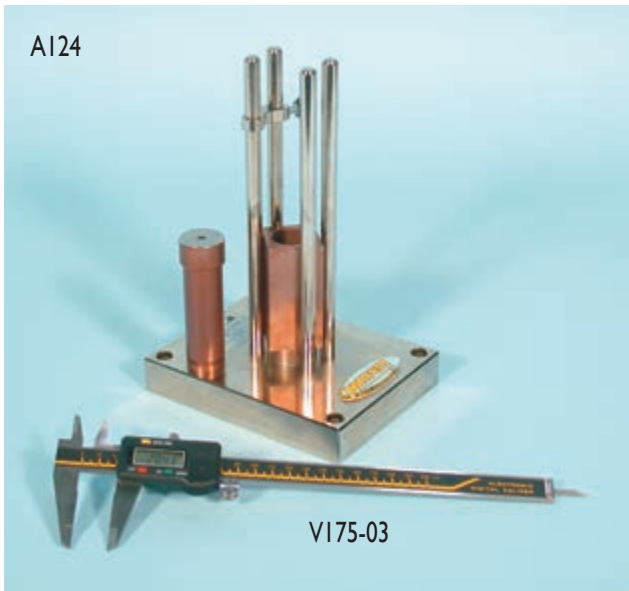
STANDARDS: **EN 1097-4** comparable to BS 812 / CNR N° 23 NLT 177

The apparatus consists of:
cylinder having inside dia. 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

ACCESSORIES:

A124-01 FILTER PAPER 25 mm dia. (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

A082

Aggregate crushing value apparatus dia. 150 mm

STANDARD: comparable to BS 812:110

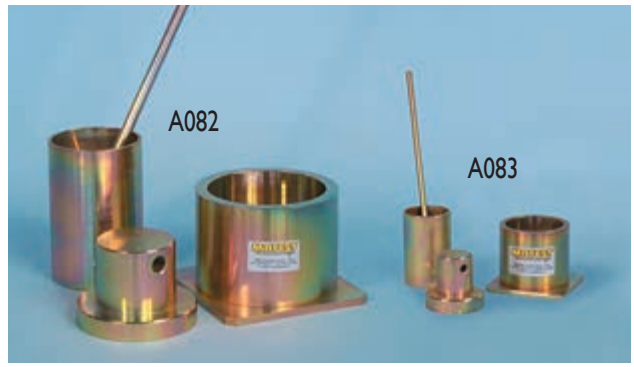
Comprising 150 mm nominal diameter steel cylinder, plunger, base plate, tamping rod and measure 115 mm diameter x 180 mm deep.
Used for aggregate passing 12.7 mm and retained by 9.52 mm sieve.
The complete assembly is cadmium plated for corrosion protection.
Weight: 20 kg

A083

Aggregate crushing value apparatus dia. 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



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 by water displacement method.
Formed by a cylindric metal container dia. 150x350 mm fitted with a siphon tube at 250 mm from bottom. Weight: 3 kg

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 812:2, 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**, dia. 200 mm by 200 mm heigh, mesh size 3,35 mm, all stainless steel made. Other models of density baskets listed at page 472

V085 **Specific gravity frame**. Technical data: see Sector "V" pag. 472

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 dia. 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:

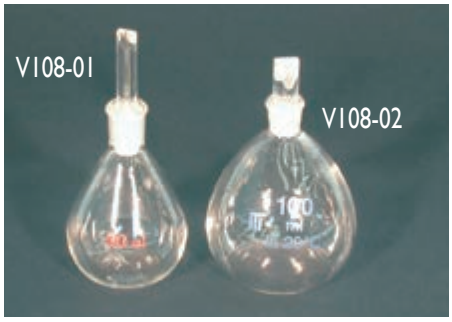
Specific gravity Bottle, Gay Lussac type, pyrex glass, complete with capillary tube stopper, to determine the particle density and specific gravity of filler in fine aggregates.

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

E136
Water bath, with 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: 230W 50/60Hz 1ph 2000W
Weight: 28 kg approx.

E136

V041



Determination of the relative density and water absorption of aggregates max. 10 mm size

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

S147
Pyknometer, glass made, with aluminium cone and rubber seal. Capacity: 1 kg

A092

Laboratory jaws crusher

STANDARD: UNE 83 120 / Comparable to EN 933-3, EN 933-6

Designed to crush any sort of material, also the hardest.
The structure is from cast iron, the shaft from rectified steel, the jaws from manganese. Jaws opening is regulated from 5 to 15 mm by a wedge.
Jaw size: 100x60 mm
Production: 100 to 400 kg/hour
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, and collecting pan.
Power supply: 230 V 50 Hz 1ph 1100W
Dimensions: 450x1000x620 mm
Weight: 115 kg

A092
without cabinet

A091-10

Jar mill

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.
Noise reduction steel cabinet and microswitch conforming to CE safety Directive.
Built in timer. Rpm: about 400
It can be used only for wet tests.
Power supply: 230 V 50 Hz 1ph 750W
Dimensions: 350x710x410 mm
Weight: 50 kg

A091-10 + A091-11

A092
with cabinet

Jars detail

"NEEDED" ACCESSORY:

A091-11 JAR, 300 cc. capacity complete with spheres.
A091-12 JAR, 1000 cc. capacity, complete with spheres.

A091-02

Jar mill capacity 1500 cc.

Same to 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 in CE markets without security cabinet (see mod. A093-11)
Power supply:
230 V 50 Hz 1ph 750W
Dimensions: 700xx700x1200 mm
Weight: 130 kg

A093

ACCESSORY:

A093-11

SECURITY CABINET, manufactured from sheet steel, lined with sound proofing-material for noise reduction, conforming to CE Safety Directive.
Dimensions: 850x800x1300 mm
Weight: 50 kg approx.

A096

Hammer grinding mill, for laboratory

Used to mill small quantities of product for laboratory testing.
Feeding is via vertical input which allows products with a particle size of max. 15 mm
It comprises a three long-lasting blades manufactured from stainless steel and an interchangeable screen with round perforations from 1 to 5 mm diameter.
- Grinding chamber dia. 110 mm - 3 fixed hammers
- Output particle size: various opening size 1, 2, 3, 4 and 5 mm (one screen included)
- Max. hardness of the material to grind: 6 Mohs
- Chamber volume: 0,5 l - Speed: 3000 rpm
- Power supply: 230V 1ph 50/60Hz 1,1kW
- Dimensions: 520 x 230 xh 420 mm
- Weight: 25 kg

A096

A096-11

SCREEN size: 1, 2, 3, 4, 5 mm; additional / spare.
(please specify opening when ordering)

A113

SKID RESISTANCE AND FRICTION TESTER

STANDARDS: **EN 1097-8** / **EN 1338, 1339, 1341, 1342** / **EN 13036-4** / **EN 1436** / BS 812:114 / ASTM E303 (see note)

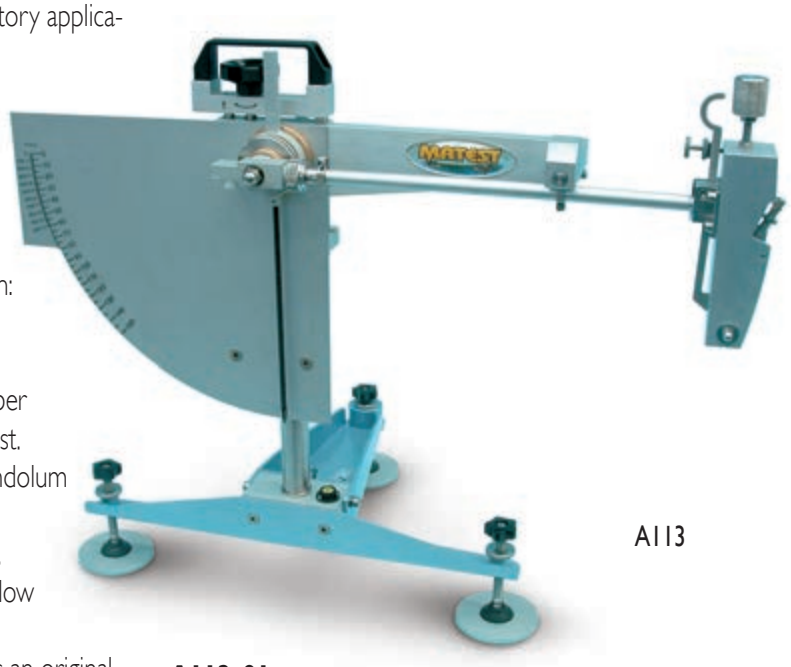
The apparatus is suitable for both site and laboratory applications to perform two types of tests:
- For measuring pavement (road asphalt) surface frictional and skid resistance properties.
- For polished stone value tests on aggregates (curved specimens) from accelerated polishing tests.

The skid tester is also suitable to perform tests on:
- Natural stones conforming to EN 1341, 1342.
- Concrete block pavers conforming to EN 1338.

The tester measures the energy loss when a rubber slider edge is propelled over the surface under test.
The slider lifting device is incorporated in the pendolum base assuring accurate adjustement operations.
The height adjusting system is simple and reliable.
The pointer, made from light alloy, has extremely low frictions granting high precision results.
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, plexiglass made, for sliding length verification.
- Thermometer range –10 to +110°C. for surface temperature measurement.
- Stool, wash bottle, bristle, tool set for machine use.
- Carrying case.
- Calibration Certificate conforming to EN 1097-8.

The tester is supplied **"WITHOUT"** rubber sliders that have to be ordered separately (see accessories).
Case dimensions: 730 x 730 x 330 mm. Weight: 32 kg

NOTE: **The tester is supplied calibrated to meet EN and BS Specifications. On request Matest can supply the skid tester calibrated to meet ASTM E303 Specifications.**



A113

A113-01

Skid Tester - ASTM E303

As above, but calibrated to meet ASTM E303 Specifications.

ACCESSORIES:

A110-03 Mounted rubber slider for site use (pavement surface), complete with conformity certificate.

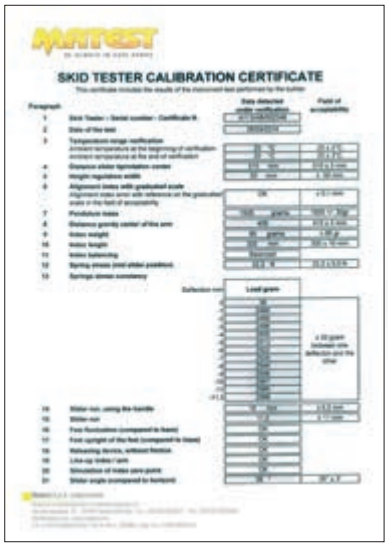
A110-01 Mounted rubber slider for Polished Stone Value tests (laboratory), complete with conformity certificate.

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.

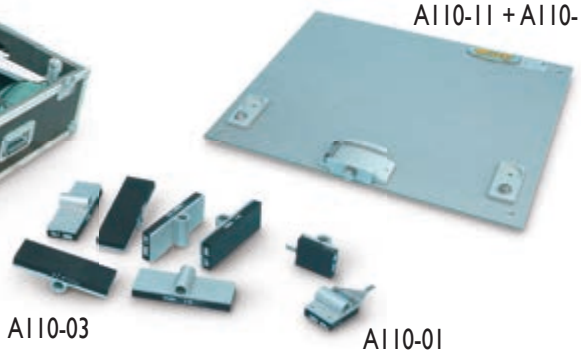
A110-13 Clamping device for tests on natural stones (EN 1341, 1342); for concrete block pavers (EN 1338) and skidding tests on wooden floor (EN 1339).

A110-20 Pink lapping film (10 sheets) for Skid Calibration.



Calibration certificate to EN 1097-8

A113 in carrying case



A110-11 + A110-12

A110-03

A110-01

A128N

Accelerated polishing machine - Matest Made

DETERMINATION OF THE POLISHED STONE VALUE

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

NEW

It measures the resistance of road aggregates, paving stones, paving blocks, to the polishing action of vehicle tyres on a road surface.
The specimens are manufactured with suitable moulds.
The specimen is than located on the Road Wheel accepting 14 specimens.
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.
Road wheel speed: 310 to 330 r.p.m.
The water is supplied at a controlled rate through a water container equipped with flow regulator.
The digital control panel, foreseen in the back side of the machine, allows to select the test time.
During the test execution the display shows the remaining time and the speed rotation of the wheel holding the specimens.
The machine provides a method of preparing polished stone specimens for use with the Skid Resistance Tester mod. A113 when used in Laboratory.
The unit is supplied complete with 2 rubber wheels (one for corn and one for flour emery), set of 4 secimen moulds and 2 mould covers, while control stone, corn and flour emery have to be ordered separately (see accessories).
Power supply: 230 V 50 Hz 1ph 750W
Dimensions: 1800x820x600 mm
Weight: 175 kg

A128N

A128N detail

ACCESSORIES:
A128-02 Corn Emery, 25 kg pack
A128-03 Flour Emery, 5 kg pack
A128-04 Control stones, ungraded, 25 kg bag.
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.

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

C129

Abrasion Böhme tester, 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

STANDARDS: **EN 1338:2004 / EN 1339, 1340, 13892-3 / EN 14157**
DIN 52108

See section "C" Concrete pag. 250

C129

A111N

Abrasion machine - Matest Made

AGGREGATE ABRASION VALUE (AAV) DETERMINATION

STANDARDS: **EN 1097-8 /** Comparable to BS 812-113

The test gives a measure of the resistance of aggregates to surface wear by abrasion.
Inadequate abrasion of road-surfacing aggregates means an early loss of the texture depth required to maintain high-speed skidding resistance.
The machine consists of a heavy duty mainframe on adjustable feet, steel lap wheel 615 mm diameter, that 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.
Supplied complete with two specimen moulds, two trays, weights, fixing device.
Power supply: 230 V 1ph 50/60 Hz
Dimensions: 1130x710x1100 mm
Weight: 200 kg

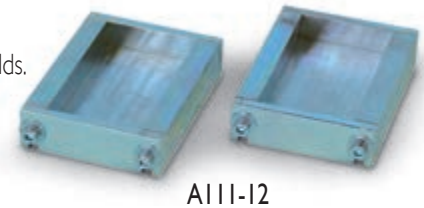
A111N

ACCESSORIES:

A111-11 Graded silica sand. Pack of 25 kg.
V179-05 Soft hair brush 3 mm dia. BS 812

SPARE PART:

A111-12
Two specimen moulds.



A111-12

A112

Abrasion tester for natural stones and concrete

ABRASION RESISTANCE ON NATURAL STONES AND CONCRETE TILES FOR PAVING

STANDARDS: **EN 1338, 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 by 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 electronic speed controller and shutting off device after the set number of revolutions, 1 kg of abrasive material, calibration plate made of boulonnaise marbre, accessories and cabinet to CE Safety Directive.
Power supply: 230 V 50/60 Hz 1ph 500W
Dimensions: 450x420x800 mm.
Weight: 85 kg

A112-05

A112 / A112-10

A112-10

Abrasion tester for bricks and glazed tiles

STANDARDS: **EN 102 / EN 12808-2 /** CEN ISO-TC 178
ISO 10545-6

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

SPARES:

A112-01 Abrasive white corundum sand 80 grade. Pack of 5 kg.
A112-05 Calibration plate made of boulonnaise marbre.

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.

A105

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

C279-02

A117 + A116-11 + A116-12

A117

End-Over-End shaker

STANDARD: **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: 230 V 50 Hz 1ph 150W
Dimensions: 550x430x500 mm
Weight: 20 kg

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 by 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 400 kg weight with band of 50 mm wide is foreseen.
The test is performed by passing the wheel on the aggregates contained into the guide for twelve times.
Dimensions:
1200x500x1850 mm
Weight: 640 kg

A108

S132N

Colour standard chart

STANDARDS: ASTM C40-11 Method D / AASHTO T21 / UNI 8020-14
For the determination of the organic impurities in soils and fine aggregates.
Chart with 5 glass reference scales.

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

Tests for thermal and weathering properties of aggregates
Determination of resistance to freezing and thawing

STANDARDS: **EN 1367-1 / EN 932-5**

It gives the needed informations on the aggregates subject to freeze and thaw test cycles.
The cold stress on aggregates depends from the saturation degree of the water and from 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, 120 mm dia. x 160mm high, 3,35 mm opening

A103-01 NEW BASKET, stainless steel mesh, 95 mm dia. x 120mm high, 1.18 mm opening

A103-02 NEW BASKET, stainless steel mesh, 95 mm dia. x 120mm high, 0.600 mm opening

A103-03 NEW BASKET, stainless steel mesh, 65 mm dia. x 80mm 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, 200 mm dia. 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

C313
Climatic chamber, 700 litres capacity
Temperature range -25+70°C.
Humidity range 10 to 90%
With programmable test cycles.
Technical details and other models described in section "C"
Concrete pag. 276

NEW

C348N *
Rock and masonry saw
It accepts blades up to dia. 400 mm.
Useful cutting height: 115 mm

NEW

ACCESSORIES:
C350-13
Diamond blade dia. 350 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 pag. 283

Determination of drying shrinkage

TESTS OF THERMAL AND WEATHERING PROPERTIES OF AGGREGATES

STANDARDS: **EN 1367-4** / BS 812:102

A107

PRISM MOULD 50 x 50 x 200 mm, three gang, 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

SPARE PART:

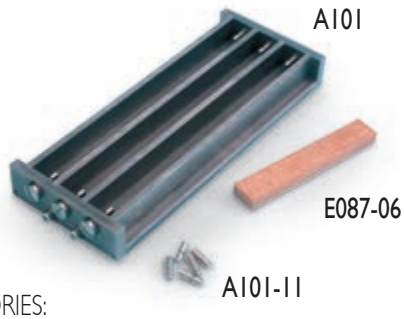
A107-11 Inserts for A107 mould. Pack of 12 pieces

Determination of potential reactivity of alkali in aggregates for use in concrete

STANDARD: UNI 8520-22

A101

PRISM MOULD, 25 x 25 x 280 mm, three gang, complete with six steel inserts to determine the dimensional variations of the specimen.
Steel made, Vickers hardness HV 400 approx.
Dimensions: 120 x 300 xh 35 mm
Weight: 4,5 kg



ACCESSORIES:

A101-11
Spare steel inserts for A101 mould. Pack of 12 pieces.

E087-06
TAMPER, hard wood made, to compact the specimen.

ADDITIONAL ACCESSORIES

E077 KIT
LENGTH COMPARATOR with dial indicator, 5 mm travel by 0,001 mm division mod. S375
See Catalogue section "E" pag. 321

AS AN ALTERNATIVE:

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

S382-13
Software, complete with USB adaptor and connection cable to PC

as an alternative:

E077-01KIT NEW
LENGTH COMPARATOR with Digital Gauge 15,3 mm travel by 0,001 mm divisions mod. S382-02, complete with battery, but "without" RS232 port

E078-01 Reference rod for A101 mould (UNI 8520-22)

E078-06 Reference rod for A107 mould (UNI EN 1367-4)

Determination of resistance to thermal shock

A023-01

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 pag. 28
Power supply: 400V 3ph 50/60Hz 9Kw

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

A023-01

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 to CE Safety Directive.
Power supply: 230 V 50 Hz 1ph 300W
Dimensions: 400x700x500 mm
Weight: 38 kg

A109

A115

Mohs' kit

STANDARD: **EN 101**

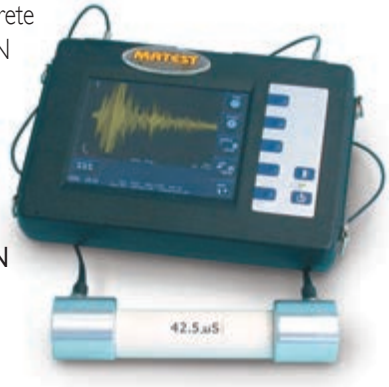
Used for determining the hardness of the surface of the materials.
Composed by a case containing 9 minerals of the Moh's hardness scale and also copper strip, small glass and magnet bar.
Weight: 500 g

A115

Index of velocity of rocks:

Ultrasonic pulse velocity tester.
See section "C" concrete mod. C369N÷C372N pag. 295 ÷ 296

C372N



A122

Bartoncomb(profilometer)300mmlength

Used for the evaluation of the surface roughness of rock samples.
This simple device allows to a myriad of very thin steel wires to perfectly lay to the outline of the sample under test, so to allow its analysis.
Dimensions: 300x120 mm
Weight: 1 kg

A122

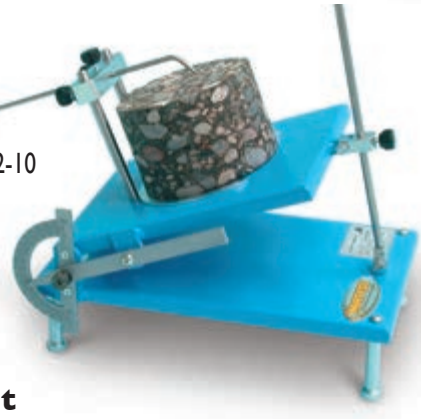
A122-01

A122-01

Barton comb (profilometer) 150 mm length

Same to mod. A122 but 150 mm long.

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 - 50°
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.

A132

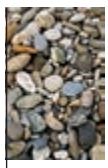
A132-01

A132

Geological Hammer, pointed tip, for preliminary rock identification. Weight 600 g approx.

A132-01

Geological Hammer, chisel edge, for preliminary rock identification. Weight: 400 g approx.



A125N

Digital point load tester (Rock strength index)

STANDARD: ASTM D5731

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 up to 55 KN, on which a manual hydraulic jack is mounted. The instrument accepts core specimens up to 4" (101,6 mm) diameter which are loaded by two coneshaped points. A graduated scale indicates the distance between the conical points.
The applied load is measured by a **high precision electric load cell** with a digital display unit range 0-56kN 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

A125N

ACCESSORY:

A125-02 Lower plate and upper plate with seat ball to modify the Point Load Tester into a port- able compression tester (see section "C" concrete, mod. C094) pag. 249

SPARE-PART: **A125-01** Set of two hardened conical points.

A125-02

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

ACCESSORY:

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

A121

C390

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 pag. 292
Dimensions: dia. 150x 230 mm. Weight : 16 kg

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

SPARE PART:
A095-01
ABRASIVE silicon carbide disc.
Pack of 25.

A095

C298

Specimen grinding machine

STANDARDS: **EN 12390-3** / ASTM D4543 / UNI 6132

Designed to grind and polish cubic and cylindrical specimens of concrete, rocks, natural stones etc. having 350 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 water-proof carter, eight abrasive charges. Supplied **"without"** locking stirrups and diamond grinding sectors to be ordered separately (see accessories).

C298 / C299

- Working base surface: 775x280 mm
- Grinding wheel: 330 mm. dia.
- Vertical span width: min. 70 mm max. 350 mm
- Power supply: 400V 3ph 50 Hz 4500 W
- Dimensions: 1220x1080x(h)1730 mm
- Weight: 410 kg

C299

Automatic grinding machine

Same to mod. C298, but the radial mouvement of the head is equipped with end of stroke system, granting the fully automatic displacement in both directions without activating the electric push button.

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 pag. 279

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 dia. and can be mounted on most grinding machines.
Weight: 7 kg approx.

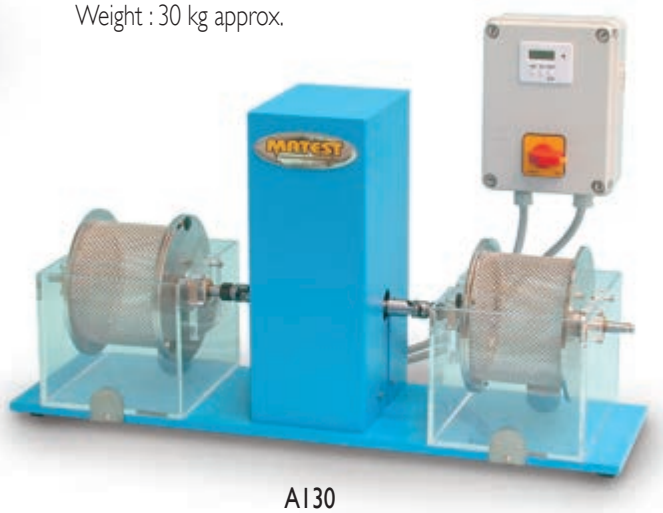
C300-08

A130

Slake durability apparatus

STANDARD: ASTM D4644

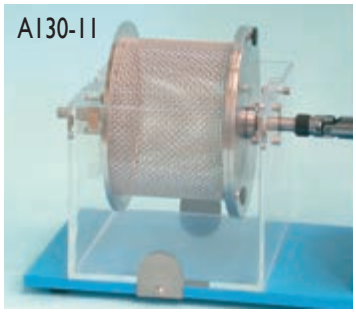
This equipment has been developed to assess the durability of rock to weakening and disintegration when subjected to the simulated effects of climatic slaking.
The rock samples are dried and then submitted to wear stress inside a drum which is rotated into water.
The test is performed different times 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 dia. 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.

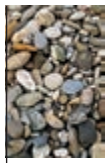


A130

ACCESSORY:

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





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 28 x 100 mm
- Impregnated diamond bit for cores with Ø 28 x 200 mm
- 2 Self-blocking pincers to fit the flanged guide assembly to the surface

Set of accessories comprising: anchors, bits, wrenches, screws.

Carrying case.

Dimensions: 550x400x200 mm approx

Weight: 10 kg. approx

C377

C377-01

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

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 dia. 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. C094 (see pag. 249), or a cement compression tester (see pag. 342) may be conveniently used.

Trimming of cores may be even obtained with the grinding machine mod. C298 + device mod. C300-08 (see pag. 279)

C377-02

SPARE PARTS:

C377-10 ELECTRIC DRILL, suitable for the microcoring purposes.

C377-15 DIAMOND BIT, dia. 28 x 100 mm

C377-16 DIAMOND BIT, dia. 28 x 200 mm

A129

Rock shear box apparatus

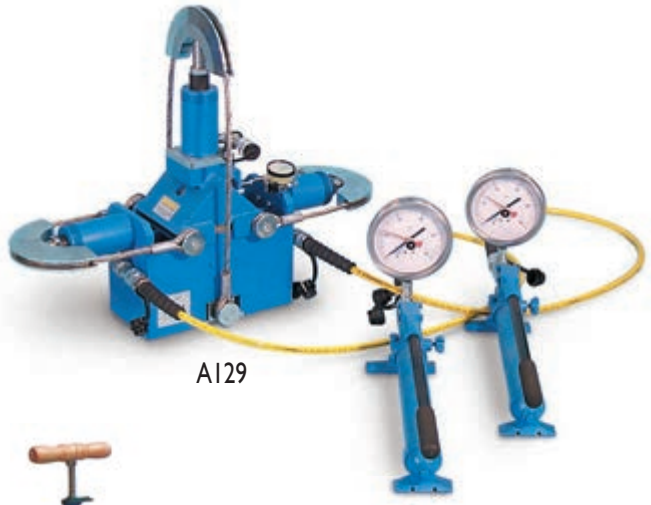
STANDARDS: ASTM D5607* / ISRM

Used to determine the strength and slope stability of rock size max 115x125 mm or cores max. dia. 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 dia. 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



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.

A129-02

A129-01

A129-03

A131

Rock shear box apparatus

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 page 428

S224-21N Software for test data processing.

Weight: 50 kg approx.

A131 + A131-01

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.

A127

Cutting-off machine

Enables rock or metal samples to be taken with cold smooth cuts, in compliance with metallographic specifications.

Blade dia. 200 mm suitable for cores up to 60 mm diameter.

Complete with cooling system, set of blades, precision clamp and specimen holder.

Power supply:
400V 3ph 50Hz 1,3kW
(singlephase on demand)

Dimensions:
570x720x550 mm.

Weight: 75 kg

A127

A150N + C089-04N

A150N

ELASTIC MODULUS of rock specimens in uniaxial and triaxial tests

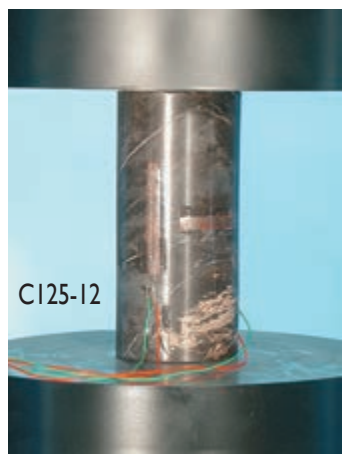
System:
Automatic with pace rate control also when releasing the load.

STANDARDS: ASTM D7012 / UNI 9724-8 / ISRM UNE 22950-3

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 made 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 page 66) for the application of the side pressure, the hydraulic system permits to maintain the pre-load level with extremely high accuracy.


C125-12

C134

- 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 as he likes and personalise the test profile, that will be effected in a completely automatic way by the testing machine.

The user must 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 (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 by means of the serial communication port RJ45 (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 specific 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. 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

Software to make Secant Compression Elastic Modulus tests on concrete
STANDARDS: UNI 6556 / ASTM C469 / ISO 6784 / DIN 1048

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 have to be ordered separately (see accessories)

C125-10...C125-13

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.

C125-15

KIT for the application of single use extensometers composed by: glue, welder, solder, cleanins 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

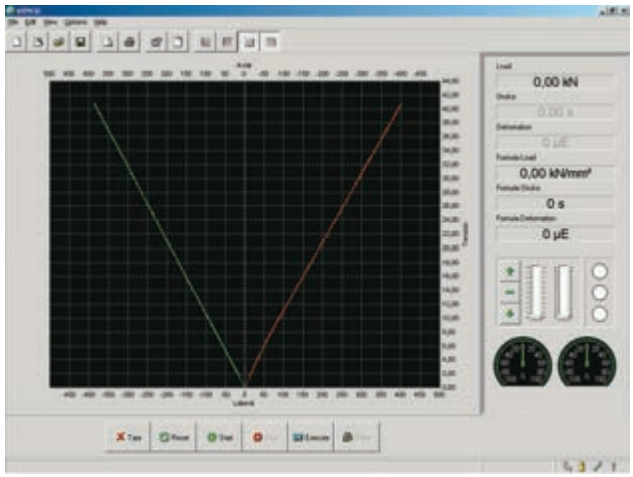
AS AN ALTERNATIVE:

B) **C134**
EXTENSOMETER / COMPRESSOMETER, electronic, universal, mechanical frame.
Technical details: see pag. 222

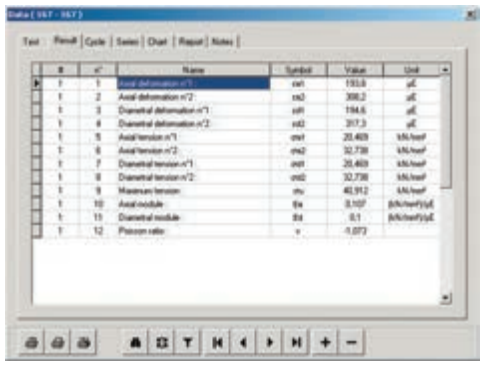
C134

C134-10

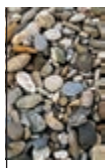
TEMPLATE, to regulate and calibrate the base length of the C134 extensometer



Typical screen shown while a test is made representing the longitudinal and transversal deformations .



Test data



TRIAXIAL TESTS ON ROCK SPECIMENS

STANDARDS: ASTM D7012 / **EN 1926, EN 14580**

The triaxial test is made on a rock specimen placed into a container (Hoek cell), closed into a latex membrane .
The specimen receives an axial load and a constant isotropic pressure normally between 5 and 6 Mpa for the whole test.

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 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.

The 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 1,0 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 to 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:

C104N LP
Automatic servo-controlled system "Servo-Plus Evolution" that grants a setting of the pressure up to 70 Mpa.

ACCESSORY:

C104-51 LP
DISCHARGE CIRCUIT UPGRADE FOR C104N LP
Suitable when rocks causing fast cell pressure increment are tested. This circuit upgrades C104N LP to a more powerful lateral pressure compensation.

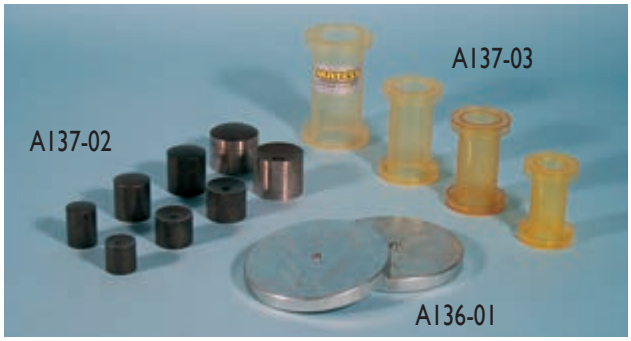
C089-04N + A150N

C104N LP

Hoek cells for rock triaxial tests

For use with pressures up to 70 MPa.
Used to measure the strength of cylindrical rock specimens which are subjected to triaxial compression.
The basic Hoek cell consists of the following:
Cell body complete with two screwed end caps and two self-sealing couplings, two spherical seats and pistons, hardened and ground, one specimen jacket.

A137 - A139



MODELS:

	Specimen Dia. x height	Size	Load spreader pads (pair)	Spare spherical seat + piston	Spare Jacket	Core drilling barrel 200 mm long	Adaptors set for extruder
A137	38,10x 75 mm	1,5"	**A136-01**	**A137-02**	**A137-03**	**A137-04**	**A141-02**
A138	42,04x 85mm	BX	**A136-01**	**A138-02**	**A138-03**	**A138-04**	**A141-03**
A139	54,74x100mm	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 to 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.
Piston's stroke: 20 mm - Platens diameter: 55 mm
Vertical daylight: max. 112 mm, min. 92 mm - Platens hardness: 60 HRC
Overall dimensions: dia. 151 by height 249 mm
Weight: 10 kg approx.

A147

A140-01

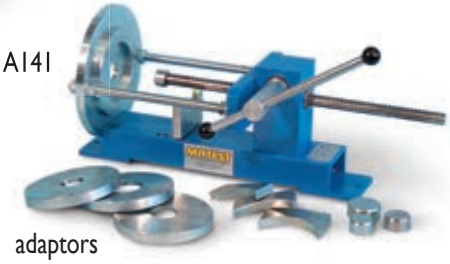
A140-01

Coring machine used in the laboratory, to obtain cores from irregular rock samples. To be used with the Core Drilling Barrels (accessory A137-04÷A139-04).
The 2 speed electric motor 1500/2700 rpm 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: 230 V 50/60 Hz 1ph 1800W
Weight: 60 kg approx.

A141

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



A141

adaptors

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

ACCESSORY:

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

A142N + A129-02

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:

A137-05 Specimen dia. 38,10 mm
A138-05 Specimen dia. 42,04 mm
A139-05 Specimen dia. 54,74 mm

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 mt.

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: 230 V 50 Hz 1ph
Weight: 20 kg

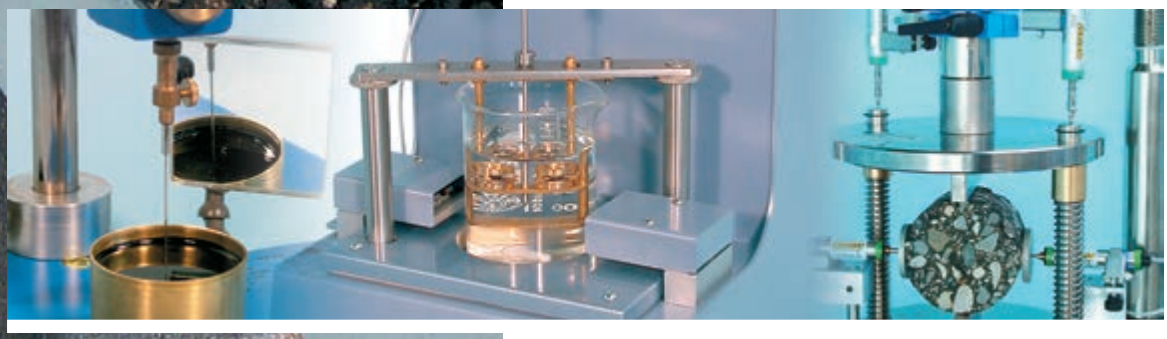
Section B
BITUMEN - ASPHALT

The use of bituminous materials is mainly addressed to roads construction.

The asphalt, named also bitumen, is mainly composed by aggregates and binder, with an infinite variation of mixtures.

It is therefore necessary to get suitable equipment to perform different test methods and to determine: binder content, internal friction, cohesion, consistency, softening point, viscosity, quality of aggregates, voids percentage, levels of compaction, stiffness modulus, fatigue resistance, Marshall test, and many other parameters.

The equipments described in this Section largely satisfy all these test procedures, conform to the new EN Standards on road materials tests, and replace those previous national Standards.



B005

Bitumen content furnace by ignition method

STANDARDS: **EN 12697-39** / ASTM D6307 / AASHTO TP53 / NCAT (National Centre for Asphalt Technology) / BS (DD)

B005

The unit provides asphalt content of bituminous paving mixtures accurate to 0.11%, with a fast, accurate, environmentally friendly, and cost effective method of determining asphalt content.
Ignition method reduces testing time when compared to solvent extraction. A 1200-1800 gram sample of asphalt can be tested in 30-45 minutes using this Content Furnace.
Unit can accommodate samples up to 5000 grams!
MATEST Furnace has an internal scale, that automatically monitors the sample weight throughout the ignition process, saving valuable technician time and increasing productivity in the lab.
The ignition method replaces the costly and time consuming solvent extraction method by eliminating the primary cost of solvent purchase and the secondary cost of solvent disposal.
MATEST Content Furnace eliminates the exposure of the asphalt technician to harmful solvents. The automatic door-lock feature prevents opening the chamber door during the critical test time. This feature provides operator safety and helps ensure testing integrity. This Content Furnace is the only system on the market containing a high temperature afterburner used in conjunction with a patented ceramic filter to reduce the emissions of the ignition process by up to 95%. Our System has the capability to accept positive or negative correction factors for use with mixes containing hydrated lime. This unique furnace automatically detects endpoint within .01% of the sample weight. Furnace software allows you to choose between automatic and manual test mode. In the automatic mode, the endpoint is detected; the software ends the test, prints out the results and beeps. In the manual mode, the endpoint is detected; the unit begins to beep but will continue to test until the user presses "stop" to end it. Once the "stop" button has been pressed, the door will unlock and the results will be printed.
Furnace software automatically compensates for weight change due to sample and basket assembly temperature change. This compensation is computed for each sample load tested, unlike competitive models that assign a fixed number to a given range of load sizes.
The Furnace is supplied complete with 4 basktes, 2 trays, 2 covers, handle, cooling cage, insulated plate, gloves, face shield, 4 rolls of printer tape.
Overall dimensions: 552x654x933 mm
Chamber Dimensions: 355x355x355 mm
Power supply:
230 V 1 F 50 Hz 4800 W 20 A
Temperature range: 200-650°C
Weight: 120 kg

ACCESSORY:
B005-10
Metal stand to hold the furnace.

B005 - accessories

A022

Muffle furnace 1100°C.

STANDARD: **EN 12697-1 clause C, EN 13108**
This furnace is used for the determination of residual mineral matter by incineration of the bituminous mixtures.
Technical details: see Section "A" Aggregates, pag. 28

ACCESSORY:
V114-10
SILICA evaporating dish, dia. 130x23 mm (160 ml capacity)

A022

B008

Automatic binder extraction unit

STANDARDS: **EN 12697-1, EN 13108**
CNR a.VII N °38
DIN 1996 / ASTM D2172

Used to perform reliable analysis on bituminous mixtures utilizing the perchloroethylene (PCE) or tetrachloroethylene solvent which is classified: R40 not cancer producing (*see note******), 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.

This unit, in a short time, performs out a serie of analysis that normally require a long time and labour, by reducing extraction costs.

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 dia. 120 mm., filler capacity approx. 400 g.
- A solvent recovery unit having reclaiming capacity of approx. 50 l/h, equipped with cooling system foreseen of devices switching ON and OFF the unit to fully 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 function allowing to activate each specific function previously analyzed.

This unit is supplied complete with:

- Two stainless steel beakers dia. 120 mm
- Four stainless steel sieves dia. 200 mm openings: 0,063 - 0,250 - 0,800 - 2 mm
- One Sieve Frame only dia. 200 mm. to improve the capacity of the first sieve.
- Set of O ring gaskets for sieves.

Sieves with different openings are available on request.
A complete extraction cycle is performed ot in approx. 25 minutes and the max. quantity of mixture per extraction is 3500 g
Power supply: 400 V 3 ph 50 Hz 5,5 kW
Overall dimensions: 1400x680x1820 mm
Total weight: 185 kg

***** *NOTE: in addition to the perchloroethylene (PCE) or tetrachloroethylene solvent, it is possible to use also the Trichloroethylene (CHC1:CC1$_2$), but as per 2001/59/CE Directive, it is classified "R45", and therefore considered a dangerous solvent. (Toxic and cancer-producing)*

B008

ACCESSORY:

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

SPARE PARTS :

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

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

B011

Centrifuge extractor 1500/3000 g capacity

STANDARDS: **EN 12697-1 clause B.1.5, EN 13108** / ASTM D2172 AASHTO T164A

Used for the determination of bitumen percentage in bituminous mixtures.

It consists of a removable, precision machined aluminium rotor bowl (accessory 1500 or 3000 g capacity), housed in a cylindrical aluminium box.

The separate control panel incorporates an electronic card fitted with AC drive that automatically drives the bowl speed rotation ramp from 0 to 3600 rpm as requested by Standards, with automatic 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)

Power supply: 230V 1ph 50-60Hz 550W

Dimensions: 550x380x500 mm approx.

Weight : 50 kg approx.

NEEDED ACCESSORIES:

B010-11 BOWL AND COVER 1500 G. CAPACITY.
Made of precision machined cast aluminium.
Weight: 3,6 kg

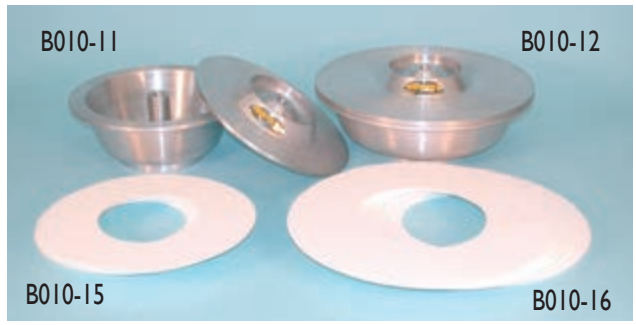
B010-15 FILTER DISC, 1500 G. CAPACITY. Pack of 100 pieces.

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.

ACCESSORY:

THRICHLOROETHYLENE SOLUTION FOR BINDER EXTRACTION.
We cannot supply for shipping problems.



B011

- Accepts bowls both 1500g and 3000g capacity
- Speed control 0-3600 rpm by "inverter" at 50/60Hz
- Separate panel for speed control and rpm on digital display.
- Explosion proof model (B011-01)
- CE safety option (B011-10)

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. B011-01.

B011-01

Centrifuge extractor "explosion proof" 1500/3000 g capacity

Same to mod. B011, but equipped with a special explosion proof electric motor.

The control panel has to be installed in a non explosive area.

B014

Continuous flow filterless centrifuge

STANDARDS: **EN 12697-1 all. B.2.1, EN 13108** / DIN 1996
CNR N° 38 / ASTM D1856

Designed for quick filterless separation of filler from binder solution or other mixtures containing sediments (cement, soil, clay), in suspension. As no filter is required, there is no dispersion of material so that the highest accuracy is assured. The solution is poured into the top funnel and falls into the rotating test container dia. 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: 230 V 1ph 50 Hz 600 W
Dimensions: 350x600x720 mm.
Weight: 60 kg

SPARE:

B014-01 ALUMINIUM BEAKER 70 mm. dia. x 200 high

ACCESSORY:

THRICHLOROETHYLENE SOLUTION FOR BINDER EXTRACTION.
We cannot supply for shipping problems.

B014-01

B014

- Filler recovery with filterless system
- Continuous flow at 11500 rpm
- Automatic speed ramp

B021

Solvent recovery still - 10 litre/hour

This efficient and compact unit, easy to install, is totally self contained. It is provided of 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 of funnel/tank with sieve insert, 10 m plastic tube.
Power supply: 230 V 1 ph 50-60 Hz 1300 W
Dimensions: 320x400x650 mm
Weight: 17 kg

B021

- 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 over-heatings

B016-10

Hot extractor set

PAPER FILTER METHOD

STANDARDS: **EN 12697-1 clause B.1.1**
EN 13108, EN 12697-14
BS 598:102

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 400mm dia. (pack of 25 pcs.)
Dimensions: 480x480x900 mm
Weight : 22 kg aprox.

ACCESSORY:
V200-02 Hot plate dia. 220 mm.
230V 1ph 50-60Hz 2000W

SPARE PART:
B016-15 Filter paper 400 mm dia. (100 pcs.)

B016-10

B017 KIT

Hot extraction apparatus

WIRE MESH FILTER METHOD

STANDARDS: **EN 12697-1 clause B.1.2, EN 13108 /** CNR a.VII N° 38
DIN 1996

This apparatus consists of a cylindrical glass jar containing a stainless steel wire basket cloth opening 0,063 mm. The asphalt sample (max. quantity 400 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: dia. 160x335 mm
Weight: 5 kg

Stainless steel condenser

B017 KIT

V200

ACCESSORIES:
B017-02 Wire basket stainless steel cloth opening 0,4 mm
B017-04 Wire basket stainless steel, double cloth 0,063 and 0,4 mm. openings.
V200 Hot plate dia. 185 mm
230V 1 ph 50-60 Hz 1500 W
V173-03 Wire mesh with ceramic centre

SPARES:
B017-01 Wire basket stainless steel cloth opening 0,063 mm
B017-03 Pyrex glass jar
B017-05 Metal condenser stainless steel with ring

B016-20 KIT

Soxhelet modified method

STANDARDS:
EN 12697-1 clause B.1.3
EN 13108

Consisting of flask 5000 ml capacity, 2000 ml extractor, cock, vapour tube, condenser; all glass made.
Complete with 25 filtering cartridges dia. 80 x 240 mm, isomantle electric heater, stand and clamps.
Power supply:
230V 1ph 50/60Hz 900W
Dimensions:
400x400x1000 ml approx.
Weight: 20 kg approx.

SPARE PART:
B016-23
Filter cartridges for Soxhelet dia. 80 x 240 mm
(pack of 25 pcs.)

B016-20 KIT

B061 KIT

Kumagawa (Soxhelet) extractor 1 litre capacity

STANDARDS:
EN 12697-1 clause B.1.3
EN 13108 / LCPC - CNR N.38

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:
230 V 1ph 50/60 Hz 750 W

B061 KIT

B061-01 KIT

Kumagawa (Soxhelet) extractor 2 litres capacity

Basically similar to mod. B061 but 2 litres capacity.

SPARES:
B061-02 FILTER CARTRIDGES, dia. 58x170 mm for Kumagawa 1 litre. Pack of 25 pieces.
B061-03 FILTER CARTRIDGES dia. 80x200 mm for Kumagawa 2 litres. Pack of 25 pieces.

B018

Binder recovery apparatus. Vacuum pump method

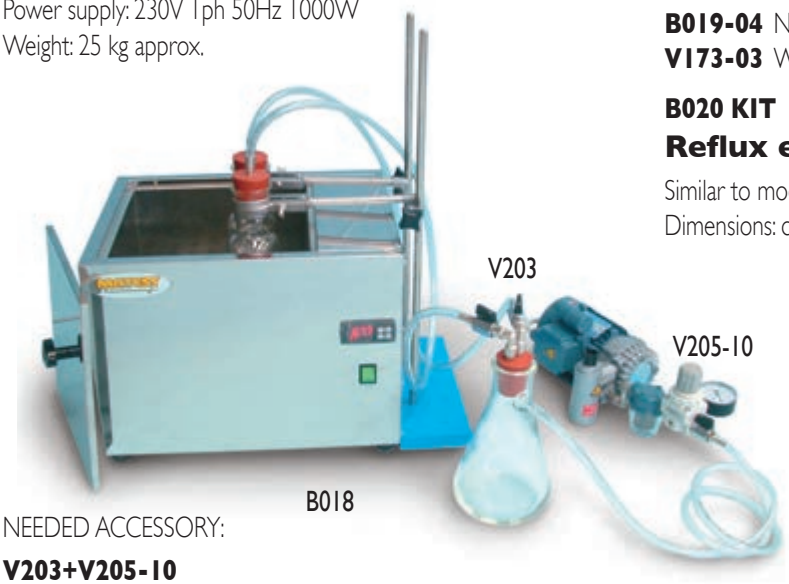
HOT EXTRACTION METHOD
SOLUBLE BINDER CONTENT (BITUMEN RECOVERY)

STANDARDS: **EN 12697-1 Clause B.3.1, EN 13108 /** 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 mm 280 x 280 xh 230.
  This unit may be used also as 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, electric heating mantle with regulator.
Power supply: 230V 1ph 50/60Hz 750W. Weight: 15 kg approx.

B019 KIT

Reflux extractor 1000 g capacity

STANDARDS: ASTM D2172 / AASHTO T164 B

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: dia. 160x510 mm - Weight: 5 kg

ACCESSORY:

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

SPARES:

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 but having 4000 g capacity.
Dimensions: dia. 280x510 mm. Weight: 9 kg

ACCESSORY:

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

SPARES:

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 300 x 300 mm

B067N

Vacuum pyknometer 10 litres capacity

THEORETICAL MAXIMUM SPECIFIC GRAVITY OF UNCOMPACTED BITUMINOUS PAVING MIXTURES (RICE-TEST)

STANDARDS: **EN 12697-5, EN 13108** / ASTM D2041 / AASHTO T209, T283

Transparent plexiglass made, complete with valve and gauge, it is utilized for a rapid determination of asphalt content, 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: 300mm dia. x 450mm high
Weight : 8 kg approx.

B067N

A059-02 KIT

V205-01+
V205-10+V205-12+
V230-03+ B067-11

ACCESSORIES:

A059-02 KIT
VIBRO-DEAERATOR, ELECTROMAGNETIC, with adjustable vibrating intensity.
To vibrate the pyknometer for the evacuation of the air.
This unit can be used also as a Sieve Shaker.
Technical details: see Section "A" Aggregates, pag. 38

B067-11 ELASTICS, to fix the pyknometer to the vibro-deaerator.

V205-01 + V205-10 + V205-12
VACUUM PUMP, PORTABLE TWO STAGES, complete with vacuum regulator and condensed water trap.
Technical detais: see Section "V" pag. 487

V230-03 TUBING FOR VACUUM, 3 m long

BINDER RECOVERY BY ROTARY EVAPORATION

B065

Rotary Evaporation Apparatus

STANDARDS: **EN 12697-1, 12697-3**

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 Specification.
The recovered asphalt can be used for further tests, as required.
The Rotary Evaporation Apparatus is essentially composed by:
- distillation flask 1000 ml capacity.
- motor of variable speed, suitable to rotate the flask at an adjustable rate of 20 to 280 rpm.
- condenser.
- solvent recovery flask, 1000 ml capacity.
- 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 50Hz - Weight: 27 kg approx.

ACCESSORIES:

B065-12 VACUUM REGULATING SYSTEM, including regulation valve, pressure gauge and vacuum digital gauge 1 mbar resolution. - 230V 1ph 50Hz

V205-01 VACUUM PUMP, dual stage.
Technical details: see pag. 453 - 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

B065-12

V205-01+V230-03

B007

ASPHALT SPLITTER

NEW

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, of three rotating paddles.
The cover is closed, the machine started, and the three paddles break and crumble the sample in grains.
One to three minutes are normally sufficient to obtain a grained sample, but the longer is the grinding time, the more grain sizes will decrease.
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 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: 490 x 730 xh 855 mm
- Weight: 85 kg approx.

SPARE PART:

B007-11
Kit of three rotating paddles with screws.

B007 Closed

B007 Open

Detail of the 3 paddles

Unloading phase

PARTICLE LOSS OF POROUS ASPHALT SPECIMEN

STANDARDS: **EN 12697-17, EN 13108**

The test concerns the determination of the particle loss by abrasion of porous asphalt mixtures.

RESISTANCE TO FUEL

STANDARDS: **EN 12697-43, EN 13108**

The test concerns the determination of the resistance of a pavement or a bituminous mixture to aviation fuel.

These two Standards require, within other specific tests, the abrasion tester:

A075

Los Angeles abrasion machine

Technical details: see Section "A" Aggregates, pag. 45

A075

DETERMINATION OF THE AFFINITY BETWEEN AGGREGATE AND BITUMEN

STANDARDS: **EN 12697-11, EN 13108**

The equipment is formed by:

B022

Bottle rolling machine, with rotation speed adjustable from 0 up to 85 rpm, used for the determination of 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. The machine can roll up to 3 bottles at the same time. Supplied complete with timer range 0 - 6 hours.

Power supply: 230V 50/60Hz 1ph

Dimensions: 385x295x160 mm.

Weight: 10 kg approx.

B022 + B022-11

B022SP NEW

Bottle rolling machine, same to mod. B022 but equipped with timer range 0 - 99 hours.

B022-11

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

B022-12

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

SAMPLING OF ASPHALT ROAD CORES FOR THE 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" pag. 280

C319

VIBRATORY COMPACTION METHOD, FOR THE PREPARATION OF BITUMINOUS TEST SPECIMENS, applicable to loose mixtures and cores to determine a density ratio for a bituminous mixture as described in the EN Specifications.

STANDARDS: **EN 12697-9, 12697-10, 12697-32** / BS 598:10

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 pavaments, for quality control purpose.

Weight: 12 kg

S197N

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" pag. 404

ACCESSORIES:

B097-11 Small tamping foot, dia. 102 mm Complete with shank.

B097-12 Large tamping foot, dia. 146 mm Complete with shank.

S197-01N Supporting frame for vibrating hammer (see pag. 404).

INDENTATION TEST USING CUBES OR MARSHALL SPECIMENS

STANDARDS: **EN 12697-20, EN 13108**

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

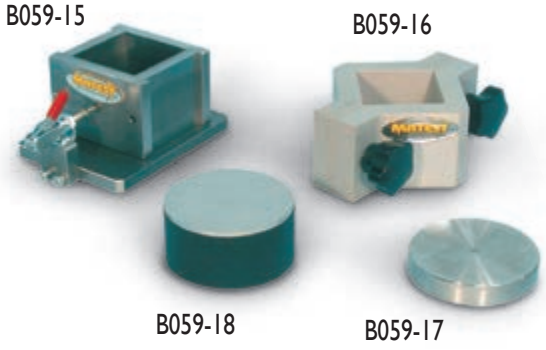
B059-10

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: 530 x 600 xh 820 mm
Weight: 160 kg

B059-21



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.

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: see section "V" pag. 480

V154

ACCESSORIES:
V154-01 Penetration probe, 120 mm long
V154-02 Surface probe, 260 mm long

BINDER DRAINAGE, BASKET METHOD

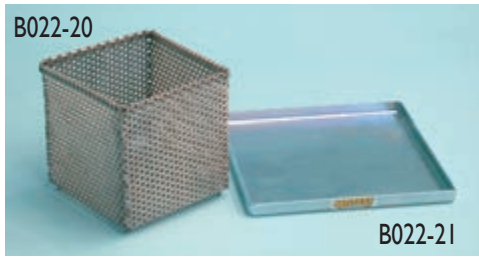
To determine the drainage of bituminous samples obtained from different mixtures of mineral fine aggregates or additives, for the evaluation of the drainage results.

STANDARDS: **EN 12697-18, EN 13108**

B022-20

Drainage basket, dimensions 100x100x100 mm, made from stainless steel sheet with 3,15 mm dia. holes.

Weight: 500 g approx.



B022-20

B022-21

B022-21

Tray, stainless steel made, dimensions 160x160x10 mm.

Weight: 500 g aprox.

DETERMINATION OF BULK DENSITY OF BITUMINOUS MIXTURES BY HYDROSTATIC GRAVITY METHOD

STANDARDS: **EN 12697-6, 12697-7, EN 13108**
ASTM D1186, D2726
AASHTO T166-93 / CNR N. 40

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" pag. 472

V075-11

V041

V085

ACCESSORIES:

V041

DENSITY BASKET, stainless steel, 200 mm dia. by 200 mm high

V075-11

DIGITAL BALANCE 6000g capacity x 0,1g sens.
Technical details and other models: see section "V" pag. 471

A106

WAX MELTING POT
Technical details:
see section "A" pag. 29

A106

V300-19

PARAFFIN WAX, pack of 4600 g

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: 7 kg approx.

B024-10

B024-05

Conical sieve 0,355mm mesh

NEW

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

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.

LABORATORY BITUMINOUS MIXERS

AVAILABLE MODELS:

E094

Mixer 5 litres capacity

STANDARD: **EN 12697-35** / BS 598:107

This bench mounting Mixer, is utilized 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: 230 V 1 ph 50 Hz 800 W
Dimensions: 450x400x480 mm
Weight: 50 kg

E094 + B028-03

E095

Mixer 5 litres capacity

Same to 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 + 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: 230V 1ph 50-60Hz 800W

E095-03 BEATER, stainless steel made.

SPARE: **E095-01** BOWL, stainless steel, 5 litres capacity.

...follows...

Mixer 20 and 30 litres capacity

STANDARD: **EN 12697-35**

These large capacity mixers have been designed to mix bituminous samples for compaction tests, Marshall and tensile splitting test and for other tests where uniformity is required. Thanks to the planetary action this mixer ensures a complete and uniform mixing. The machine is provided with a variable speed drive allowing to set a wide range of speeds:

- from 20 to 130 rpm for the planetary action
- from 60 to 390 rpm for the revolving action

The stainless steel cover can be lifted to inspect the bowl, and in this case the motor automatically turns off to prevent accidents to CE safety Directive.

A timer allows to select the mixing time or the continuous mixing.

The mixer is supplied complete with stainless steel bowl, but **"without"** whisk beater, **"without"** coupling and **"without"** electric heater that must be ordered separately (see accessories).

B027 / B027L

B027-01N / B027-01L

AVAILABLE MODELS:

B027 MIXER, 20 LITRES CAPACITY
Power supply: 400V 3ph 50Hz 1,1kW
Dimensions: 489x693xh 944 mm
Weight: 110 kg approx.

B027SP MIXER, 20 LITRES CAPACITY
Identical to mod. B027 but with power supply: 230V 1ph 50Hz 1,1kW

B027L MIXER 30 LITRES CAPACITY NEW
Identical to mod. B027, but with bowl capacity of 30 litres.
Power supply: 400V 3ph 50Hz 1,1kW
Dimensions: 700x539xh944 mm
Weight: 120 kg approx.

B027LSP MIXER 30 LITRES CAPACITY NEW
Identical to mod. B027L, but with power supply: 230V 1ph 1,1kW

ACCESSORIES:

MODEL:	B027 (20 litres)	B027L (30 litres)
WHISK THIN wire beater, EN Specifications	**B027-03**	**B027-03L**
WHISK THICK wire beater, EN Specifications	**B027-06**	**B027-06L**
COUPLING beater/shaft for B027-03(L), B027-06(L), B027-04(L)	**B025-08**	**B025-08L**
OTHER MODELS OF BEATERS, NOT CONFORMING TO STANDARDS:		
BEATER, STAINLESS STEEL	**B027-07** NEW	-----
BEATER, aluminium	-----	**B027-02L**
SPIRAL Beater	**B027-04**	**B027-04L**
HOOK Beater	**B027-05**	**B027-05L**
COUPLING beater/shaft for B027-02(L), B027-05(L), B027-07	**B025-09**	**B025-09L**
ISOMANTLE HEATER, electric, complete with thermoregulator. The isomantle winding action of the bowl allows a more uniform heating of the bituminous sample. Power supply: 230V 1ph 50/60Hz 1000W	**B027-01N** NEW	**B027-01L** NEW
BOWL, Stainless Steel, spare-part	**B027-11**	**B027-11L**

B026N

PaveMix - Matest made

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.

The mixer 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 to get easy the unloading operation.

The control panel foresees:

- Digital thermo regulator to set temperature and to control the mixing temperature.
- Mixing speed regulator.
- Main and start/stop switches.
- Command to tilt the bowl.

Technical Specifications and features:

- Mixing capacity: 32 litres max.
- Mixing bowl: stainless steel AISI 316
- 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.

Heating power: 3000 W
Power supply: 230V 1ph 50/60Hz 4500 W
Dimensions: 1280 x 700 x h1210 mm
Weight: 350 kg

Bowl detail: open and tilted

HOT MIX ASPHALT COMPACTABILITY DETERMINATION

B031N1

Marshall Automatic EN (impact) Compactor

STANDARDS: **EN 12697-10 / EN 12697-30:2012** 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.
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: 500 x 500 x 1890 mm
Weight : 220 kg

B031N 1

ACCESSORY:

B031-01
CABINET, lined with sound-proofing material for noise reduction within CE limits
Dimensions:
800 x 800 x 2000 mm approx.
Weight : 100 kg approx.

B031N 1 + B031-01

SPARE PART:

B033-11N
Compaction Hammer complete

B029N-KIT

Marshall compaction mould, 4" dia.

STANDARDS: **EN 12697-10 / EN 12697-30:2012**
CNR N° 30 / NF P98-251-2
Inside diameter: 101,6 mm (4")
Steel manufactured, plated against corrosion.
Weight: 3,150 kg

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.

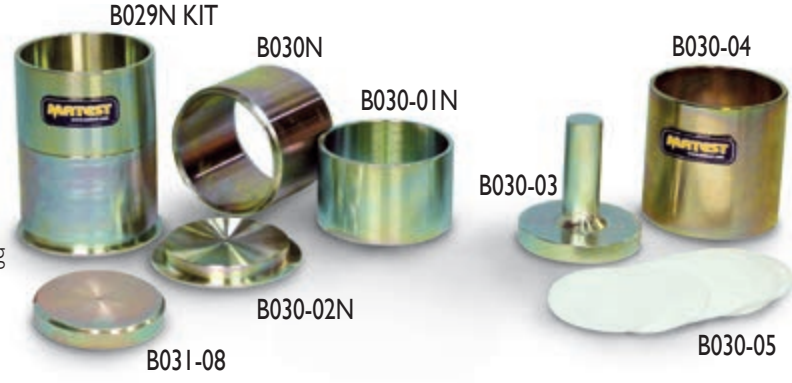
B030-01NF FILLING COLLAR only (NF P98-251-2). Weight: 850g

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 dia 100mm. Pack of 100

B031-08 DISTANCE PIECE, (to use of the B029N-KIT mould with the old Compactors model B031 and B031N).



MARSHALL STABILITY ASTM - SPECIMEN COMPACTION

B033

Automatic Marshall compactor for 4" Ø moulds

STANDARDS: ASTM D6926 / 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 60 blows per minute.
This compactor is suitable only for Marshall moulds dia. 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. B033-01 and B033-03)
Power supply: 230 V 1 ph 50Hz 300 W
Dimensions: 540x400x1600 mm
Weight: 95 kg

B033

B033-01

Automatic Marshall compactor for 4" Ø moulds

Same to mod. B033, but equipped with safety guard, conforming to CE Safety Directive.
When opening the guard during Compactor working, a microswitch automatically stops the unit.

B033-01

B033 + B033-03

B033-11

B033-04

ACCESSORIES:

B033-03
SOUNDPROOF SECURITY CABINET, steel made with micro-switch, complying to CE Safety Directive, lined with sound-proofing material for noise reduction.
Accessory for B033 model.
If the door is opened while the Compactor is working, it automatically stops.
Dimensions: 660x660x1900 mm
Weight: 70 kg approx.

B033-04 STEEL PLATE, dia. 100x50 mm, to heat the Compaction's Hammer.

SPARE:

B033-11 COMPACTION HAMMER complete for B033, B033-01 Compactors.

B032-KIT

Marshall compactor, hand operated for 4" Ø moulds

STANDARDS: ASTM D6926
AASHTO T245

Similar to mod. B033, but the hammer is lifted and released manually.
Dimensions: 320x320x1600 mm
Weight: 60 kg approx.

The assembly consists of:

B034
COMPACTION HAMMER, with 4,53 kg sliding weight, guided on a shaft.
Plated against corrosion
Weight: 10 kg

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

B037 SUPPORT and hammer guide.

B032 KIT

B032-01

Marshall compactor, hand operated, for 6" and 4" Ø moulds

STANDARDS: ASTM D6926, D5581
Comparable to AASHTO T245

Supplied complete with compaction hammer 6" diameter, wooden pedestal capped with steel plate and mould clamp device, support/ hammer guide.
Dimensions: 320x320x1700mm
Weight: 70 kg approx.

ACCESSORIES:

B034
COMPACTION HAMMER 4" diameter, complete, for B032-01 Compactor.

B032-11
REDUCTION COLLAR to fix the mould B029KIT (4" dia.) to the Marshall Compactor mod B032-01

SPARE PART:

B032-05
COMPACTION HAMMER 6" diameter, complete, for B032-01 Compactor

B032-11

B032-01

B035-01

Automatic Marshall compactor for 6" and 4" Ø moulds

STANDARDS: ASTM D6926, D5581 / Comparable to AASHTO T245
This apparatus automatically compacts the Marshall specimens 6" and 4" diameter and stops after the preset number of blows.
Supplied complete, **"except for the compaction hammers 6" diameter** (mod. B035-11) **and 4" diameter"** (mod. B035-12), and the moulds, which must be ordered separately.
It cannot be sold in CE markets without safety guards (see mod. B035-02 and B035-03). Power supply: 230V 1ph 50Hz 500W
Dimensions: 460x570x1700mm. Weight: 180 kg approx.

B032-05 B034

B035-02

Automatic Marshall compactor for 6" and 4" Ø moulds

Same to mod. B035-01, but equipped with safety guards, conforming to CE Directive.

B035-11 B035-12

B035-01

ACCESSORIES:

B035-11 COMPACTION HAMMER 6" diameter for the B035-01 and B035-02 Compactors.

B035-12 COMPACTION HAMMER 4" diameter for the B035-01 and B035-02 Compactors.

B035-03 SOUNDPROOF SECURITY CABINET, steel made, lined with sound-proofing material, complying to CE Safety Directive.

B030 KIT

Marshall compaction mould, 4" Ø

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 dia. 100 mm. Pack of 100.

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

B029-01

Marshall compaction mould, 6" Ø

STANDARD: ASTM D5581-96

Consisting of mould body, filling collar and baseplate.
Inside diameter: 152,4 mm (6")
Steel manufactured, plated against corrosion
Weight: 5 kg approx.

S114

Universal extruder

Hand operated, actuated by a 5 tons hydraulic jack, it is designed to extrude samples having dia. 4" and 6". It can therefore extrude Marshall, CBR, Standard and Modified Proctor specimens.
Dimensions: dia. 300x500 mm
Weight: 30 kg

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 50Hz
Dimensions:
1800x830xh2500 mm
Weight: 380 kg

ACCESSORY:

B079-01
LOWER CUPBOARDS, bilaminated plastic made, complete with doors and shelves.

B041

GYROTRONIC - Superpave Gyratory Compactor, Matest made

NEW

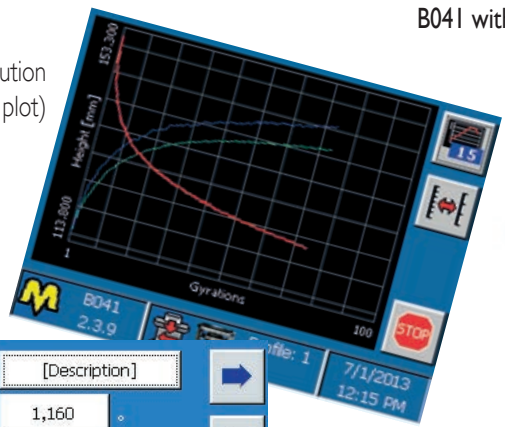
STANDARDS: **EN 12697-10, EN 12697-31** / ASTM D6925 / AASHTO T312 / SHRP M-002

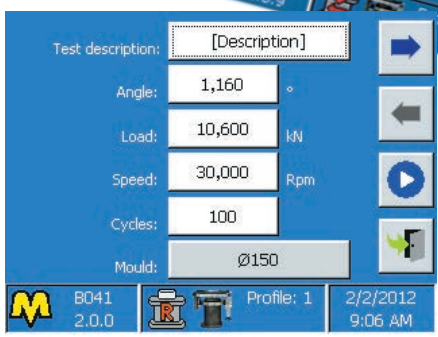
This Gyratory Compactor, entirely developed and manufactured by Matest, is used to simulate and reproduce the real compaction conditions under actual road paving operations, hence determining the compaction properties of the asphalt.
Such compaction is achieved in a fully automatic way, by combining 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 with the internal angle set according to the Standard chosen by the customer:

- **Angle set to 1,16° to meet ASTM D6925, AASHTO T312, SHRP M-002**
- **Angle set to 0,82° to meet EN 12697-10, EN 12697-31**

B041 with mould

Test execution (data plot)





Setting of test parameters

B041-20

MAIN FEATURES:

- Highly rigid steel frame ensuring excellent angle control, to meet the strict tollerances requested by EN Specifications.
- Electro-pneumatic action with servo-controlled regulator.
- Electronic control unit with touch screen color display, that runs like a standard PC based on Windows operating system.
- Software for acquisition and PC data processing.

The touch-screen icon interface allows an easy set up of the parameters and immediate automatic execution of the test, data acquisition, processing, graphics and file.
Direct connection to Intranet (connection to a LAN network) and Internet to establish a remote communication and receive an immediate diagnostic analysis of the potential problem from Matest technicians, or for software updates.
Unlimited memory storage with: 2 USB ports, 1 SD card.
Hardware technical details: see catalogue at page 24.

TECHNICAL SPECIFICATIONS:
- Compacted specimen size: dia 100 and 150 mm; height from 0 to 200 mm for both sizes.
- Mould dimensions: Internal dia100 and 150 mm; height 250 mm for both moulds.
- Gyratory angle: adjustable from 0 to 2,4°
- 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 150mm dia specimen: adjustable from 10 to 900 kPa (900 kPa with 9 bar compressor) (800 kPa with 8 bar compressor) (700 kPa with 7 bar compressor)
- Vertical load on 100 mm dia 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 assure 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 etc., to be ordered separately (see accessories)
Power supply: 230V 1ph 50/60 Hz 1000W 12A
Dimensions: 640x500xh1050mm
Weight: 240 kg

AVAILABLE MODELS:

B041
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.

B041EN
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.

Gyratory compactor with shear stress measurement device

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.

MAIN FEATURES:
- The device provides the most important parameters required to determine the main properties of asphalt mixes, and to predict their suitability for practical uses.
- Useful for research purposes and experimental studies, and increasingly being considered as a "needed accessory" in most of the worldwide markets.
- A group of load cells (integrated into the Gyratory Compactor's frame) measure all the involved forces acting on the specimen, which are analyzed by the software in order to calculate the effective shear stress value.
- Real time visualization of the instant shear stress value along the entire compaction process.
- Calculation of the resultant load's eccentricity and consequently the effective tilting moment.
- Possibility to export the results into an Excel data report, which can be easily edited by the operator.

ADVANTAGES:
- The shear stress measurement device is integrated into the Gyratory Compactor and therefore it doesn't require any additional operation to be done by the user.
- The system comes already calibrated from the factory.
- Available either with ASTM configuration (internal angle: 1,16°) or EN configuration (internal angle: 0,82°).

AVAILABLE MODELS:

B041-01
Gyratory compactor with shear stress measurement device - ASTM

STANDARDS: ASTM D6925 / AASHTO T312 7 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.

B041-01 EN
Gyratory compactor with shear stress measurement device - 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.

Test execution with shear stress measurement

...follows...

ACCESSORIES to perform the test:

B041-05 Hardened specimen cylinder 100 mm dia complete with bottom plate

B041-06 Hardened specimen cylinder 150 mm dia complete with bottom plate

B041-08 Hardened specimen cylinder 100 mm dia with holes for cold mix compaction, complete with bottom plate

B041-09 Hardened specimen cylinder 150 mm dia with holes for cold mix compaction, complete with bottom plate

B041-11 Top penetration piston 100 mm dia

B041-12 Top penetration piston 150 mm dia

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 100mm dia moulds. Pack of 2

B041-14 Metallic disc for 150mm dia 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 100mm dia moulds. Pack of 100

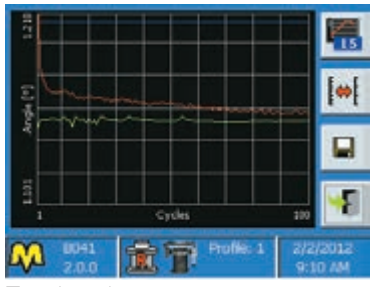
B041-16 Filter paper for 150mm dia moulds. Pack of 100

Hollow Punches for Gyratory Compactor:

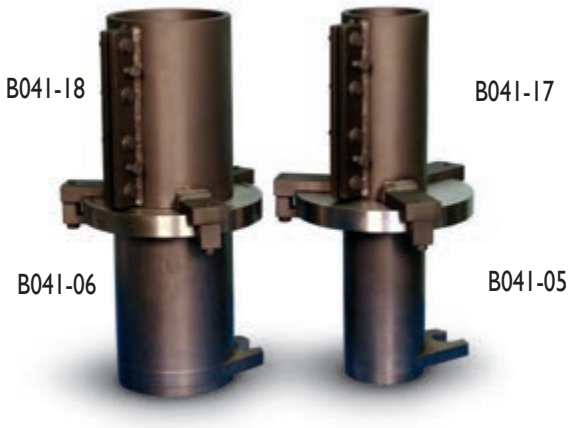
Used to maintain the core in the right shape and store cohesive asphalt samples after compaction.
Some asphalt mixes can be very unstable due to their high void ratio and large particle size. Wrapping the sample around the hollow punch will prevent it from crumbling down or receiving physical deformations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

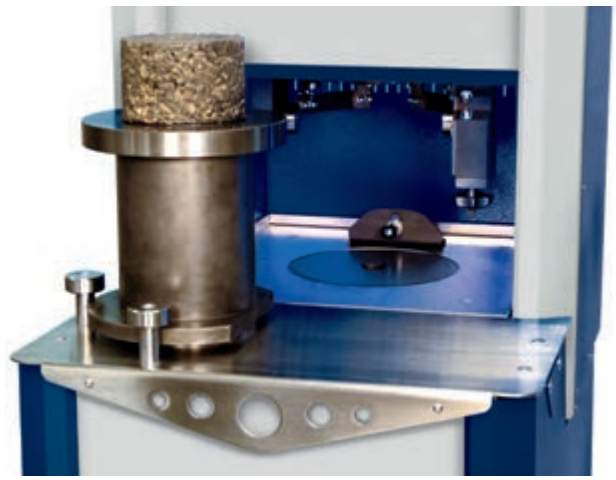
B041-17
Hollow Punch to stabilize and to mature the sample 100 mm dia.

B041-18
Hollow Punch to stabilize and to mature the sample 150 mm dia.

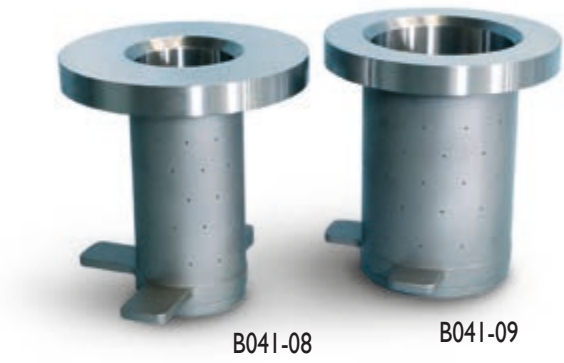


Test data plot





B041-23 extruder with mould



ACCESSORIES for the Gyratory Compactor:

V207 Air Compressor, pressure 10 bar.
Technical details: see page 454

B041-35 Filter group for condensed water removal from the compressed air. **(Necessary Accessory)**.

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

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)

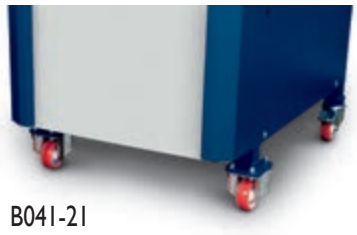
B041-23 Pneumatic automatic specimen extruder, it can be fixed to the worktop B041-20, or to any bench.

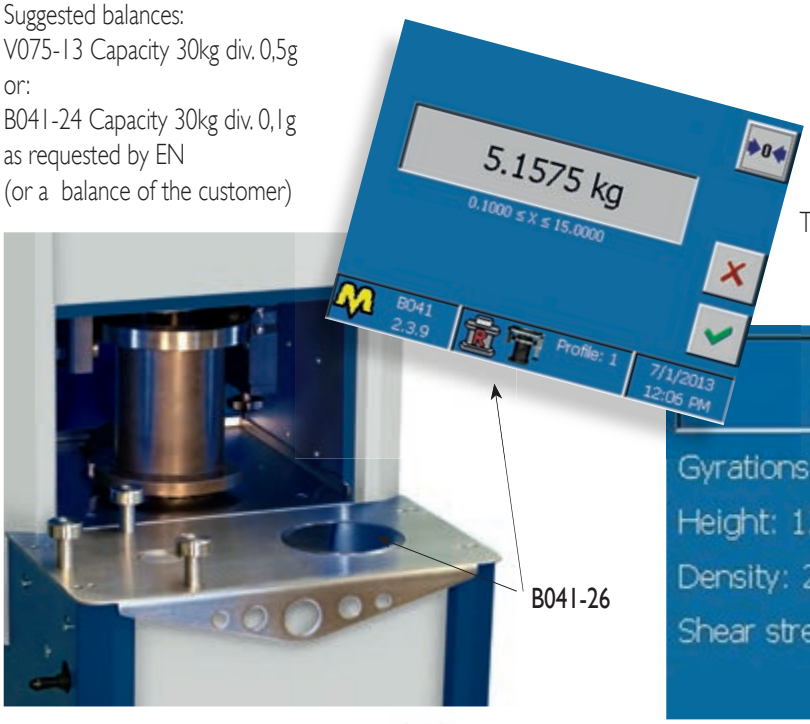
B041-26
BALANCE, "integrated" into the worktop, to facilitate the sample and the mould weightings, by avoiding the stress of lifting them.
The weighting reading values are directly and automatically displayed on the control panel of the Compactor.
Capacity: 30 kg
Accuracy: +/- 6 g

As alternative:

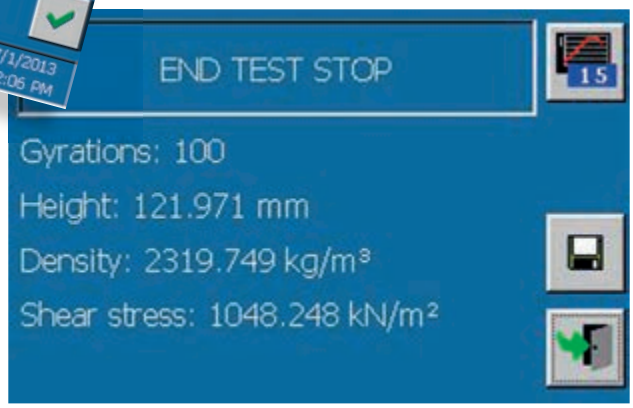
B041-27
BENCH for lateral bearing of a weighting balance.
Suggested balances:
V075-13 Capacity 30kg div. 0,5g
or:
B041-24 Capacity 30kg div. 0,1g
as requested by EN
(or a balance of the customer)

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

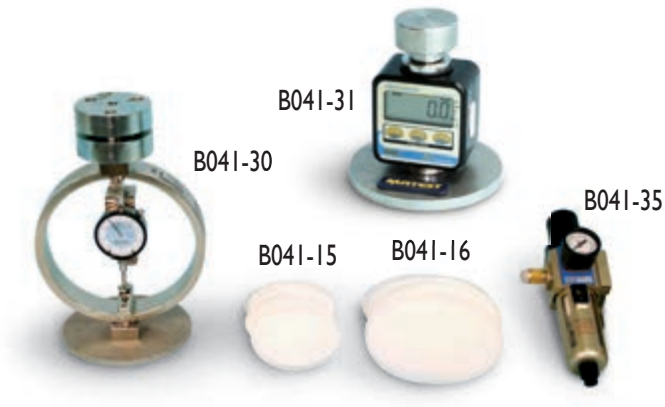

B041-21



Test configuration (balance)



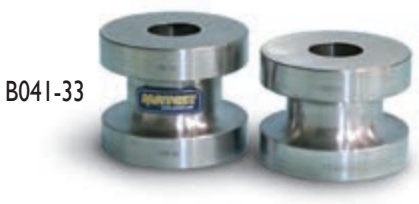
End test data (with shear stress value)



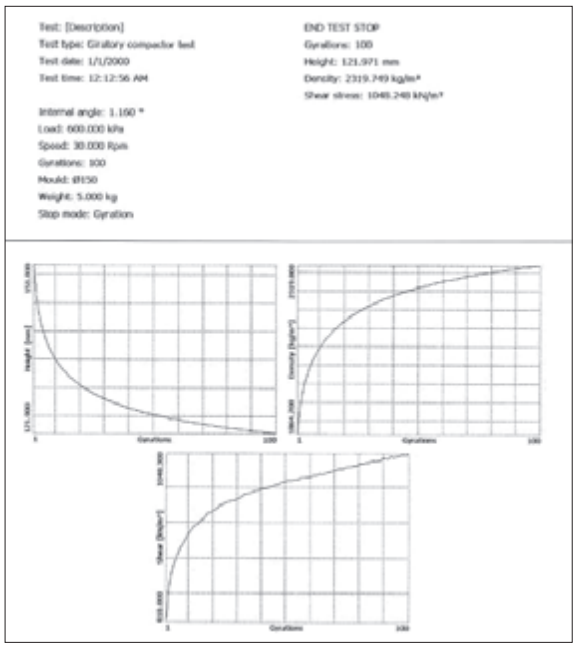
B041-30 Vertical force testing device with load ring.

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.


Final report

...follows...

B041-28

GAM - Gyratory internal Angle Measurer

STANDARDS: **EN 12697-31** / ASTM D7115 / AASHTO T344

NEW

This Gyratory Angle Measurer has been designed by MATEST to provide an angle validating device which can be used by the operator to carry on 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".

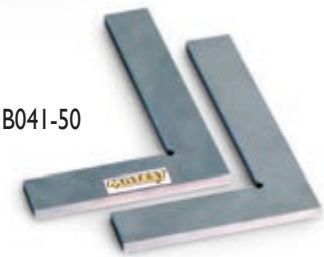
An excel spreadsheet, which is supplied along with the device, is used for data acquisition and processing, and provides the precise value of the internal angle according to the calculation procedure specified by EN 12697-31 (Annex-C) and AASHTO T344.

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
- 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
- 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.

B041-28



B041-50

TECHNICAL DETAILS:

- 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

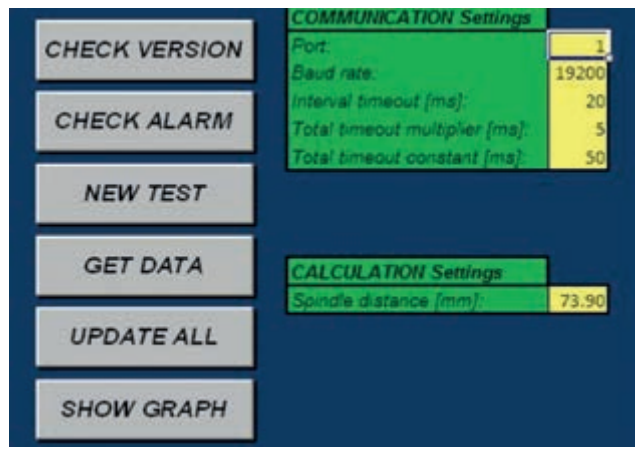
Power supply: n°2 batteries 1.5V type AA
Dimensions: Diameter 150mm , Height 115mm
Weight: 5.6 kg

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).



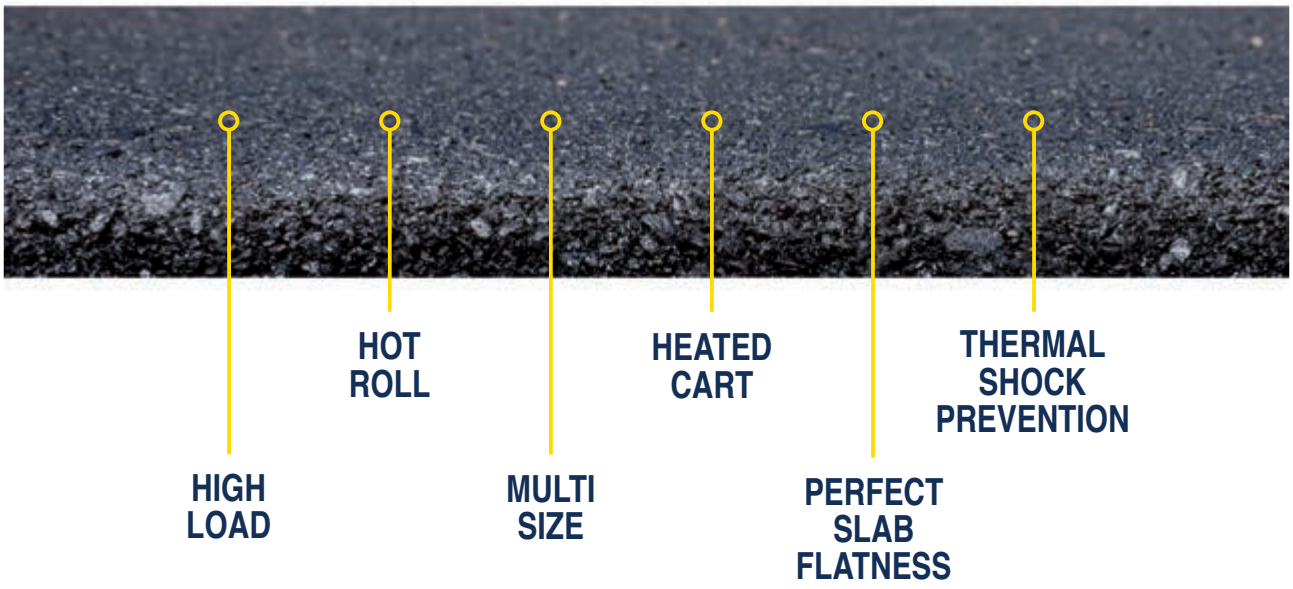
Excel spreadsheet: it allows several operation to be carried on (data acquisition, data processing, visualization of graphs,…)

ARC

ASPHALT ROLLER COMPACTOR

meets and exceeds EN 12697-33

THE FIRST ELECTROMECHANICAL SYSTEM FOR THE BEST SPECIMEN DENSITY



B039

ARC - Asphalt Roller Compactor

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
  320x260 mm, thick up to 180 mm
  305x305x25 to 100 mm thick
  400x305x25 to 100 mm thick
  500x400 mm, thick up to 180mm
- Vertical force selectable up to max. 40 kN
- **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 **or even just one of them** NEW
- The required n° of passes can be set before starting the test allowing an accurate test control by n° of passes NEW
- **Sliding carriage speed adjustable** between 3 m/min and 12 m/min NEW
- **Detailed output file** listing each pass and displaying duration, sample height, applied load and eventual roller and cart temperature NEW

B039
with open guard

...follows...

B039

ARC - Asphalt Roller Compactor, Electromechanical system High load, hot roll, multi size

STANDARD: **EN 12697-33**

NEW

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 page 98).
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.

B039

MAIN FEATURES:

- **Sturdy frame made of steel**
- Mould supporting table with alternating displacement system, for table displacement and vertical load pressure
- **Integrated touch screen control unit based on Windows operating system**. The control unit runs like a standard PC for the management and analysis of data, test results, graphs.

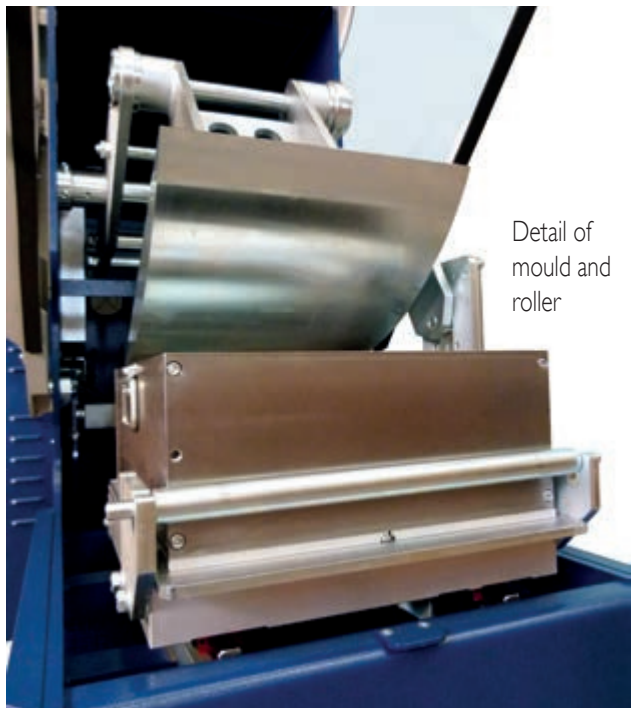
  The **touch-screen icon interface** allows an easy set up of the parameters and an immediate execution of the test.
- **Direct Internet and Intranet** (LAN) **connection for remote technical assistance**. This features allows operators to establish a remote communication and receive software updates or an immediate diagnostic analysis of the potential problem from Matest technicians. Hardware technical details: see pag. 24
- **Unlimited memory storage** with: 2 USB ports, 1 SD card slot.
- **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

Detail of the control panel

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).

Power supply: 230V 50/60Hz 1ph 2100W (3100W with the heated segment roller)
Dimensions: 2200x1030 xh 1880 mm (2410mm with opened guard)
Weight: 1300 kg



Detail of mould and roller

ACCESSORIES:

"STANDARD" SEGMENT ROLLER, available dimensions:

B039-04 ROLLER for 320x260mm mould
B039-05 ROLLER for 500x400mm mould
B039-06 ROLLER for 400x305mm mould
B039-07 ROLLER for 305x305mm mould

MOULD to prepare asphalt slabs. Complete with handles. Available dimensions:

B038-09 MOULD for slabs 320x260x180mm
B038-10 MOULD for slabs 305x305x50mm
B038-11 MOULD for slabs 305x305x100mm
B038-12 MOULD for slabs 400x305x50mm (no handles)
B038-13 MOULD for slabs 400x305x100mm
B038-18 MOULD for slabs 500x400x180mm
B038-19 MOULD for slabs 400x305x120mm
B038-20 MOULD for slabs 320x260x50mm

B039-21 Centering Plate for 400x305mm mould
B039-22 Centering Plate for 305x305mm mould
B039-23 Centering Plate for 320x260mm mould

B039-15 ROLLING VIBRATING DEVICE, reproducing street-roller vibrations during asphalt laying off.

B038-13 B038-18

B039-06R B039-05R

B039-06 B039-07 B039-22 B039-21

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 by:

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.

"HEATED" SEGMENT ROLLER, complete with heating resistances. Available dimensions:

B039-04R ROLLER for 320x260mm mould NEW
B039-05R ROLLER for 500x400mm mould NEW
B039-06R ROLLER for 400x305mm mould NEW
B039-07R ROLLER for 305x305mm mould NEW

B039-03
Sliding Cart Heating Option

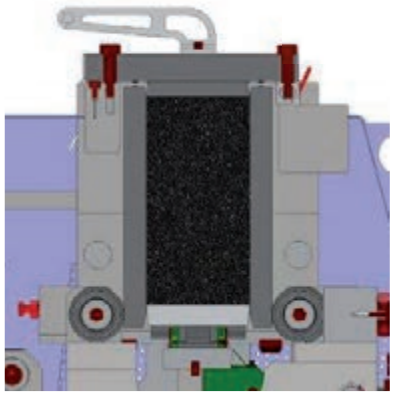
Thermoregulated circuit with temperature probe to set and control cart temperature and keep mould hot

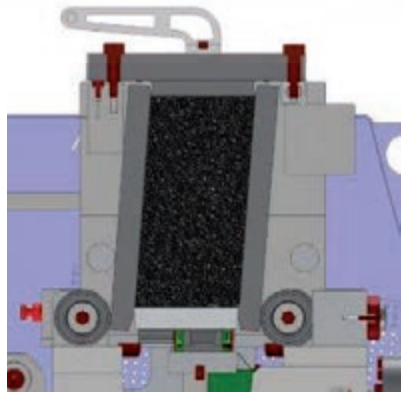
B039A

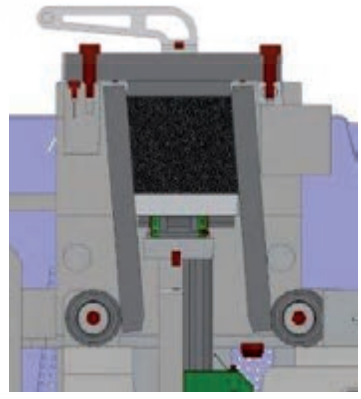
ASC - Asphalt Shear box Compactor

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 100mm diameter cylinders, all having essentially identical properties.
The electronic control unit with touch screen color display operates like a standard Windows based PC for the management and analysis of the data, test results and graphs.
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.

B039A







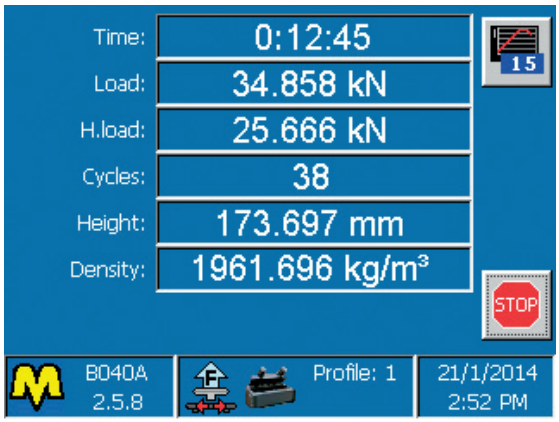
During the compaction process a lateral displacement is applied to the specimen along with a vertical load, which results in a shearing action that makes the compaction similar to the the on-field one.

MAIN FEATURES:

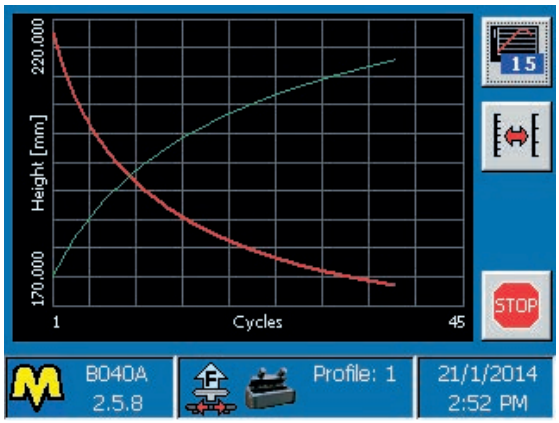
- Extremely sturdy fabricated frame combined with precision machined components
- Servo hydraulic vertical ram with integral hydraulic power supply
- Precision electro-mechanical shearing motion
- Integral specimen extruder
- Electronic control unit with touch screen color display (no need for PC)
- 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
- ASC can be equipped with a load cell for shear stress measurement, upon request

TECHNICAL SPECIFICATION:

Vertical force:	Up to 100kN
Shearing force:	Up to 50kN
Shear angle:	4° ± 0.1°
Shearing cycle rate:	3 ± 0.1 gyrations per minute
Mould width:	150mm ± 0.1mm
Mould length:	450mm ± 0.1mm
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:	149mm ± 0.2mm
Loading platen length:	449mm ± 0.2mm
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:	145mm to 185mm ± 0.1mm
Power supply:	230V 1ph 50/60Hz
Dimensions:	788x1360x(H)1314mm
Weight:	1200 kg



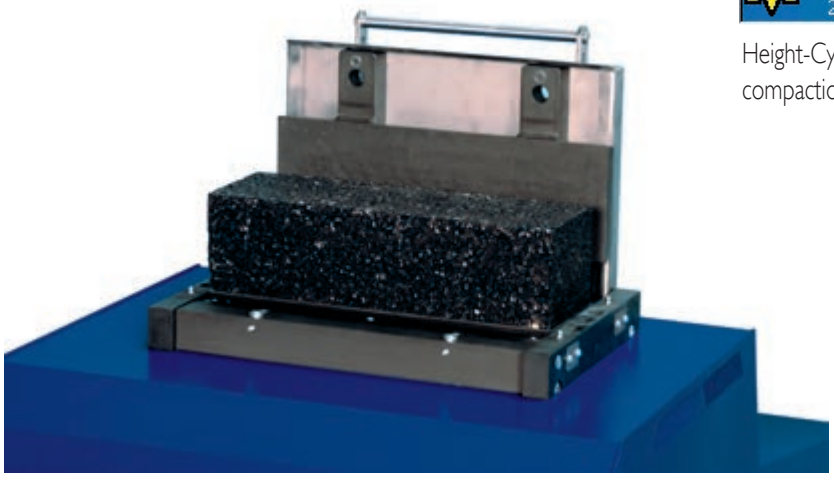
Test parameters during compaction



Height-Cycles and Density-Cycles curves during compaction

ACCESSORIES:

B039A-01 Loading Chute
B039A-02 Tray (2 off)
B039A-03 Spreading comb
B039A-04 Leveling blade



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.

B038

UNITRACKER - Single Wheel Tracking Apparatus

STANDARDS: **EN 12697-22** / BS 598:110

This test, developed in laboratory, consists in 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.

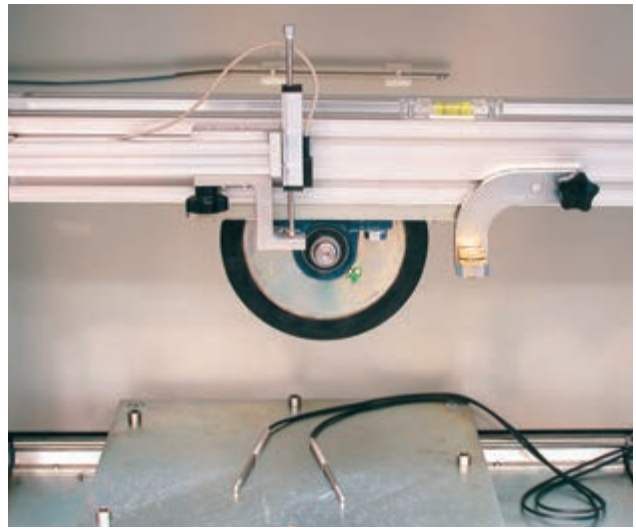
To perform the test, a wheel tracking apparatus is used to simulate the effect of traffic and to measure the deformation susceptibility of the bituminous sample.

Matest wheel tracker performs the test as per procedures A and B (6 or 2 tests), clearly specified by the EN Standard.

B038 with open doors

Technical specifications

- The machine fully satisfies both EN 12697-22 and BS 598:110 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: 400 x 390 mm and can accept rectangular slabs of several sizes:
  305 x 305 mm, 50 or 100 mm high
  305 x 400 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 400 x 500 mm, 180 mm high (this mould can be compacted with Matest 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.



B038 detail

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.

B038 detail

The use of the B038 Wheel Tracker requires connection to a PC with Windows 98, 2000, XP minimum requirements.

Power supply: 230V 50/60Hz 1ph 2200W
Power rating of the table: 500 W
Dimensions: 1580 x 650 xh 1790 mm
Weight: 400 kg approx.

B038-13 B038-18

B038 with closed doors

ACCESSORIES:

* **B038-09** MOULD with HANDLES size 320 x 260 x 180 mm
* **B038-10** MOULD with HANDLES size 305 x 305 x 50 mm
* **B038-11** MOULD with HANDLES size 305 x 305 x 100 mm
* **B038-12** MOULD no HANDLES size 400 x 305 x 50 mm
* **B038-13** MOULD with HANDLES size 400 x 305 x 100 mm

B038-14 MOULD for core sample 200 mm diameter, 50 mm high

* **B038-18** MOULD with HANDLES size 500 x 400 x 180 mm
* **B038-19** MOULD with HANDLES size 400 x 305 x 120 mm
* **B038-20** MOULD with HANDLES size 320 x 260 x 50 mm

H009-01 PC complete with LCD monitor 17", keyboard, mouse, cables, installation.

Notes:

* These moulds are suitable to be used also with Matest Roller Compactor.

Insert plates to reduce the thickness of the mould are available on request.

B038A

SMARTRACKER™

NEW

MULTI WHEELS HAMBURG WHEEL TRACKER; TEST ENVIRONMENT: DRY+WET

STANDARDS: **EN 12697-22** / 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.
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.

B038A

SMART FEATURES:

- Comply with **EN 12697-22** and **AASHTO T324**.
- **No lifting of heavy wheel assemblies**. Wheels retract automatically away from samples and park into rest position.
- **Sturdy machine**, designed for the rugged construction laboratory environment stainless steel sample tanks.
- **Two independent loaded wheel systems each capable of conducting wet or dry sample tests simultaneously**.
- **Sliding sample positioning mechanism** for easy mould handling and placement in the machine.
- Does not require lifting of heavy wheel components.
- **Fully Automatic machine**. Detects and stops the test when the target rut depth is reached.
- **Touch-screen control unit based on Windows operating system** for user friendly execution of the test, management of the data and visualization of the results.
- 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.**
- Small footprint to accomodate small construction labs.

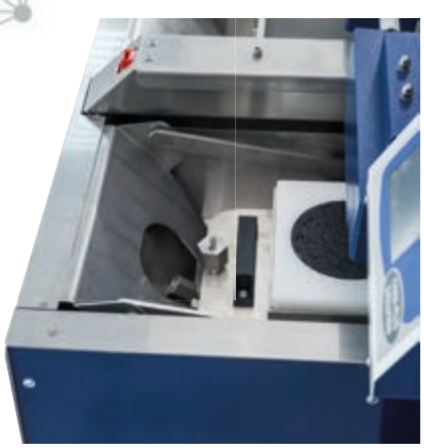
SmarTracker™

ITS INTELLIGENT DESIGN IS JUST THE BEGINNING

SIMULTANEOUS TESTING OF WET AND DRY SAMPLES

WHEELS INNOVATIVE ROLL OFF MECHANISM

UNIQUE SYSTEM TO LOAD-UNLOAD THE MOULD



B038A

The SMARTRACKER™ combines smart features with the solid construction needed for the rugged laboratory environment.

TOP 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
- **High performance components**
- **Rugged machine** with ample use of stainless steel

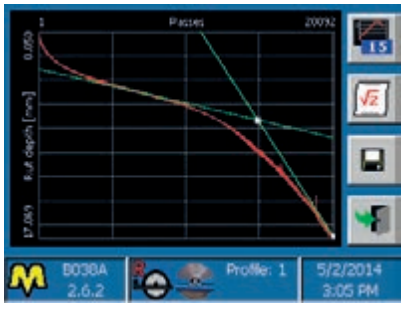
SAFETY FEATURES:

- 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

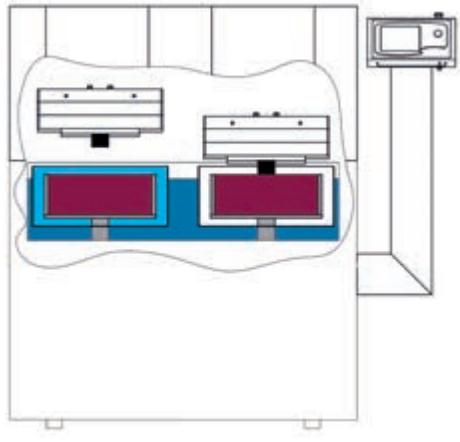
B038A open

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.



Real time results plot of the Rut Depth along with the no. of passes.



Smartracker while performing a dry test (right tank) + wet test (left tank) at the same time.

TECHNICAL DETAILS:

- Wheel load: 705 N
- Wheel speed: from 20 to 30 cycles/minute.
- Temperature control:
  EN 12697-22: 2500 W heaters for air temperature control, ventilation for temperature uniformity, probe for air temperature, all controlled by the electronic system.
  AASHTO T324: 4000 W heaters, recirculating pump, automatic feed and controls level.
- Temperature control range: from ambient up to 75° ±1° C
- Table travel: 230 mm
- Rut depth transducers range: 25 mm ± 0,1 mm accuracy.
- Slab thickness: adjustable from 38 to 120 mm

Power supply: 220V 50 Hz - 110V 60 Hz
Dimensions: 1400x1300x1300 mm
Weight: 450 kg

B038A-01
Rubber wheel for EN 12697-22

B038A-02
Steel wheel for AASHTO T324

NEEDED ACCESSORIES:

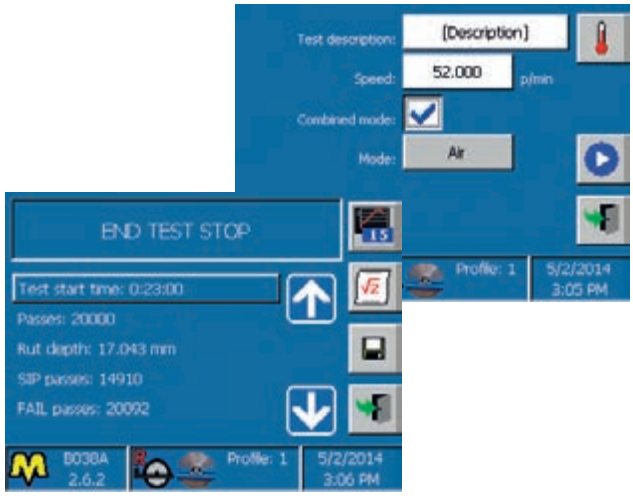
EN 12697-22

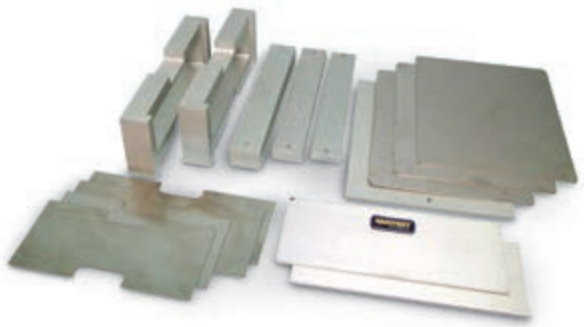
- **B038A-01** Rubber wheel 203x50 mm
- **B038A-11** EN Mould 400x305xH120 mm
- **B038A-12** Set of vertical adaptors for EN mould to allow the positioning of specimens lower than 120 mm (up to a minimum specimen thickness of 20 mm)
- **B038A-13** Set of horizontal adaptors for EN mould to allow the positioning of specimens 260x230 mm and 305x305mm

AASHTO T324

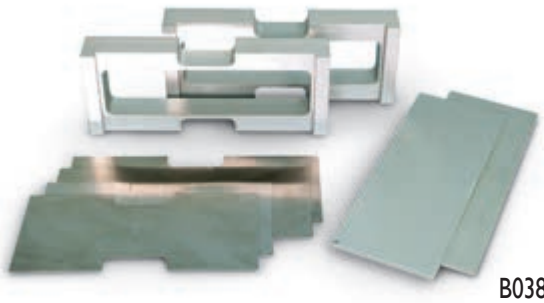
- **B038A-02** Steel wheel 203x47 mm
- **B038A-10** AASHTO Mould (2 cylinders dia. 150x60 mm)
- **B038A-03** Tool for AASHTO positioning

B038A-10 AASHTO mould





B038A-13
Horizontal adaptors for EN moulds



B038A-12
Vertical adaptors for EN moulds

B038A-11 EN mould

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-14 Verification KIT for the calibration of the wheel load

Pavetest, a new division of Matest

Pavetest is the new division of Matest committed to developing innovative, dynamic testing systems for asphalt.
Whilst Pavetest Pty. Ltd. may be a new player in this growing market sector, they are certainly not lacking experience. With many years of experience in developing pavement testing systems between them, Con Sinadinos (Managing Director) and Alan Feeley (Technical Director) bring a wealth of experience and talent to the company. The benefit is evident in every aspect of every product, which are designed to perform, built to last and easy to use.
From its inception, Pavetest's aim is to develop a range of **testing systems with unparalleled performance, ultimate versatility and exceptional reliability, at a price that represents real value for money.**
Pavetest's range of pavement testing systems both complements and completes Matest's Asphalt and Bitumen business unit.

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 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)
- gives superior low noise performance and resolution of 20 bit over the full dynamic input signal range (no auto ranging required).

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 CDAS 16 channels

B206 **16 Channel CDAS** - Acquisition 16 CH, 20 bit resolution
Sampling rate up to 192 kHz over all channels
Smoothing up to 64 times over-sampling
Calibration Automatically on power up
Control Axis 4
Communication USB or Ethernet

Dimensions: 100(h) x 310(d) x 250(w) mm
Mains Power: 90–264V 50/60 Hz

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.

TestLab software is included with CDAS - Control and Data Acquisition System. It is supplied on CD that also includes the relevant Method files (based on the test configurations supplied) and calibration files for all transducers supplied.

B200

AMPT/SPT Asphalt Mixture Performance Tester

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 TP 79-09 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.

The machine includes:

B205 8 Channel Control and Data Acquisition System (CDAS) & TestLab software (see page 104)
B220-02 30 mm Actuator LVDT
B220-08 Load cell (± 15 kN)
B293-01 Pressure transducer (± 300 kPa)
B292-02 Temperature transducer (0°C-65°C)
B200-01 On-specimen LVDT (1mm) (3 off)
B200-02 105 mm bottom loading platen
B200-03 105 mm top loading platen

B200 AMPT/SPT Asphalt Mixture Performance Tester

MAIN FEATURES:

- **Compact, fully self contained, precision engineered unit**.
- Thermoelectric (TE) Heating/Cooling - More reliable and environmentally friendly than mechanical refrigeration & heating elements.
- **Built-in, silent, air compressor with associated air preparation equipment** – No need for external compressed air supply.
- **Patented magnetically mounted on-specimen transducer system**, based on loose core LVDTs.
- Optional Epsilon (extensometer) on-specimen strain transducers.
- **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**.

TECHNICAL SPECIFICATIONS:

- Load capacity: 15 kN (Static) - 13.5 kN (Dynamic)
- Actuator stroke: 30 mm
- Specimen size: 100 mm (dia) x 150 mm (h)
- Temperature range: 4 to 60°C
- Confining pressure: 0 to 210 kPa
- Noise level: Less than 70 db at 2m

Power Supply: 208V / 230V 50 or 60 Hz
Dimensions: 1330(h) x 630(d) x 1100(w) mm
Weight: 200 kg (excluding oil)

ACCESSORIES:

B201 KIT AMPT Consumables kit
B202 AMPT Gauge Point Fixing Jig
B203 AMPT Dynamic Verification Device
B204 AMPT Overlay jig
B207 AMPT Indirect Tensile (IDT) Jig
B208 AMPT Semi-Circular Bending (SCB) Jig

SPARE PARTS:

B201-51 AMPT Gauge points
B201-52 5 Minute, two part epoxy 24 ml

B202 Gauge point fixing jig

AMPT product detail

B203 verification device with on-specimen **B200-01** LVDTs and load cell

B210 STAND-ALONE SERVO-PNEUMATIC FOUR POINT BENDING (4PB) SYSTEM

STANDARDS: **EN 12697-24 Annex D / EN 12697-26 Annex B /** AASHTO T321 / ASTM 03 / 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.
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.

The machine is supplied with:

B210-01 Servo-pneumatic Four Point Bending (4PB) Device with 10 mm actuator LVDT (B210-05), ± 5 kN load cell. (B210-04) and 2 mm On-specimen LVDT (B290-05)
B270-12 Air reservoir assembly
B205 8 Channel Control and Data Acquisition System (CDAS) & TestLab software (see page 104)

B210-01
Servo-pneumatic four point apparatus

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

OTHER MODELS:

B210-01 **SERVO-PNEUMATIC 4PB APPARATUS for use with Pavetest DTS-16**, including:
B210-04 ± 5kN load cell.
B210-05 10 mm actuator LVDT
B290-05 2 mm On-specimen LVDT
B212 **4PB JIG, for use with Pavetest DTS-30** (see page 110)

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)
- **Servo actuator** Capacity ± 5 kN; Frequency Up to 60 Hz;
  Stroke 10 mm
- **On-specimen transducer** Range ±1 mm; Resolution 0.0002 µm;
  Accuracy Better than 5 µm

Power Supply: 110-230V/50-60 Hz/1ph (B210)
Dimensions: 600(h) x 250(d) x 570(w) mm (B210 and B210-01)
420(h) x 250(d) x 570(w) mm (B212)
Weight: 39 kg

ACCESSORIES:

B210-02 4PB PVC Beam
B210-03 4PB Reference beam
B211 Temperature controlled cabinet: +2°C to +60°C to suit 4PB Apparatus
B250-07 Temperature measuring kit comprising two (-80°C to +80°C) RTDs and dummy asphalt specimen

TECHNICAL FEATURES:

- **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.
- Two 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.
- **Markings on the top clamp pads assist the operator to centre the beam laterally prior to clamping**.
- 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.
- A low profile, high performance stainless **steel ring torsion load cell** is used **to measure and control the load and a co-axially mounted** (LVDT) **displacement transducer** on the actuator is used **to position the centre cradle**.
- 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.
- **The Windows based, TestLab software** provides a user interface that is as simple and efficient as possible and application software according to the above mentioned international Standards.

16 kN SERVO-PNEUMATIC DYNAMIC TESTING SYSTEM

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.

The machine comprises:

B220-03 20 kN Load frame with manual crosshead
or
B220-04 20 kN Load frame with motorized crosshead (for B220-02-KIT version)
B220-07 16 kN Servo-pneumatic actuator (30 mm stroke)
B206 16 Channel Control and Data Acquisition System (CDAS) & TestLab software (see page 104)
B270-12 Air reservoir assembly
B220-01 Load cell (± 20 kN)

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

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 5 litres/sec

Power Supply: 110/230 V, 50/60 Hz, 2.5 kW, 1 ph
Dimensions: 1020(h) x 450(d) x 500(w) mm load frame
2100(h) x 900(d) x 750(w) mm with temperature controlled cabinet
Weight: 100 kg without temperature controlled cabinet

ACCESSORY:

B221 Temperature controlled cabinet: -20°C to +80°C to suit DTS-16

TEST CONFIGURATIONS and RELATED JIGS:
see pages 110 and 111

B220-02-KIT 16 kN Servo-Pneumatic dynamic testing system (motorized crosshead) with **B221** Temperature controlled cabinet

B220-02 KIT
DTS-16 detail

B220-04
20 kN Load frame with motorized crosshead

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.

The machine includes:

B230-03 150 kN Load frame
B230-04 30 kN Servo-hydraulic actuator (100 mm Stroke)
B230-05 2.2 kW Hydraulic Power Supply
B206 16 Channel Control and Data Acquisition System (CDAS) & TestLab software (see page 104)
B230-01 Load cell (± 30 kN)
B230-02 100 mm actuator LVDT

MAIN FEATURES:

- **Compact, robust (150 kN) 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
- 4 axis control and 16 channel data acquisition as standard

ADVANTAGES:

- **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.
- **The speed of the HPS pump motor is controlled using a variable-frequency drive (VFD), or inverter drive.**
  This enables the motor to be slowed down, or turned off, when the oil flow from the pump exceeds the flow required by the actuator at any given time. This not only reduces noise and heat generation but also offers cost savings, by reducing power consumption.
  Furthermore, the HPS can operate at 50 Hz or 60 Hz.

TECHNICAL SPECIFICATIONS:

- **Load frame**	Between Columns 600 mm Vertical Space 800 mm
- **Servo actuator**	Capacity ± 30 kN Frequency up to 100 Hz 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 Mains Power: 208V - 240V, 50/60 Hz, 2.5kW, 1 ph

Power Supply: 208V - 240V, 50/60 Hz, 2.5 kW, 1 ph
Dimensions: 2100(h) x 900(d) x 700(w) mm with temperature controlled cabinet

B230 30 kN Servo-Hydraulic Dynamic Testing System with **B231** temperature controlled cabinet

ACCESSORY:

B231 Temperature controlled cabinet: -20°C to +80°C to suit DTS-30

TEST CONFIGURATIONS and RELATED JIGS:

see pages 110 and 111

WHAT MAKES IT DIFFERENT MAKES IT BETTER!

The DTS-30 is Universal Testing Machine (UTM), but not as most people know it. It does not conform to the "me too" attitude of most UTM manufacturers. The innovations featured on the DTS-30 are built on many years of experience, developing, studying and using various universal testing machines from a number of manufacturers.

The first thing you will notice about the DTS-30 is the absence of a reaction frame. **The reaction frame** most certainly exists, but it's **embedded in the test chamber**. This provides a very sleek appearance, maximizes the space inside whilst reducing the space required outside.

Since it is mandatory to control the test temperature of most pavement materials, e.g. asphalt, **the test chamber is insulated and forms part of the temperature controlled cabinet**.

Most UTM manufacturers opt for an elaborate (and expensive) moveable crosshead, only to find that its range (and usefulness) is limited by the climatic chamber.

The DTS-30 has a remotely positioned reaction shaft that adjusts the work space. However, you won't need to adjust it often because the **servo-hydraulic actuator has 100 mm of stroke**.

B230 DTS-30 Dynamic Testing System, open

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.

This also makes servicing, replacing or upgrading the temperature control unit virtually effortless: it can be removed without dismantling the machine or disrupting the testing program.

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.

Firstly, **it is a neat, compact and integrated solution**, that places all hydraulic components within easy reach: gone are the long hydraulic hoses that run up and down the side of the machine and got in the way. They have been replaced by **shorter hoses that connect the actuator to the hydraulic power supply** that's tucked neatly away behind the machine, under the test chamber.

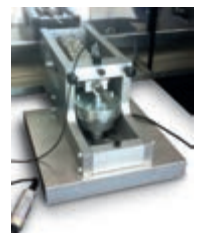
Can't see the **Control and Data Acquisition System (CDAS)?** That's because **it's housed neatly, in the cabinet in front of the machine**.

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

TESTING KIT	RELEVANT STANDARD(S)	DYNAMIC SYSTEM	ACCESSORIES CONSUMABLES	PICTURE
B250 KIT **IDTM** Indirect Tensile Modulus	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)	**B220** DTS-16 with Climatic chamber (B221) **B230** DTS-30 with Climatic chamber (B231) **B240** DTS-130 with Climatic chamber (B241)	**B250-03** Asphalt proving ring **B250-04** 100 mm diameter PVC specimen **B250-05** 150 mm diameter PVC specimen **B250-06** Torque screwdriver **B250-07** Temperature measuring kit: two RTDs (-80°/+80°) and dummy asphalt specimen	
B251 KIT **IDTF** Indirect Tensile Fatigue	EN 12697-24 Annex E – Indirect tensile test on cylindrical shaped specimens	**B220** DTS-16 with Climatic chamber (B221) **B230** DTS-30 with Climatic chamber (B231) **B240** DTS-130 with Climatic chamber (B241)	**B251-01** LVDT mounting strip gluing jig (Included in B251 KIT) **B250-07** Temperature measuring kit: two RTDs (-80°/+80°) and dummy asphalt specimen **B251-51** LVDT mounting strip to suit 100 mm specimen **B251-52** LVDT mounting strip to suit 150 mm specimen	
B260 KIT **UCC** Uniaxial cyclic compression	EN 12697-25 Cyclic compression. Test Method A - Uniaxial cyclic compression test with confinement	**B220** DTS-16 with Climatic chamber (B221) **B230** DTS-30 with Climatic chamber (B231) **B240** DTS-130 with Climatic chamber (B241)	**B250-07** Temperature measuring kit: two RTDs (-80°/+80°) and dummy asphalt specimen	
B253 KIT **IDTOS** Indirect Tensile modulus, creep compliance and strength using on-specimen transducers	ASTM D7369 Resilient Modulus of Bituminous Mixtures by Indirect Tension Test AASHTO T 322 Creep Compliance and Strength of Hot-Mix Asphalt (HMA) Using the Indirect Tensile Test Device	**B220** DTS-16 with Climatic chamber (B221) **B230** DTS-30 with Climatic chamber (B231) **B240** DTS-130 with Climatic chamber (B241)	**B253-02** Gauge point template, 100 mm specimen (Included in B253 KIT) **B253-03** Gauge point template, 150 mm specimen (Included in B253 KIT) **B250-07** Temperature measuring kit: two RTDs (-80°/+80°) and dummy asphalt specimen **B253-51** Short gauge point **B253-52** Long gauge point	
B212 **4PB** Four Point Bending	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)	**B230** DTS-30 with Climatic chamber (B231)	**B250-07** Temperature measuring kit: two RTDs (-80°/+80°) and dummy asphalt specimen **B210-02** 4PB PVC Beam **B210-03** 4PB Reference beam	
B280 KIT **2PB** Two Point Bending	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)	**B230** DTS-30 with Climatic chamber (B231)	**B250-07** Temperature measuring kit: two RTDs (-80°/+80°) and dummy asphalt specimen **B280-51** 2PB Mounting 25 mm apex plate (Included in B280 KIT) **B280-52** 2PB Mounting 50 mm apex plate (Included in B280 KIT) **B280-53** 2PB Mounting base plate (Included in B280 KIT) **B280-02** Two point Bending (2PB) gluing jig	

TESTING KIT	RELEVANT STANDARD(S)	DYNAMIC SYSTEM	ACCESSORIES CONSUMABLE	PICTURE
B261 KIT **PD** Permanent deformation	AS/NZS 2891.12.1 Determination of the permanent compressive strain characteristics of asphalt - Dynamic creep test	**B220** DTS-16 with Climatic chamber (B221) **B230** DTS-30 with Climatic chamber (B231) **B240** DTS-130 with Climatic chamber (B241)	**B250-07** Temperature measuring kit: two RTDs (-80°/+80°) and dummy asphalt specimen **B260-03** 100 mm top platen **B260-04** 150 mm top platen	
B255 KIT **E*** Dynamic modulus	AASHTO T342 Determining Dynamic Modulus of Hot Mix Asphalt (HMA)	**B230** DTS-30 with Climatic chamber (B231) **B240** DTS-130 with Climatic chamber (B241)	**B202** AMPT Gauge Point Fixing Jig **B203** AMPT Dynamic Verification Device **B253-53** AASHTO T342 gauge point **B250-07** Temperature measuring kit: two RTDs (-80°/+80°) and dummy asphalt specimen	
B270-01 **TRM** Triaxial resilient modulus	AASHTO T307 Determining the resilient modulus of soils and aggregate materials	**B220** DTS-16 **B230** DTS-30 **B240** DTS-130	**B270-02** External LVDT mounting kit **B290-02** 2 X Displacement transducer (±5 mm) **B293-02** Pressure transducer (±600 kPa) **S315-07** 100 mm diameter bottom platen **S314-03** 100 mm diameter top platen **B270-04** Air reservoir assembly confining pressure upgrade kit (for DTS-16) or **B270-03** Air reservoir assembly with confining pressure control (for DTS-30/130)	
B270-01 **CCT** Cyclic triaxial compression	EN 12697-25 Cyclic compression. Test Method B - Triaxial cyclic compression test	**B220** DTS-16 with Climatic chamber (B221) **B230** DTS-30 with Climatic chamber (B231) **B240** DTS-130 with Climatic chamber (B241)	**B270-02** External LVDT mounting kit **B290-02** 2 X Displacement transducer (±5 mm) **B293-02** Pressure transducer (±600 kPa) **B270-05** 110 mm diameter bottom platen **B270-06** 110 mm diameter top platen **B292-01** Temperature transducer (-80°C to +80°C) **B270-04** Air reservoir assembly confining pressure upgrade kit (for DTS-16) or **B270-03** Air reservoir assembly with confining pressure control (for DTS-30/130)	
B254-01 **SCB** Semi-Circular Bending	EN 12697-44 Tensile Strength and Fracture Toughness-Crack Propagation	**B220** DTS-16 with Climatic chamber (B221) **B230** DTS-30 with Climatic chamber (B231) **B240** DTS-130 with Climatic chamber (B241)	**B250-01** Basic Indirect Tensile Jig **B290-07** Deformation gauge **B250-07** Temperature measuring kit: two RTDs (-80°/+80°) and dummy asphalt specimen	

Marshall compression frames

Available models:

B042 KIT Marshall mechanical load frame

B043 KIT Marshall digital load frame

S212N-S215A Universal Multispeed load frame (see pag. 408)

S213N-S214 KIT CBR/Marshall dual speed load frame (see pag. 408)

S205 UNITRONIC load frame (see pag. 414)

B042 KIT

Marshall mechanical 50 kN load frame

STANDARDS: **EN 12697-34, EN 13108** / ASTM D1559, D6927-06
AASHTO T245 / BS 598:107 / NF P98-251-2
CNR N° 30

Ruggedly constructed with frame to encompass the strain and loads, easy to use, it is designed to operate with the minimum of maintenance.
Platen rate is 50.8 mm/minute also maintained under load thanks to an overpowered electric motor. The applied load is measured by a precision proving ring 30 kN capacity incorporating a stem brake holding the maximum reading and it is supplied with relevant calibration certificate. The machine includes an electric device for automatic stop when reaching the max capacity load of the proving ring, so as to prevent any overload damage, limit switches stopping the platen at max. and min. excursions.
The unit is supplied complete with load ring 30 kN capacity, stability mould flow meter with dial gauge.
Power supply: 230 V 1 ph 50 Hz 750 W
Dimensions: 410x400x1110 mm
Weight: 110 kg

SPARES:

B046N
STABILITY MOULD, 4" Ø
STANDARDS: EN, ASTM, NF, BS, CNR, AASHTO
The inside diameter is of 4" (101,6 mm).
The mould is completely open in the front and the introduction of the specimen becomes very easy thus avoiding disassembling operations.
Weight: 6 kg

B047 FLOW METER
Mounted on top of the stability mould, holding the dial gauge and incorporating a stem-brake keeping maximum deflection.
Weight: 0,5 kg

B047-01
DIAL GAUGE
Stroke 10 mm,
div. 0,01 mm to be used in conjunction with the Flow Meter B047.

ACCESSORIES:

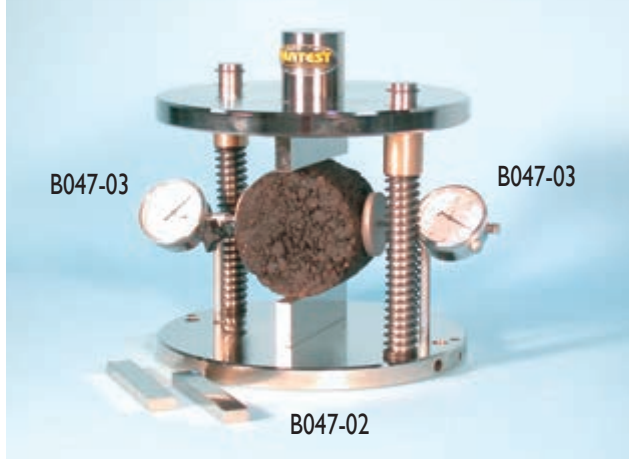
B047-02

Tensile splitting device

STANDARDS: **EN 12697-23** / ASTM D4123 / CNR 134

Used to measure the splitting tensile strength and the radial strain of a Marshall specimen dia 4" and 6", where a vertical load is applied. Supplied complete with knives to test specimens having dia. 4" and 6". Steel manufactured, plated against corrosion.
Dimensions: dia. 248x270 mm. - Weight: 14 kg

B047-03
Set of two dial gauges 10 mm. stroke and 0,01 mm. sens. complete with adjustable supports for strain measurements.



B043 KIT

Digital Marshall Tester 50 kN capacity

STANDARDS: **EN 12697-34, 12697-23, 12697-12, EN 13108**
ASTM D1559, D6927-06 / AASHTO T245 / BS 598:107
NF P98-251-2 / CNR N° 30

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 page. 122, Hardware technical details: see pag. 24) measures and displays at the same time the stability in kN and the flow in mm with pick 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: 230 V 1 ph 50 Hz 900 W
Dimensions: 650x400x1100 mm. Weight: 120 kg

ACCESSORIES for B043 KIT:

B043-01N

SOFTWARE UTM2 (Universal Testing Machine 2)
Licence for **MARSHALL** test
Standards: **EN 12697-34** / CNR N. 30 / ASTM D1559
BS 598 :107 / NF P98-251-2
Data processing program for "X-Y STABILITY/FLOW"
General description and technical details: see UTM2 pag. 14

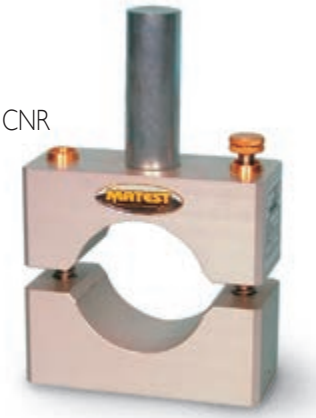
B043 KIT

Note:
The Digital Marshall Tester B043KIT, completed by the specific accessories (listed below) is suitable to perform also the following tests:

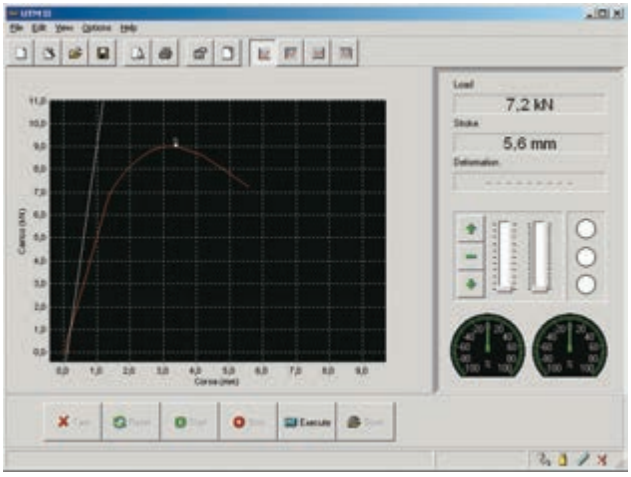
SPARE:

B046N
STABILITY MOULD 4" Ø
STANDARDS: EN, ASTM, NF, BS, CNR

The inside diameter is 4" (101,6 mm); the mould is completely open in the front and the introduction of the specimen becomes very easy thus avoiding disassembling operations.
Weight: 6 kg



B046 N



B043-01N: Load/deformation "x-y" graphic exemple

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 dia. 150mm or 100mm obtained from road cores or on laboratory made specimens.
Needed accessories:

B043 KIT Digital Marshall tester
B047-10 LEUTNER testing head for specimens 150mm dia.
B047-11 Spacers for 100 mm dia. specimens with Leutner head.
B043-03N Software for Marshall and Leutner tests.

B047-10 + B047-11

... follows ...

DETERMINATION OF INDIRECT TENSILE STRENGTH

STANDARDS: **EN 12697-23** / ASTM D4123 / CNR N.134

Equipment: Digital Marshall Tester B043 KIT, and:

B047-02

TENSILE SPLITTING DEVICE FOR SAMPLE DIA. 4" AND 6"

Used to measure the indirect tensile strength and the radial strain of a Marshall specimen dia. 4" and 6", where a vertical load is applied.

Supplied complete with loading knives to test specimens having dia. 4" and 6".

Steel manufactured, plated against corrosion.

Dimensions: dia. 248 x 270 mm

Weight :14 kg

B047-04

SET OF TWO LINEAR RESISTIVITY TRANSDUCERS,

stroke 10 mm, accuracy and linearity +/- 0,3%.

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** / ASTM D4123 / CNR N. 134

General description and technical details: see UTM2 pag. 14

GAUGE BLOCKS. Grade 1

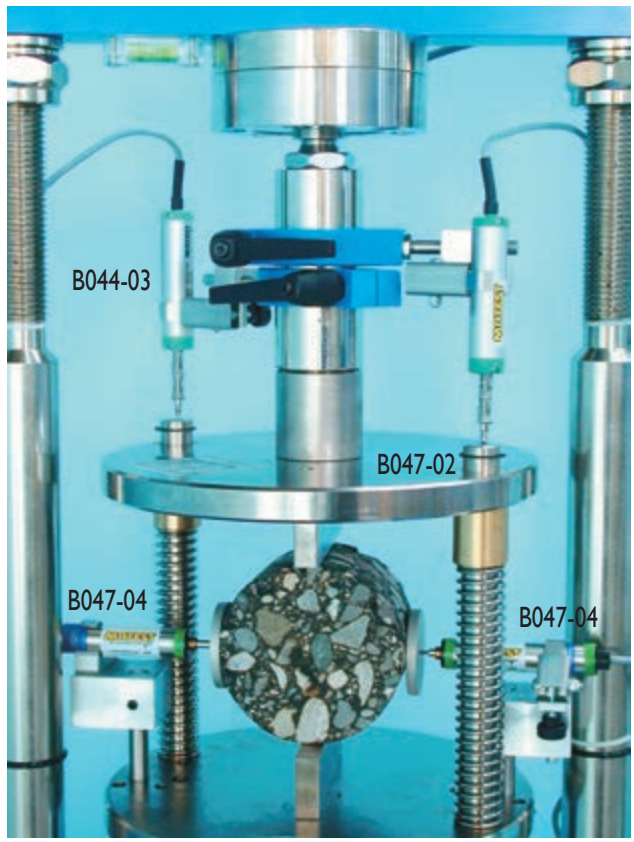
Used to calibrate the linear displacement transducers.

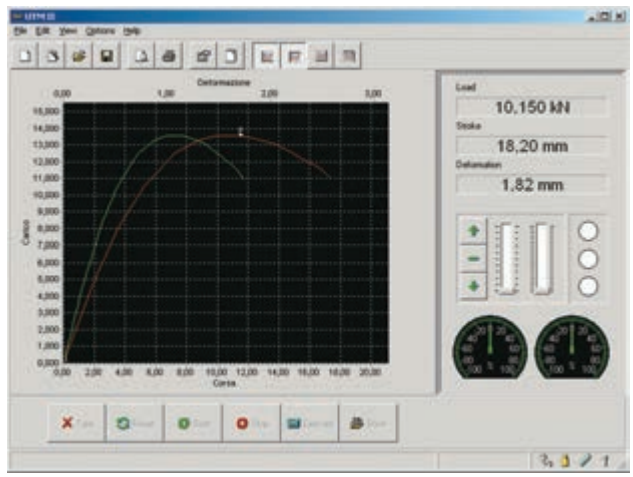
Models:

S336-43 Gauge block, nominal length 10 mm

S336-47 Gauge block, nominal length 50 mm

Technical details: see pag. 453





B043-02N: Test report

DETERMINATION OF WATER SENSITIVITY OF BITUMINOUS SAMPLES

STANDARDS: **EN 12697-12, EN 13108**

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 and 12697-23 Standard require 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 pag. 125

B052-02

MULTI-FUNCTION TESTING FRAMES, ALSO SUITABLE FOR MARSHALL TESTS

S213N

CBR/Marshall 2 speeds frame 50 kN

The frame is provided of two fix speed ranges, easily selectable by a frequency changer (inverter) activated by an electric switch:
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 pag. 408

S212N

Universal multispeed load frame 50kN, 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:
- 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 (see accessories).
Power supply: 230V 1ph 50/60Hz 750W
Technical Specifications: see page 408

S212N

S213N
with accessories for Marshall test

ACCESSORIES for S212N and S213N frames:

MARSHALL test, 4" Ø:

S212-05	Load piston
B046N	Stability mould 4" Ø
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 6" Ø (with S212N frame only)

STANDARD: ASTM D5581-96

S212-05	Load piston
B046-02	Stability mould 6" diameter
B047	Flow meter
B047-01	Dial gauge for flow meter
S370-10S	Load ring 50kN with electric stop safety device
S374	Brake device to hold max. load

NOTE:
The frames S212N and S213N are suitable also for tensile splitting tests (EN 12697-23) by using the specific devices described at pag. 112, 114

B046-02

...follows...

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 - S213N), 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 at page 122), 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:

S214N KIT

CBR/Marshall 2 speed load frame digital, computerized

Technical details of the frame: see mod. S213N, pag. 408
Supplied complete with "Cyber-Plus 8 Evolution" system (B044N-SET, details at pag. 122, Hardware details at pag. 24), load cell and displacement transducer, but **"without"** accessories to be ordered separately.

S214N KIT + accessories MARSHALL

S215A

Universal multispeed load frame digital, touch-screen, computerized "Cyber-Plus 8 Evolution"

Technical Spec. of the frame: see mod. S212N at page 408
Technical Spec. of S215A: see page 410
Supplied **"without"** accessories for Marshall, CBR, Unconfined tests and Software, to be ordered separately (see accessories).

S215A + accessories MARSHALL

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** / CNR N. 30 / ASTM D1559

B043-02N SOFTWARE UTM2 (Universal Testing Machine 2)
Licence for **TENSILE SPLITTING** test
Standards: **EN 12697-23** / CNR N. 134 / ASTM D4123

Description and technical details of Software UTM2: see pag. 14

H009-01 PERSONAL COMPUTER, complete with LCD monitor 17", 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.

NOTE: The frames S214N KIT and S215A are suitable also for tensile splitting and direct shear (Leutner) test, by using the specific devices described at pag. 113

ACCESSORIES FOR THE FRAMES, MOD. S214N KIT AND S215A MARSHALL tests

S212-05 Load piston
B046N Stability mould 4" Ø
B046-02 Stability mould 6" Ø
(with S215A frame only)
Standard: ASTM D5581-96

B046-02

[Descrizione]
Rate:
60.000
mm/min
Stop load:
10
%
Diameter:
120.000
mm
Profile: 1
200kN
6/21/2013
10:44 AM
S206
2.3.9
MATEST
MARSHALL TESTER

S205

UNITRONIC 50 kN, UNIVERSAL MULTIPURPOSE COMPRESSION/FLEXURAL AND TENSILE FRAME FOR:
- COMPRESSION / FLEXURAL TESTS, 50 kN MAX. CAPACITY LOAD
- TENSILE TESTS, 25 kN MAX. CAPACITY LOAD (accessory mod. S205-05)

WITH AUTOMATIC LOAD OR DISPLACEMENT/DEFORMATION CONTROL, for testing:

Asphalt:
- MARSHALL
- SPLITTING TENSILE
- DIRECT SHEAR (Leutner) on the connection between bituminous strata

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 (accessory mod. S205-05)

Metal, plastic, wires, ropes, textiles, papers etc.
- TENSILE TESTS, 25kN max capacity load (accessory mod. S205-05)

Clay blocks:
- PUNCHING

Rock and stones:
- UNIAXIAL SPLITTING TENSILE

Various materials:
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 S205-05), 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 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.

Hardware and software specifications:
- Negative blue graphic display **"320 x 240 pixel"**
- 4 analogue A/D outputs for transducers or load cells.
- Permanent memory and clock calendar
- Fully automatic test processing with real time acquisition and visualization of the load/displacement or deformation, curve load/time/deformation.
- Memory of more than 100 tests, with possibility to display/delete tests from the file storage
- Multi-languages function: Italian, English, French, Spanish

Technical data:
- Maximum compression capacity: 50kN
- Maximum tensile capacity: 25kN (accessory S205-05)
- Adjustable testing speed from 0,01 to 51mm/minute
- Adjustable pace rate from 1 to 15000N/sec.
- Max. ram travel: 100mm
- Daylight between columns: 380mm
- Max. vertical daylight: 850mm

Power supply: 230V 1F 50/60Hz 1500W
Dimensions: 500x450x1450mm. Weight: 130 kg approx

S205
with load cell

NOTE:
Additional specific applications for tests on:
- Soil, Rock
- Concrete, Clay Blocks
- Cement
- Tensile tests etc.

are listed with technical details, accessories, pictures at pag. 414

S205

UNITRONIC 50 kN, SPECIFIC APPLICATIONS ON BITUMINOUS MATERIALS:

Marshall stability test

Standards: **EN 12697-34** / ASTM D1559 / AASHTO T245
BS 598 :107 / NF P98-251-2 / CNR N° 30
Test development with displacement control.

Needed accessories:

S337-34 Strain gauge load cell, 50 kN capacity.
S212-05 Loading piston.
B046N Stability mould.
B043-01 Software for Marshall test.

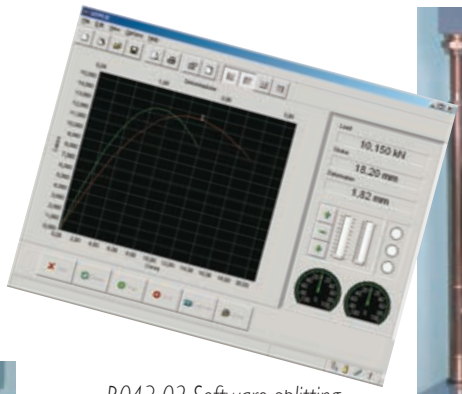
Splitting tensile test

Standards: **EN 12697-23** / ASTM D4123 / CNR N° 134
Test development with displacement control.

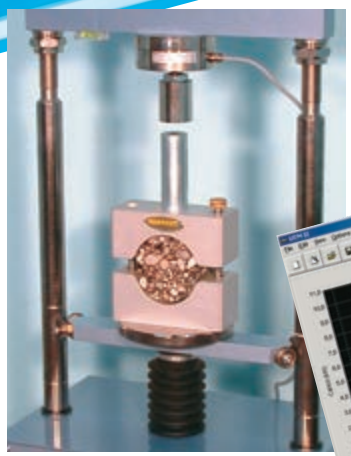
Needed accessories:

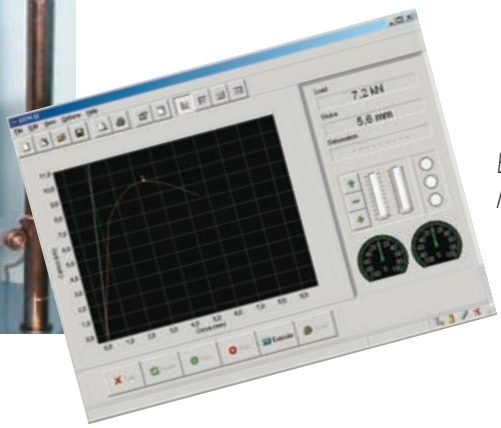
S337-34 Strain gauge load cell, 50 kN capacity.
S212-05 Loading piston.
B047-02 Splitting tensile device for samples dia. 4" and 6"
B047-04 Set of TWO displacement transducers with accessories.
B043-02 Software for Splitting Tensile test.

File Marshall test



B043-02 Software splitting tensile test





B043-01 Software Marshall test

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 dia. 150mm or 100mm 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 150mm dia.
B047-11 Spacers for 100 mm dia. specimens with Leutner head.
B043-03 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 pag. 414

S206N

UNITRONIC 200kN "Matest made"

UNIVERSAL ELECTROMECHANICAL FRAME, 200KN CAPACITY, "TOUCH-SCREEN" FOR:
- 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:
Roads (Marshall, Duriez, CBR etc.), Steel, Concrete, Cement, Wood, Plastic, etc.
The machine is composed by 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 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.

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 pag. 24

S206N

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 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: 950 x 560 x 2400 mm. Weight: 820 kg

S206N

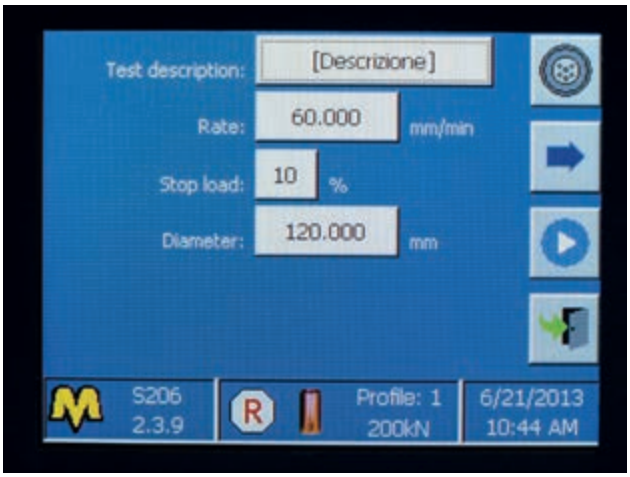
UNITRONIC 200 kN, specific applications:

Duriez test on 80 and 120 mm dia. samples

STANDARD: NF P98-251-1/4

S206N Unitronic 200 kN
B096-01 Duriez set dia. 80 mm (see page 146)
B095-01 Duriez set dia. 120 mm (see page 146)
S206-21N Software for Duriez test

B095-01



S206-21N Software for Duriez test

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 dia. 150mm or 100mm obtained from road cores or on laboratory made specimens.

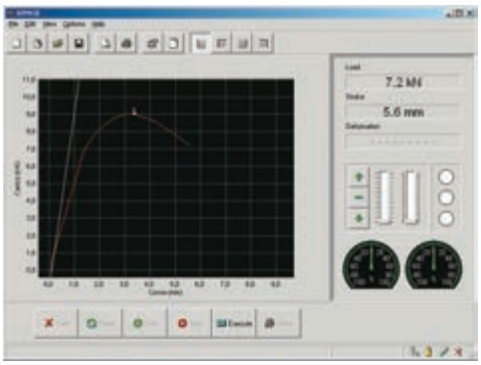
S206N Unitronic 200 kN
S337-34 Strain gauge load cell 50 kN capacity
S206-31 Flange/connector of the load cell S337-34
S212-05 Loading piston
B047-10 LEUTNER testing head for specimens 150mm dia.
B047-11 Spacers for 100mm dia. specimens with Leutner head
B043-03N Software for Leutner and Marshall tests.

Marshall stability test

STANDARDS: **EN 12697-34** / ASTM D1559 / AASHTO T245 / BS 598:107 / NF P98-251-2 / CNR N°30

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
B043-01N Software for Marshall test

B046N



B043-01N Software for Marshall test

Splitting tensile test

STANDARDS: **EN 12697-23** / ASTM D4123 / CNR N° 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 dia. 4" and 6" (page 114)
B047-04 Set of TWO displacement transducers with accessories (page 114)
B043-02N Software for Splitting Tensile test (page 14)

B047-02 + B047-04

S337-34

S212-05

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, pag. 420

B044N SET

B044N-SET

Cyber-Plus 8 Evolution "Touch-Screen"

Acquisition and data processing system. 8 channels.
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 2 speeds load frame mod. S213N.
- CBR loading machine motorized mod. S211 KIT.

Cyber-Plus 8 Evolution allows:

- Acquisition up to 8 analogical/digital channels: load cell and linear displacement potentiometric vertical and/or horizontal transducers.

To perform the following tests:

MARSHALL: **EN 12697-34** / ASTM D1559 / CNR N. 30
NF P98-251-2 / BS 598 :107

- INDIRECT TENSILE TEST: **EN 12697-23** / ASTM D4123
- DETERMINATION OF THE WATER SENSIBILITY OF BITUMINOUS SPECIMENS: **EN 12697-12**
- CBR TEST: **EN 13286-47** / CNR / UNI 10009
  ASTM D1883 / BS 1377 / NF P94-078.
- UNCONFINED TEST: ASTM D2166
- Remote control of the digital unit through PC and UTMII software

Hardware specifications:

- 8 indipendent channels available for the load cells or potentiometrics transducers or strain gages for load, deformation 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.
- Automatic calculation and visualization of all the results according to the Standard.
- 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.)
- Safety function for automatic machine stop at max. reached load and deformation of the strain transducer.
- 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 pag. 24

B044N-SET is composed by:

B044N
CYBER-PLUS 8 EVOLUTION, Unit for data acquisition, as described
Power supply: 230V 1F 50/60Hz

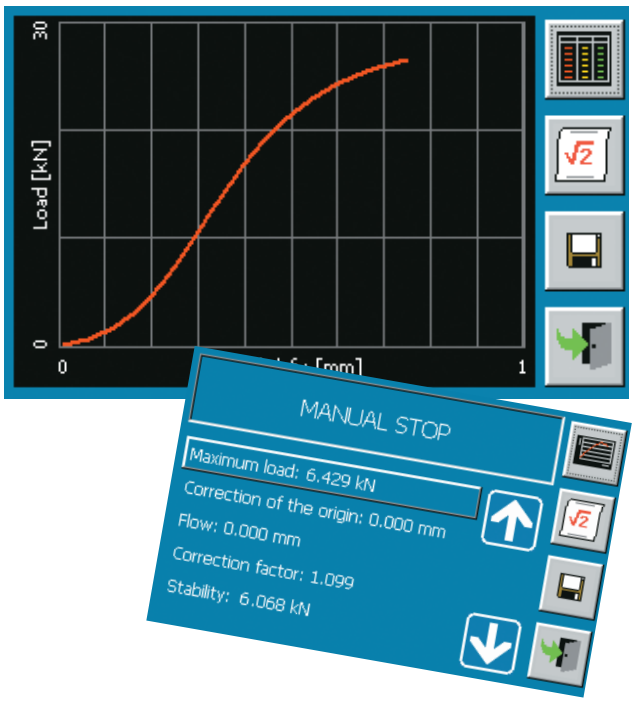
S337-34
LOAD CELL, 50kN capacity, with high precision strain transducers, complete with cable and connector

S336-14
LINEAR DISPLACEMENT TRANSDUCER, 50mm stroke, independent linearity +/- 0,1% complete with cable and connector

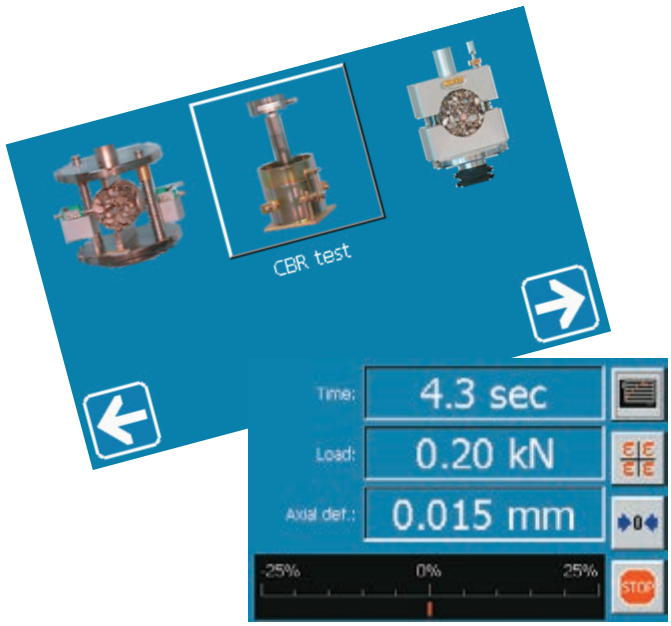
Accessories for fixing the load cell and transducer to the test machine.
The system is supplied fully calibrated with calibration certificate, and ready for use.
Every item can be ordered separately.

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** / CNR N. 30 / ASTM D1559
BS 598 :107 / NF P98-251-2



B043-02N
SOFTWARE UTM2 (Universal Testing Machine 2)
Licence for **INDIRECT TENSILE STRENGTH**
Standards: **EN 12697-23** / CNR N. 134 / ASTM D4123



S218N
SOFTWARE UTM2 (Universal Testing Machine 2)
Licence for **CBR** Test
Standards: **EN 13286-47** / CNR/UNI 10009 / ASTM D1883
BS 1377 / NF P94-078

S218-01N
SOFTWARE UTM2 (Universal Testing Machine 2)
Licence for **UNCONFINED** Test
Standards: ASTM D1883

Description and technical details of Software UTM2: see pag. 14

C127N Graphic printer on thermo paper on board.

H009-01
PERSONAL COMPUTER, complete with LCD monitor 17", 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.

Water baths for Marshall specimens

STANDARDS: **EN 12697-34, EN 13108** / ASTM D1559, D5581 / 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.

MODELS:

B051

Marshall water bath

The internal tank and cover are stainless steel made, outside box is from 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: 615 x 505 x 150 mm
Overall dimensions: 660 x 540 x 230 mm
The bath is supplied **"without"** thermostat and heating element to be ordered separately (see accessories).
Weight: 18 kg

B051

B051+B051-01

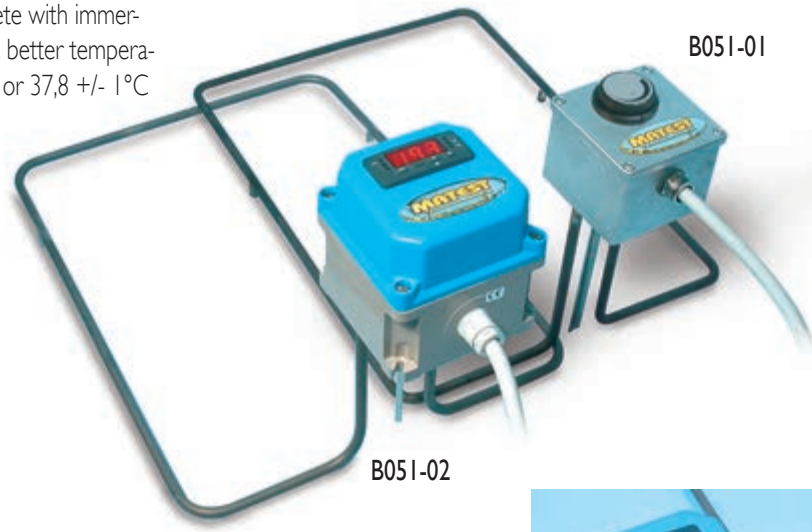
"NEEDED" ACCESSORY for the B051 Bath:

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 accuracy 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.

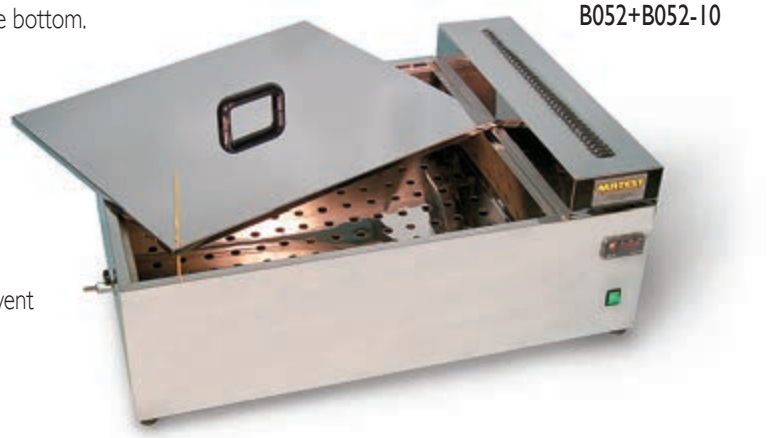
DETAIL B051-02

B052

Digital water bath

This bath is fully double walled stainless steel made with wool insulation. The specimens are held by a shelf spaced from the bottom.
Complete with digital thermostat and 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 of a dual safety thermostat to prevent accidental over-heatings.
Inside dimensions: 700x550x165 mm
Outside dimensions: 900x640x340 mm
Power supply: 230 V 1 ph 50/60 Hz 1500 W
Weight: 28 kg

B052+B052-10



B052-01

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: 230 V 1ph 50/60 Hz 1200 W
Weight: 15 kg

B052-02

B052-02

Digital water bath with cooling device

Similar to mod. B052 but equipped with cooling unit housed 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: 230 V 1 ph 50/60 Hz 1650 W
Weight: 60 kg

ACCESSORY FOR MOD. B051 ÷ B052-02
B052-10 Alcool control thermometer 0-100°C subd. 1°C

B053-10

Cohesion tester

STANDARDS: **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 dia. 60 x h 6 mm, 5 moulds dia. 60 x h 10 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 with 4 holes to prepare the sample:

B053-12 MOULD 140x140x6,3 mm
B053-13 " 140x140x10 mm
B053-14 " 200x200x13 mm
B053-15 " 200x200x19 mm

SPARE PARTS:

B053-16 MOULD dia. 60 x h 6 mm (5 pieces)
B053-17 MOULD dia. 60 x h 10 mm (5 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.

Weight: 40 kg approx.

SPARE:

B053-01

Metal test plate.

B053

S148

Consistency determination

STANDARDS: **EN 12274-3, EN 1097-6**

SAND ABSORPTION CONE AND TAMPER, also used for the determination of the absorption and specific gravity of fine aggregates.

Weight: 600 g approx.

S148

B053-10

B053-20

Planetary abrasion tester

DETERMINATION OF WEARING

STANDARDS: **EN 12274-5** / ASTM D3910

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.

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/m2

Weight: 1500 g approx.

B053-05

A113

SKID RESISTANCE AND FRICTION TESTER

MEASUREMENT OF SKID RESISTANCE OF AN ASPHALT SURFACE

STANDARDS: **EN 13036-4 / EN 1097-8 /** ASTM E303 (see note)

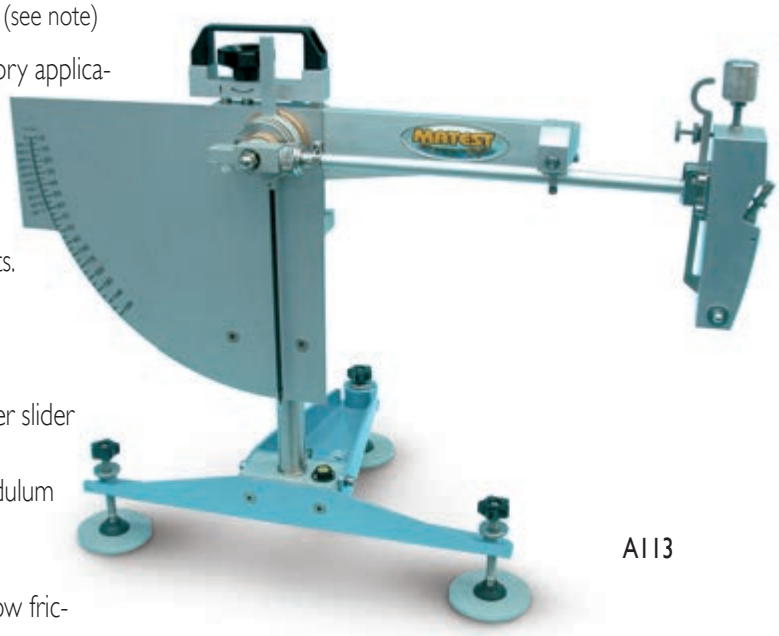
The apparatus is suitable for both site and laboratory applications to perform two types of tests:
- For measuring pavement (road asphalt) surface frictional and skid resistance properties.
- For polished stone value tests on aggregates (curved specimens) from accelerated polishing tests.

The skid tester is also suitable to perform tests on:
- Natural stones conforming to EN 1341, 1342.
- Concrete block pavers conforming to EN 1338.

The tester measures the energy loss when a rubber slider edge is propelled over the surface under test.
The slider lifting device is incorporated in the pendulum base assuring accurate adjustment operations. The height adjusting system is simple and reliable.
The pointer, made from light alloy, has extremely low frictions granting high precision results.
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, plexiglass made, for sliding length verification.
- Thermometer range –10 to +110°C. for surface temperature measurement.
- Stool, wash bottle, bristle, tool set for machine use.
- Carrying case.
- Calibration Certificate conforming to EN 1097-8.

The tester is supplied **"WITHOUT"** rubber sliders that have to be ordered separately (see accessories).
Case dimensions: 730 x 730 x 330 mm. Weight: 32 kg

NOTE: **The tester is supplied calibrated to meet EN and BS Specifications. On request Matest can supply the skid tester calibrated to meet ASTM E303 Specifications.**



A113

A113-01

Skid Tester - ASTM E303

As above, but calibrated to meet ASTM E303 Specifications.

ACCESSORIES:

A110-03 Mounted rubber slider for site use (pavement surface), complete with conformity certificate.

A110-01 Mounted rubber slider for Polished Stone Value tests (laboratory), complete with conformity certificate.

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.

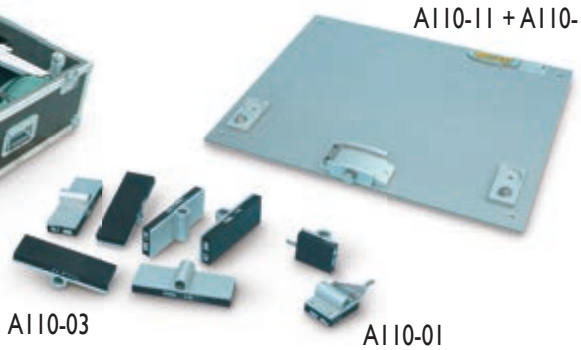
A110-12 Clamping device for Polished Stone Value tests in Laboratory.

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.

Calibration certificate to EN 1097-8

A113
in carrying case



A110-11 + A110-12

A110-03

A110-01

B056 KIT

Standard dial penetrometer

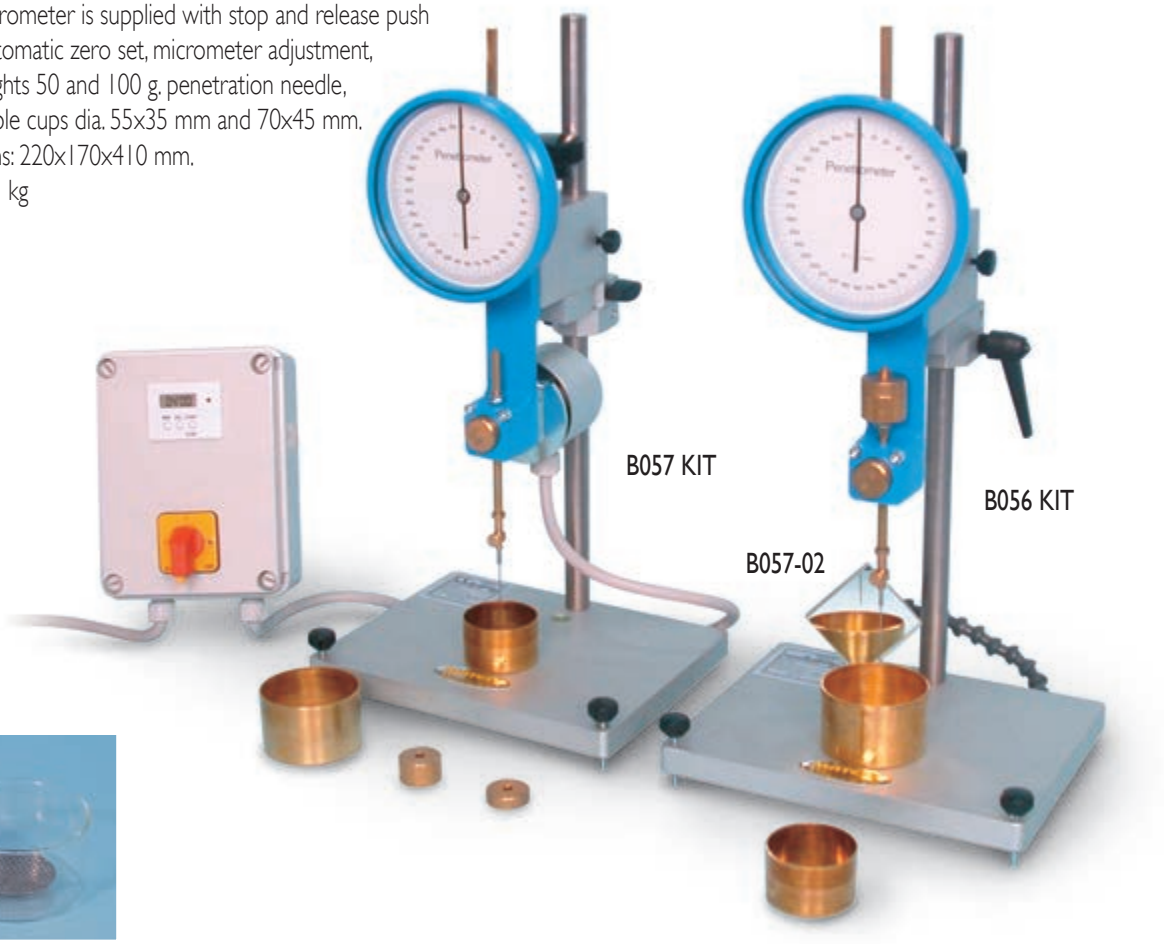
STANDARDS: **EN 1426** / ASTM D5 / BS 2000 / NFT66-004 / AASHTO T49
UNI 4162 / UNE 7013 / NLT 124 / CNR N° 24

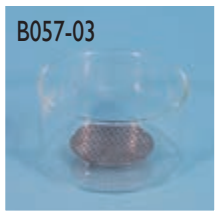
Used to determine the consistency of a bituminous sample under fixed conditions of load, time and temperature. The penetration is expressed in distance of tenths of millimeters vertically penetrated by a standard needle. The standard penetrometer is ruggedly constructed, with an aluminium base table with levelling screws, plated vertical rod, **"micrometric vertical adjustment device"**.
The slider is brass made with free fall.
The dial, graduated in 360° (division 0,1 mm.), has 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 dia. 55x35 mm and 70x45 mm.
Dimensions: 220x170x410 mm.
Weight: 11 kg

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: 230 V 1 ph 50/60 Hz 200 W
Dimensions: 220x280x410 mm.
Weight: 15 kg





ACCESSORIES:

B057-02 MIRROR, for an easier setting of the needle.

B057-03 TRANSFER DISH, made from glass, with support.

B057-06 PENETRATION NEEDLE HARDENED STEEL, supplied with UKAS Verification Certificate. Weight: 2,5 ± 0,05 g

B057-07 PENETRATION NEEDLE HARDENED STEEL
Each needle is individually verified with engraved serial number, and perfectly meets EN 1426 Specification.
Weight: 2,5 ± 0,05 g

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:

B057-01 PENETRATION NEEDLE, NOT HARDENED.
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, dia. 55x35 mm

V122-06 SAMPLE CUP, brass made, dia. 70x45 mm

B056-01 KIT

Standard digital penetrometer

STANDARDS: **EN 1426** / ASTM D5 / BS 2000 / NFT66-004 / AASHTO T49
UNI 4162 / UNE 7013 / NLT 124 / CNR N° 24

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 dia. 55x35 mm and 70x45 mm.
Dimensions: 220x170x410 mm.
Weight: 11 kg

B057-03

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: 230 V 1 ph 50/60 Hz 200 W
Dimensions: 220x280x410 mm. Weight: 15 kg

ACCESSORIES:

B057-02 MIRROR, for an easier setting of the needle.

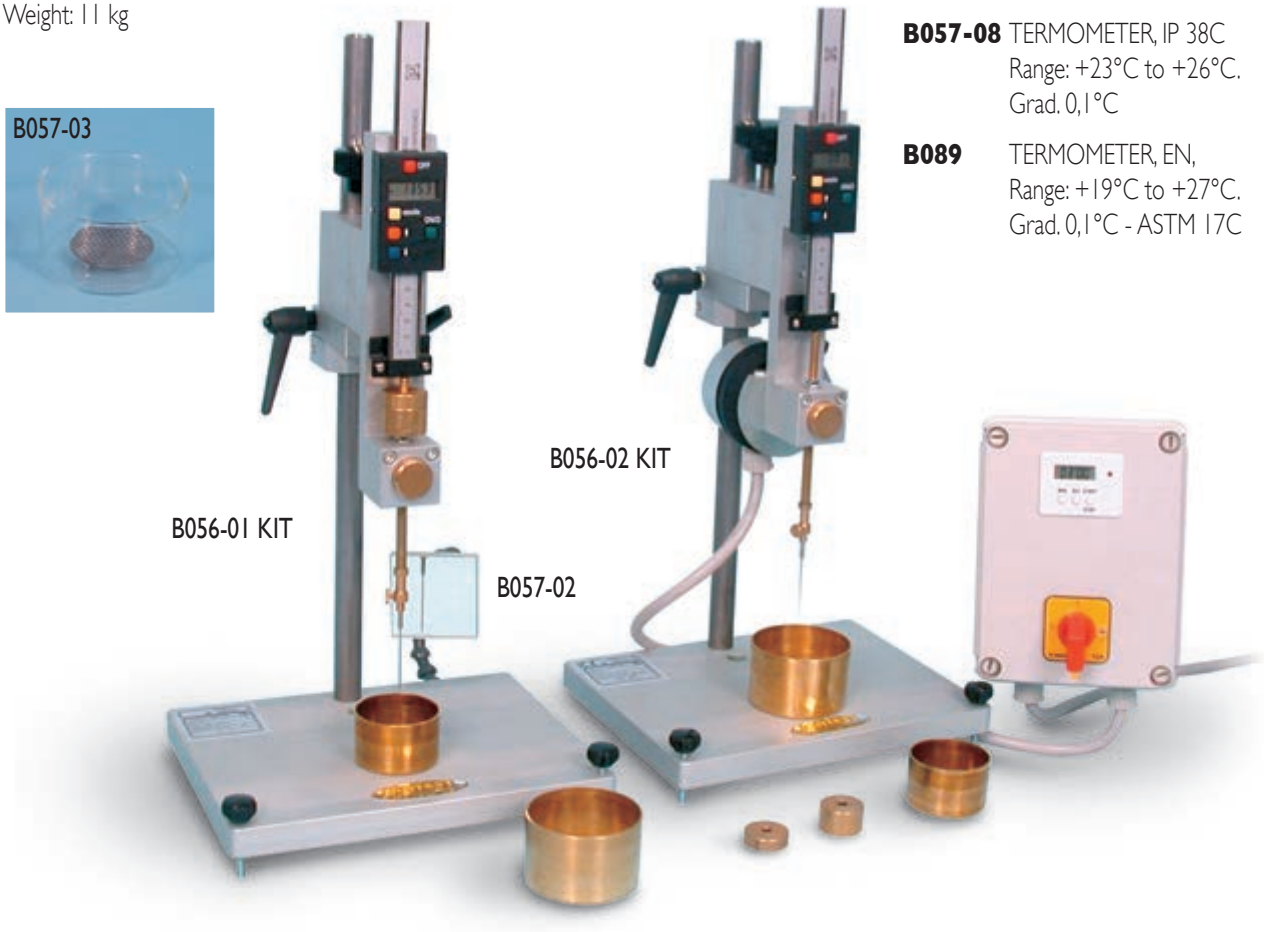
B057-03 TRANSFER DISH, made from glass, with support.

B057-06 PENETRATION NEEDLE HARDENED STEEL, supplied with UKAS Verification Certificate. Weight: 2,5 ± 0,05 g

B057-07 PENETRATION NEEDLE HARDENED STEEL, each needle is individually verified with engraved serial number, and perfectly meets EN 1426 Specification. Weight: 2,5 ± 0,05 g

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:

B057-01 PENETRATION NEEDLE, NOT HARDENED.
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, dia. 55x35 mm

V122-06 SAMPLE CUP, brass made, dia. 70x45 mm

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.

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: 230 V 1 ph 50/60 Hz 350 W
Dimensons: 375x335x420 mm
Weight: 12 kg

B016

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: 230 V 1 ph 50-60 Hz 500 W
Dimensions: 140x140x350 mm
Weight: 5 kg

B059 KIT

Automatic digital penetrometer

STANDARDS: **EN 1426** / ASTM D5 / BS 2000 / NF T66-004 NLT 124 / AASHTO T49 / UNI 4162 / UNE 7013 CNR N° 24

Digital measure of the penetration values.
Measuring range: 50 mm, sens. 0,01 mm
Motorized approach of the needle, driven by camera (needle diameter = 5 mm on the monitor).
Electric control of the approach.
Electromechanical release and locking device of the needle.
Motorized return of the needle.
USB port for printer or PC connection.
Supplied complete with needle, weights, sample cups.
Power supply.
230V 1 ph 50 Hz
Dimensions:
260 x 320 x 540 mm
Weight : 23 kg

B059 KIT

B060

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: dia. 50x250 mm. Weight: 2 kg

B066 KIT

Rolling Thin-Film Oven - ASTM

EFFECT OF HEAT AND AIR ON A MOVING FILM OF ASPHALT. RTFOT METHOD

STANDARDS: ASTM D2872 / AASHTO T240

Utilized 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.
Provided of large glass door for inspections.
The oven must be connected to a suitable air pressure supply.
Supplied complete with precision digital thermostat to maintain 163°C temperature, control thermometer ASTM 13C, ventilation device, set of eight glass containers dia. 64x140 mm.
The oven is equipped of a dual safety thermostat to prevent accidental over-heatings.
Power supply: 230 V 1 ph 50 Hz 1700 W
Dimensions: 620x620x910 mm
Weight: 55 kg

B066 KIT

B066-01 KIT

Rolling Thin-Film Oven - EN

STANDARD: **EN 12607-1**

Same as for mod. B066 but with modified test chamber to meet EN 12607-1 Specifications. Supplied complete.

SPARES:

B066-02 Glass container dia. 64x140 mm
B064-03 Thermometer, ASTM 13C. Range: +155°C. to +170°C. div. 0,5°C.

B064 KIT

Asphalt oven with rotating shelf.

THIN FILM AND LOSS ON HEATING DETERMINATION. TFOT METHOD

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 from 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: 230 V 1 ph 50 Hz 1500 W
Internal dimensions: 330x330x330 mm
Outside dimensions: 460x450x700 mm
Weight: 40 kg

B064 KIT + B064-01 KIT

THE OVEN MOD. B064 CAN BE EQUIPPED IN TWO VERSIONS, WITH THE FOLLOWING ACCESSORIES:

B064-01 KIT

Rotating shelf complete with 9 containers dia. 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 dia. 140x9,5 mm for the "**Determination of Thin Film**" to: **EN 12607-2** / ASTM D1754 / AASHTO T149 / UNE 7110 Standards.

B064-01 KIT

B064-02

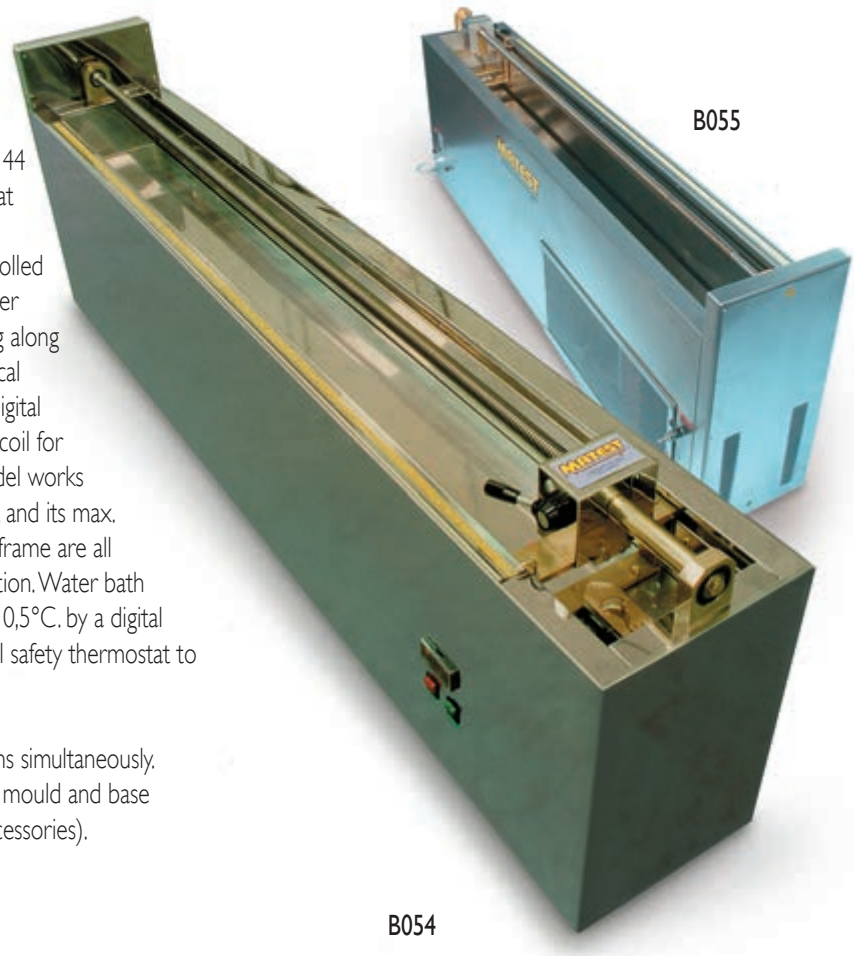
SPARES:

V122-05 Brass container dia. 55x35 mm
B064-04 Stainless steel container dia. 140x9,5 mm

B054

Ductilometer

STANDARDS: **EN 13589 / EN 13398**
ASTM D113, D6084 / AASHTO T51
NFT66-006 / NLT 126 / UNE 7093 / CNR N° 44
Used to determine the bituminous ductility, that is to say, the distance to which a briquette of molten bitumen can be extended under controlled conditions, before its 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 which is fitted with digital thermostat, immersion electric heater, cooling coil for cold water circulation and pump unit. This model works in an automatic way at a speed of 50 mm/min. and its max. stroke is 1500 mm. The tank and the external frame are all made from stainless steel with fibreglass insulation. Water bath temperature is maintaned constant at 25°C ± 0,5°C. by a digital thermoregulator. The unit is equipped of a dual safety thermostat to prevent accidental over-temperatures.
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 1 ph 50 Hz 1000 W
Dimensions: 2140x350x400 mm
Weight: 95 kg



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: 2140x350x750 mm. Weight: 130 kg

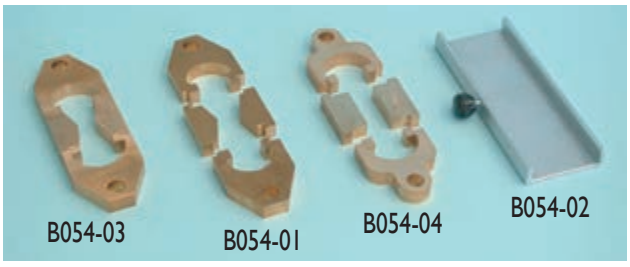
ACCESSORIES:

B054-01
DUCTILITY BRIQUETTE MOULD - STANDARDS: ASTM, AASHTO
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.



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 of 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

SPARES:

B077-01
Plate (spring) in special armonic steel

B077-02
Thermometer IP 42C

B055-10

Ductilometer with data acquisition

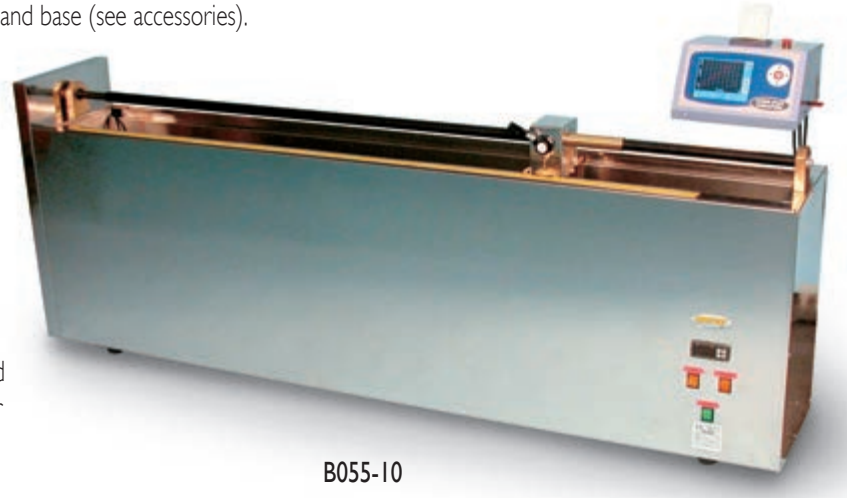
Technical, mechanical and Standards specifications: same to mod. B054, but upgraded with:
- Cyber-plus 8 evolution data acquisition and processing system, "colour touch screen display" ¼ VGA, 24 bit resolution. It automatically performs data acquisition and processing. Directly connected to printer (accessory) 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 pag. 24
- 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 later on).



B055-10

C128
LASER PRINTER, bench model, for graphics and certificates with direct connection via USB

Ductility moulds and base plate:
see pag. 132

B055-20N

B055-20N

Ductilometer with data acquisition "high performance"

STANDARDS: **EN 13589, 13703, 13398 /** ASTM D113, D6084
AASHTO T51

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
- Visualization of the 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 8 evolution data acquisition and processing system "colour touch screen display" (technical details: pag. 24).
- Software UTM2 to unload and visualize test data to PC.
- Glass upper cover.

Supplied **"without"** briquette mould and base (see accessories).
Power supply: 230V 1ph 50/60Hz 1000W
Dimensions: 2140x400x450mm. Weight: 110 kg approx.

ACCESSORIES:

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 +5°C to +25°C. (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 pag. 132

Detail: 3 load cells 500 N

B072

Ring and Ball softening point apparatus

STANDARDS: **EN 1427** / ASTM D36 / AASHTO T53 / NF T66-008
Comparable to: BS 2000 / UNI 4161 / DIN 52011 / UNE 7111

The softness of bitumen depends, amongst other factors, on the temperature of the substance, where, as the temperature is raised, the softness of the bitumen increases. The unit consists of a pyrex beaker, brass frame, two tapered rings, two ball centering guides and two balls. Weight 900 gr.

ACCESSORIES:

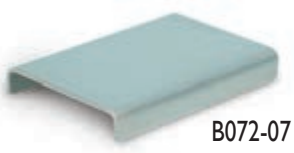
B072-01 THERMOMETER ASTM 15 C -2 to+80°C subd. 0,2°C

B072-02 THERMOMETER ASTM 16 C +30 to+200°C subd. 0,5°C

B072

B072-07

Pouring plate, to pour the bituminous mixture into the brass tapered ring, as requested by EN 1427 Specification.
Dimensions: 75x50x10 mm



B072-07

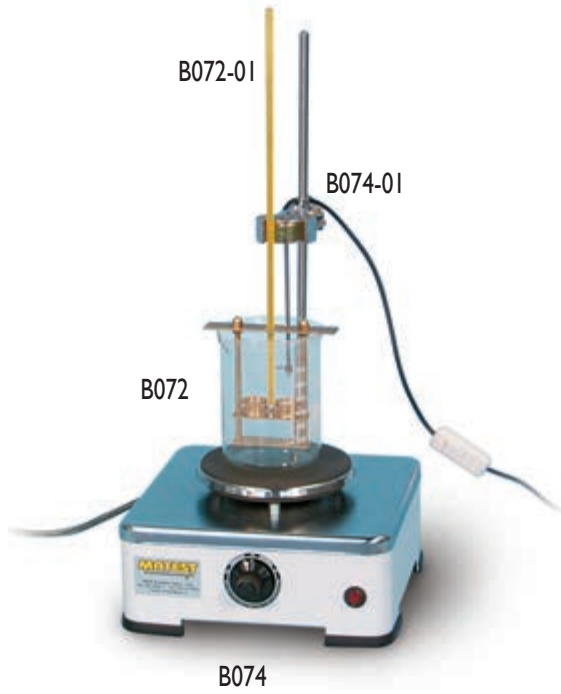
B074

Hot plate, complete with thermoregulator for temperature adjustment.
Power supply: 230 V 1 ph 50/60 Hz 1000 W
Weight: 6 kg

ACCESSORY:

B074-01

Electric stirrer, accessory to the hot plate B074 to ensure a more uniform temperature to the bath.
Supplied complete with vertical support and base.
Power supply: 230 V 1 ph 50 Hz 100 W
Weight: 3 kg



B072-01

B074-01

B072

B074

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.
Alternative version to mod. B074 + B074-01
Power supply: 230V 1ph 50-60Hz 700W
Weight: 4 kg approx.

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.
Power supply: 230V 1ph 50-60Hz 700W

SPARES for B072:

B072-03 Steel ball dia. 9,5 mm

B072-04 Brass tapered ring

B072-05 Ball centering guide

B072-06 Pyrex beaker

B072-01

B072

B073-01

B070N1

SOFTMATIC

Automatic Digital Ring and Ball apparatus "TOUCH-SCREEN"

STANDARDS: **EN 1427** / ASTM D36 / AASHTO T53 / NF T66-008;
comparable to: BS 2000 / DIN 52011 / UNE 7111 / UNI 4161 / CNR N.35

B070N1

This "high tecnology" 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.

Real time visualization of the Temperature(°C)-Time(sec) graph along the entire test.

A magnetic stirrer with electronic speed adjustment from 0 to 160 rpm also ensures an uniform temperature in the vessel during the test execution.

The touch-screen graphical interface allows an easy set up of the parameters and the immediate execution of the test.
High resolution color display, 1/4 VGA, offers all the functions of a PC for the management and analysis of data, test results, and graphs.

Two test parameters can be selected by 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.

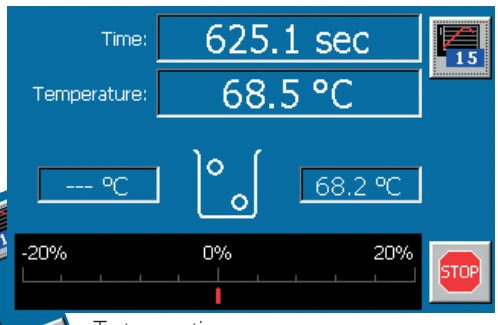
Language selection: English, French, Spanish, German, Italian, Polish, Russian, Greek, Portuguese, Dutch.
Functions of: clock calendar, test number, user/customer name, general notes, start/end of the test.
Real time visualisation of the bath temperature, test progress, rpm of the stirrer.

Unlimited memory, with possibility to save data onto an external memory (USB pendrive, SD card) and then edit them through an Excel spreadsheet.

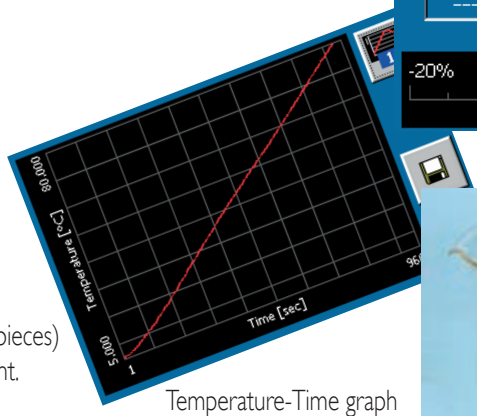
The tester is basically composed by:
- Ceramic-glass heating plate with automatic cut off at the end of the test cycle.
- Motherboard with microprocessor, which controls: heater/stirrer, temperature probe, laser sensors, pre-heating phase of the plate, and memorizes all the test parameters.
- Steel balls centering device.

Power supply: 230V 1ph 50/60Hz 700W
Dimensions: 500x350xh550 mm
Weight: 20 kg approx.

Main Functions:
Touch-Screen display like a normal PC
Unlimited memory
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



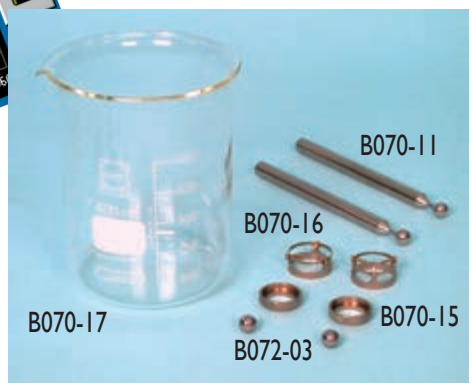
Test execution



Temperature-Time graph

ACCESSORY:

B070-11
RODS WITH SPHERICAL ENDS (set of 2 pieces) for checking and calibration of the instrument.



SPARE PARTS for B070N:

B072-03 Steel ball 9,5 mm diameter
B070-15 Brass tapered ring, chromed
B070-16 Brass centering guide, chromed
B070-17 Pyrex beaker

B075

Water in bitumen emulsions

STANDARDS: **EN 1428, 12847** / ASTM D244 / NF T66-023, T66-113

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 50-60Hz 500W
Weight: 8 kg approx.

B075

B076

Water in bituminous materials (Dean-Stark)

STANDARDS: ASTM D95, D244
AASHTO T55, T59 / IP 74-77
CNR No. 101 / NLT 123

Identical to mod. B075 except for the receiver having 10 ml capacity.

Bituminous emulsions: Residue on sieving

STANDARD: **EN 1429**

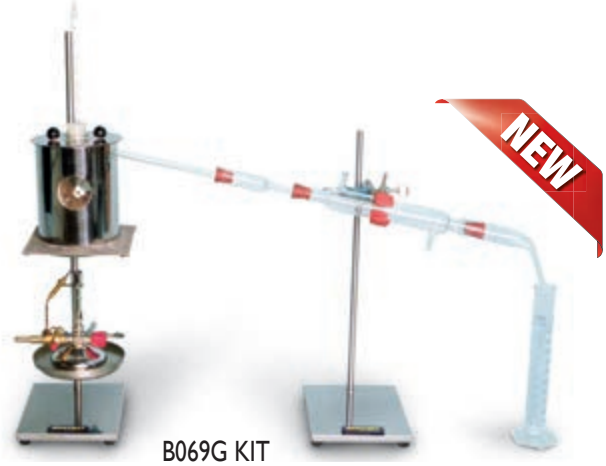
B076-21 Sieve, stainless steel, 75 mm dia., 0,5 mm opening
B076-22 Sieve, stainless steel, 75 mm dia., 0,16 mm opening
B076-24 Pan and Cover, stainless steel, 75 mm dia.

B076-21 ÷ B076-24

Bituminous emulsions: Mixing stability with cement

STANDARD: **EN 12848**

B076-23 Sieve, stainless steel, 75 mm dia., 2 mm opening
B076-22 Sieve, stainless steel, 75 mm dia., 0,16 mm opening
B076-24 Pan and Cover, stainless steel, 75 mm dia.

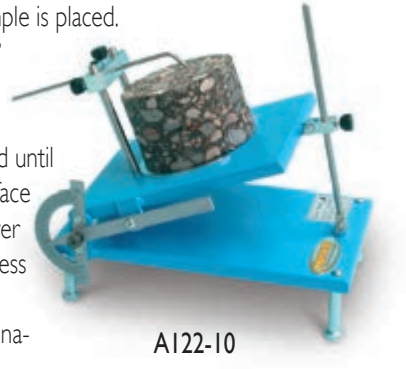


B069G KIT

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 - 50°
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.



A122-10

Dimensions: 270x175x265 mm. Weight : 5 kg approx.

Distillation of cut-back asphalts

STANDARDS: ASTM D402 / AASHTO T78 / NF T66-003
UNE 7112, 7072

Used to measure the amount of the most volatile constituents in cut-back asphaltic products.

MODELS:

B069 KIT

Distillation of cut-back asphalts, electric

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 750W
Weight: 12 kg approx.

B069 KIT

B069G KIT

Distillation of cut-back asphalts, gas operated

The apparatus consists of: BUNSEN BURNER, universal, with air control. Complete with gas-stop valve controlled by a flame sensor and maximum thermostat with reset button, distillation flask, condenser tube, adapter, shield, receiver supports, graduated cylinder, thermometer ASTM 8C -2 to +400C°, subd. 1°C
It can be sold in CE markets, but not usable in closed spaces.
Weight: 8 kg approx..

B069-11 Spare thermometer ASTM 8C

B063-10

Particle charge tester

DETERMINATION OF PARTICLE POLARITY OF BITUMEN EMULSIONS

STANDARDS: **EN 1430** / ASTM D244 / 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: 200x200x600mm
Weight: 3 kg approx.

B063-10

ACCESSORY:

B063-11
BEAKER 500 ml capacity to ASTM spec.

B072-20

Wilhelmi softening point apparatus

STANDARDS: **EN 1871** / 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 dia.
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 1000W
Weight: 4 kg approx.
See pag. 134

B063 KIT

Emulsified asphalt distillation apparatus

STANDARDS: **EN 1431** / ASTM D 244 / AASHTO T 59
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 in CE markets, but not usable in closed spaces.
Weight: 12 kg

SPARE:
B063-01 Thermometer 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

B065

Rotary Evaporation Apparatus

BITUMINOUS BINDERS. DETERMINATION OF THE 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 introducing 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 by penetration, viscosity and softening point tests.
The Rotary Evaporation Apparatus is essentially composed by: distillation flask 1000 ml capacity rotated by a speed motor at an adjustable rate of 20 to 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 valve and transparent flexible hose for solution intake.
The Rotatory Apparatus requires a vacuum pump and a vacuum regulating system (see accessories at pag. 76).
Power supply: 230V 1ph 50Hz. Weight: 27 kg approx.

B065

B075-05

Determination of solubility of bituminous binders

STANDARDS: **EN 12592** / ASTM D2042 / IP 47
The set comprises :
Gooch crucible complete with funnel and rubber ring
Filter flask 500 ml capacity with rubber stopper
Whatman filter fibreglass discs, 25 mm dia. (pack of 100)
Weight: 1000 g approx.

B075-05

B075-01

Graduated cylinder with side tubes and stopper

BITUMEN EMULSIONS: 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.
To perform this test the water in petroleum emulsion equipment mod.B075 ia also required. See pag. 136

B075-01

B075-08

B075-08

Glass tube with glass filter

BITUMEN EMULSIONS: DETERMINATION OF PENETRATION POWER
STANDARDS: **EN 12849** / IP 487
The glass tube has 41,5 mm inside dia. 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.

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 50Hz, 1ph
S157-06 Support base for stirrer.
B090-11 Propeller for electric stirrer.
B090-12 Metallic container, 500 ml capacity.
B090-20 Reference filler, 50 kg (two bags of 25 kg).
B090-21 Reference filler original Sikasoil recommended by EN Standard. Bag of 50 kg.

B090

B090-10

B090-11

B090-12

B080

Engler digital viscometer

STANDARDS: ASTM D 940, D 1665 / AASHTO T54 / BS 2000
NF T66-020 / 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: 230 V 1 ph 50 Hz 300 W
Dimensions: 265x270x550 mm.
Weight: 12 kg

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

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

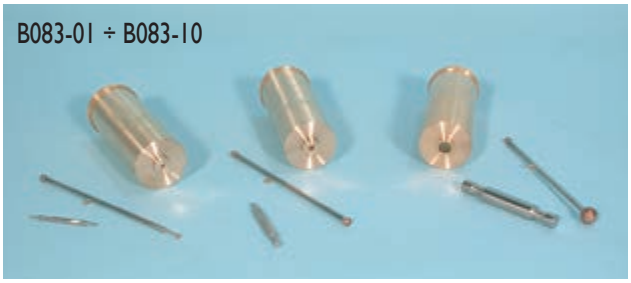
B082-04 THERMOMETER NF T66 -020 range 0-55°C. subd. 0,2°C

B082-06 Kohlraush calibration flask 200 ml capacity

B082-07 Filter screen, ASTM N°50

SPARE:

B082-05 Engler testing flask



B083-01 ÷ B083-10

Efflux Viscometer, "Standard TAR" (BRTA, Redwood)

STANDARDS: **EN 12846 / EN 13357** / IP 184
NF T66-005 / BS 2000

B084-01 KIT

Standard TAR (BRTA, Redwood) Digital Viscometer

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 100ml 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

B084-02 KIT

"Two Places" Standard TAR (BRTA, Redwood) Digital Viscometer

Basically structured as mod. B084-01,
but having **"TWO ELEMENTS"**

ACCESSORIES for Standard TAR:

Standards: EN, NF, IP
B083-01 Go/not go gauge for dia. 4 mm orifice
B083-02 Cup with orifice dia. 4 mm
B083-03 Ball valve dia. 4 mm

Standards: EN, NF, IP, BS
B083-04 Go/not go gauge for dia. 10 mm orifice
B083-05 Cup with orifice dia. 10 mm
B083-06 Ball valve dia. 10 mm

Standard: EN 12846
B083-08 Go/not go gauge for dia. 2 mm orifice
B083-09 Cup with orifice dia. 2 mm
B083-10 Ball valve dia. 2 mm

SPARE PARTS:

B083-07
Thermometer IP 8C,
range 0 - 45°C., subd. 0,2°C.

V101-03
Graduated cylinder, glass,
100ml capacity

B084-01 KIT + accessories

B086 KIT

Cleveland open cap flash and fire point tester

STANDARDS: **EN 22592** / ASTM D92 / AASHTO T48
IP 36/67 / UNE 7075 / 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
Weight: 10 kg

"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 / UNE 7066, 51021

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:
230 V 1 ph 50/60 Hz 500 W
Dimensions: 270x270x550 mm.
Weight: 12 kg

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.

SPARES:
B089-06 FUROL orifice
B089-07 UNIVERSAL orifice
B089-08 SAYBOLT flask 60 ml capacity

B087-01

Two tube Saybolt viscometer

Basically structured as mod. B087 but with two tubes. Supplied complete except thermometers, filter funnel and withdrawal tube.

Hubbard-Carmick specific gravity

STANDARDS:
EN ISO 3838 / ASTM D70 / NF T66-007

VIII Cylindrical type, 24 ml
VIII-01 Conical type, 25 ml

B092 KIT

Tag closed-cup viscometer. Flash Point

STANDARDS: ASTM D56 / 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: 230 V 1 ph 50 Hz 700 W.
Dimensions: 200x300x400 mm approx. Weight: 10 kg

B092 KIT

B094-01 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:
230 V 1 ph 50 Hz 700 W.
Dimensions:
200x300x400 mm approx.
Weight: 10 kg

B093 KIT

B094 KIT

Pensky-Martens digital flash point tester

STANDARDS: **EN 22719** / ASTM D93 / AASHTO T73 / 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:
230 V 1 ph 50 Hz 700 W.
Weight: 10 kg

B094 KIT

SPARES:
B092-10 Thermometer ASTM 9C
B092-11 Thermometer ASTM 57C
B094-10 Thermometer ASTM 10C

B094-01KIT

Pensky-Martens flash point tester

Similar to mod. B094KIT, but with "electric" thermoregolator (not digital) and the stirrer performs "only" method "A"

B085-07

DSR - Dynamic Shear Rheometer

STANDARDS: ASTM D7145, ASTM D7405 / AASHTO T315

The DSR is a dynamic shear rheometer system specifically configured to apply controlled shear deformation to asphalt binder or bitumen samples; and for the determination of the elastic and viscous behavior of a bituminous binder. The system enables measurement of flow properties (such as shear viscosity from flow tests) and dynamic material properties (such viscoelastic modulus and phase angle from oscillation tests) to Asphalt industry standards.
The DSR has been designed to satisfy the demands of high throughput grade testing of Asphalt binders (bitumen) to AASHTO Specifications.
Integrated fluid immersion cell specifically based on patented principle for temperature control of highly thermally-sensitive asphalt or bitumen samples.
Excellent temperature stability and accuracy: +/- 0.01°C. resolution.
Rapid, robust manual gap set, with pre-set gaps for AASHTO tests for simplicity of use. Plate measuring systems, both upper and lower plates, designed to comply with industry Standards (AASHTO).
Dedicated AASHTO specification QC software package (TruGrade) available.
Multiple stress creep recovery kit (MSCR) to ASTM D4705 test.

Specifications:
- Torque range: 10 µNm to 10 mNm
- Torque resolution: 1 µNm
- Position resolution: 1 µrad
- Frequency range: 10 µHz to 100 Hz
- Temperature control range: 5°C to 95°C (total immersion cell)
- Temperature accuracy: better than ± 0.1°C.

The Rheometer requires to be connected to:
- PC and color printer
- Compressed air: 6 bar clean, dry air

That are not included in the supply.

Power supply: 110V or 220V 1ph 50/60Hz
Dimensions: 230 x 350 xh 600 mm. Weight: 18 kg

B085-07

B085-05

BBR - Bending Beam Rheometer

STANDARDS: 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.

TEST FRAME:
- Three-point bend test apparatus
- 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
  mechanical refrigeration system
  cooling coil located within the test bath
  no pumping required. Cools Ethylene Glycol - water - methanol mix (recommended for safety) to -40°C.
- Compressed air: 0.34 MPa clean, dry air supply required
- CE certified model

SOFTWARE:
- Control, acquisition and analysis software
- BBR Software version 4.16W
- Computer interface card
- Menu driven program, mouse compatible
- 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.

B085-05

B091N

Pressure Ageing Vessel (PAV3)

STANDARDS: **EN 14769** / ASTM D652 / AASHTO R28

The unit has been developed to simulate the accelerated ageing of bitumen and bituminous binders after 5 to 10 years.
The sample is exposed to high pressure and temperature for 20 hours, to simulate the effect of a long time oxidative ageing by verifying the penetration and softening point characteristics.

PAV3 features include:
- Touch screen controller with front panel user interface with easy to use step-thru operation.
- Bench top unit with integral vessel/oven design.
- USB port on front unit with software upgrades and data storage.
- Remote capabilities: with APP control PAV with smart phone, tablet or IPad.
- Timer to set time and date for automatic preheat.

Construction: CE certified vertical stainless steel pressure vessel with encased band heaters and integral pressure measurement control. Temperature is measured by Platinum RTD.

Specifications:
- Operating pressure: 2.1 +/- 0.1 Mpa
- Temperature range: 80°C to 115°C, res: 0.1°C
- Test temperature uniformity: +/- 0.5°C
- Time to return to set point temperature: less than 60 min.

B091N

The unit is supplied complete with:
10 specimen pans AASHTO T179; O-Ring; precision anodized aluminum sample rack; Hex socket wrench; specimen loading/unloading tool; single stage regulator; high pressure hose assembly; instruction manual. Power supply: 230V 1Ph 50/60Hz 10A
Dimensions: 760x460x700 mm. Weight: 130 kg

NOTE: a source of compressed air with a pressure of at least 325 psi and a pressure regulator is required to operate the PAV

B091-01

Vacuum Degassing Oven for PAV

For degassing pressure aged binder samples to precisely and accurately meet ASTM D6521 and AASHTO R28 Standards.
Stainless steel construction, hinged lid to conserve space and access the vacuum chamber, holds up to 4 specimen containers.
Self-contained automatic vacuum system, high precision digital display controller indicating: time, temperature, current stage of each process.
It maintains temperature up to 170°C with accuracy +/- 5°C
Power supply: 230V 1ph 50Hz. Dimensions: 610x400x305 mm
Weight: 60 kg approx.

DYNAMIC VISCOSITY BY ROTATIONAL VISCOMETERS

STANDARDS: **EN 13302** / ASTM D2196, D4402 / AASHTO T316

Test Method: Determines the dynamic viscosity of a substance by the rotation of a specified spindle within the sample at the speed giving the maximum torque reading on the viscometer. The resulting torque reading is used to calculate the viscosity of the substance.

AVAILABLE MODELS:

B085-20

Rotational Viscometer, standard model

- Viscosity range: 100 -13,000,000 cP
- Rotational speed range: 0.3 - 100 rpm
- Thermometer:
  0°C to +100°C resolution 0.1°C
  precision: ± 0.1°C
- Touch key board with 6 keys
- Direct readout on graphic display
- Data displayed: selected speed rpm (18 selectable);
  selected spindle; viscosity result: cP or cSt
  base scale percentage: %; sample temperature: °C or °F
  shear rate, shear stress, density
- This instrument determines both relative and absolute viscosity
- Program: 10 working memories; Unit converter: SI to CGS
- Auto alarm in the case of any fault being detected
- Automatically checks for correct operation point by scanning at different speeds
- Calibration by the user himself
- Interface: USB; 10 language options
- AISI 316 stainless steel spindles: R2, R3, R4, R5, R6 and R7

Supplied complete with spindles, stand, carrying case.
Power supply: 100-240V 1ph 50/60Hz
Weight: 5 kg approx.

B085-20

B085-30

Rotational Viscometer, high performance model

Basically similar to standard model, but in addition:

- Viscosity range: 100 - 40,000,000 cP
- Rotational speed range: 0.1 - 100 rpm
- Repeatability: 0,2%
- Touch key board with 9 keys
- RS 232 unidirectional interface, download to a computer
- Suitable for routine, but also experiment and research tests

Supplied complete with spindles, stand, carrying case
Power supply: 115-230V to 12VDC 1.2A
Weight: 5 kg approx.

B085-30

ACCESSORY (for all models):

B085-32

TEMPERATURE CONTROL AND CONFIGURATION FOR VISCOSITY MEASUREMENTS

The heater holds the container with the sample. The spindle is introduced into the sample and a microprocessor control unit measures viscosity, assuring that the required temperatures is maintained.

DYNAMIC VISCOSITY
Determination

NEW

B088

Viscometer bath

STANDARDS: Comparable to **EN 12595** / ASTM D2171
AASHTO T201

This precision viscometer bath is used to determine both the Dynamic and Kinematic viscosity of liquid asphalts, keeping the capillary type viscometers at an uniform temperature.
Consisting of:
- glass container, 20 liters capacity,
- stainless steel lid with five holes for capillaries,
- selector and digital temperature reading,
- motor stirrer, heating element.

Allows to simultaneous temperate five capillaries.
Temperature range: room +5°C. to 150°C.
Temperature stability: ± 0,1°C.
Temperature sensor: PID
Protection against temperature excess and low liquid level.
Viscometers and thermometers are not included.
Power supply: 230V 1ph 50/60Hz 2000W
Weight: 10 kg

B088

NOTE:
On request the viscometer bath is available with temperature stability: ± 0,01°C as requested by EN 12595 (code number: B088-01)

ACCESSORIES:

B088-03 Silicone oil, type 50 CSt, for tests with B088 bath with temperature range: 90°C up to 150°C
Can of 25 kg (20 lt approx)

B088-05 Holder for Cannon-Manning and Asphalt Institute viscometers

B088-06 Holder for Cannon-Fenske viscometers

B088-07 Holder for Zeitfuchs cross-arm viscometers

B088-08 Holder 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

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
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 bath, the B088-05 holder, the B088-16 pressure regulator and the B088-17 vacuum manifold 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

Note: To measure the viscosity with the Asphalt Institute vacuum viscometers, the B088 bath, the B088-05 holder, the B088-16 pressure regulator and the B088-17 vacuum manifold are also needed.

B088-16

B088-16
Viscometer pressure regulator, for precise control. 230V 1ph 50/60Hz

B088-17
Vacuum manifold, to obtain vacuum to the viscometers introduced into the bath

KINEMATIC VISCOSITY
Determination

NEW

STANDARDS: **EN 12595** / ASTM D2170
AASHTO T201

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 mm2/s2	Viscosity range mm2/s2		
B088-50	0,002	0.5	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	250
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	9000	to	45000
B088-63	100	20000	to	100000

Note: to measure the kinematic viscosity with the Cannon-Fenske viscometers , the B088 bath and the B088-06 holder are also needed.

Note: to measure the kinematic viscosity with the BS viscometers, the B088 bath and the B088-08 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 mm2/s2	Viscosity range mm2/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, the B088 bath and the B088-07 holder 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 mm2/s2	Viscosity range mm2/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

Duriez test set

STANDARD: NF P98 - 251-1/4

Used to determine the mechanical and phisical properties of bituminous mixtures.

Duriez test set for 120 mm dia. 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 dia. 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

S206N

UNITRONIC 200 kN "Matest Made"

UNIVERSAL ELECTROMECHANICAL FRAME FOR COMPRESSION TESTS ON DURIEZ SAMPLES 80 MM AND 120 MM DIAMETER, WITH SERVOCONTROLLED SYSTEM OF LOAD OR DISPLACEMENT/STRAIN.

The machine is also suitable for tests on:
- Bituminous mixtures (Marshall, Leutner shear, Splitting tensile)
- Concrete (flexure on beams and clay tiles, splitting on cylinders, cubes and block pavers, punching)
- Cement and mortar (compression and flexure)
- Soil (CBR)
- Steel rebars (tensile)

Technical details: see pag. 420

B099-10

Sand patch equipment

STANDARDS: **EN 13036-1** / ASTM E965 / CNR N. 94
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 250/180 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

S206N

B098N

Travelling beam device Matest Made

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.
Weight: 55 kg approx.

B098-03N

B098-01N
detail

B098N

ACCESSORIES:

B098-01N

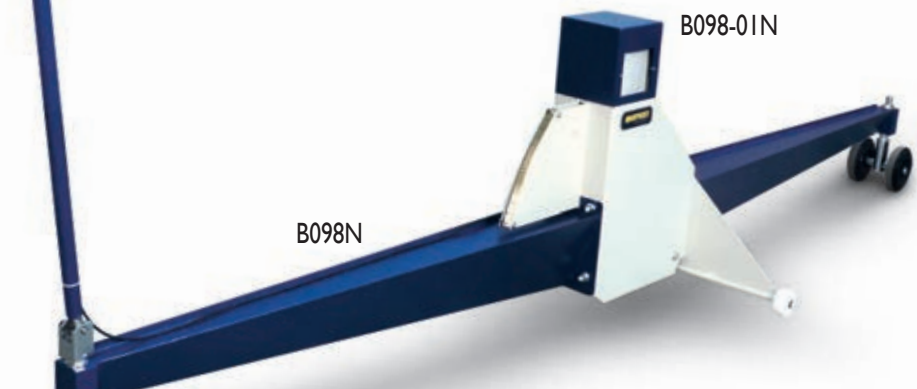
Autographic recording device Matest made

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.

SPARE-PARTS:
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.


B098-01N

B098N

B111

"Non Nuclear" Electromagnetic Density Gauge, infrared temperature sensor

The Electromagnetic Density Gauge is a non nuclear sensing device that allow field density real time measurement of asphalt. This technically advanced instrument for quality control allow 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.

B111

Dimensions: 229x406x152 mm. Weight: 5 kg

B099 KIT

MOT straight edge

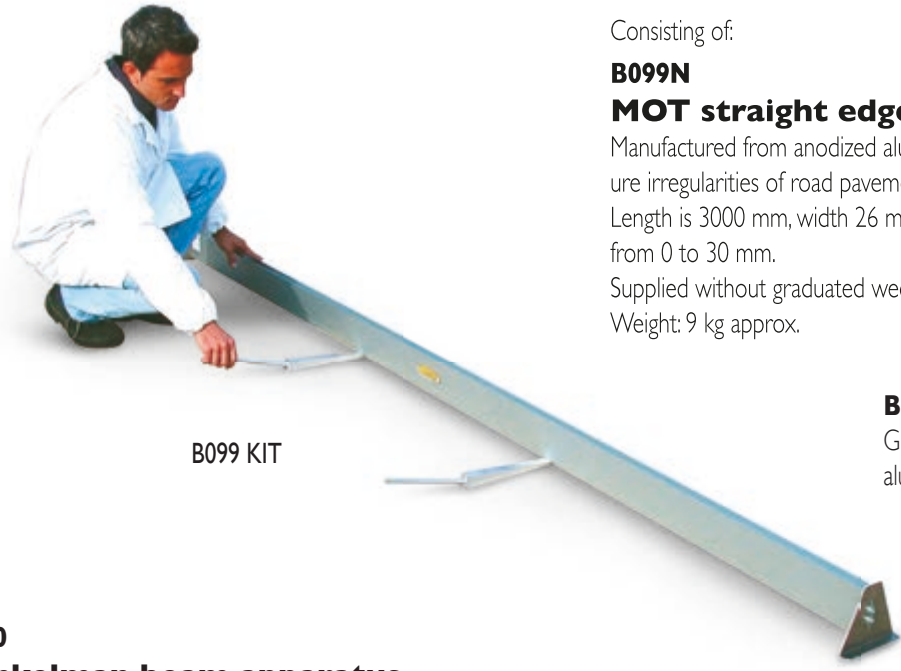
IRREGULARITY MEASUREMENT OF PAVEMENT SURFACE
STANDARD: **EN 13036-7**

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.
Weight: 9 kg approx.



B099 KIT

B099-01N

GRADUATED WEDGES, anodized aluminium alloy (set of two)

B099-01N

B100

Benkelman beam apparatus

STANDARDS: 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 250 cm.
Beam fulcrum ratio 4:1
Supplied complete with wooden carrying case.
Weight: 16 kg

B102

Benkelman beam apparatus

STANDARD: 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.
Weight: 16 kg

B102

B100

B100-02

ACCESSORY:

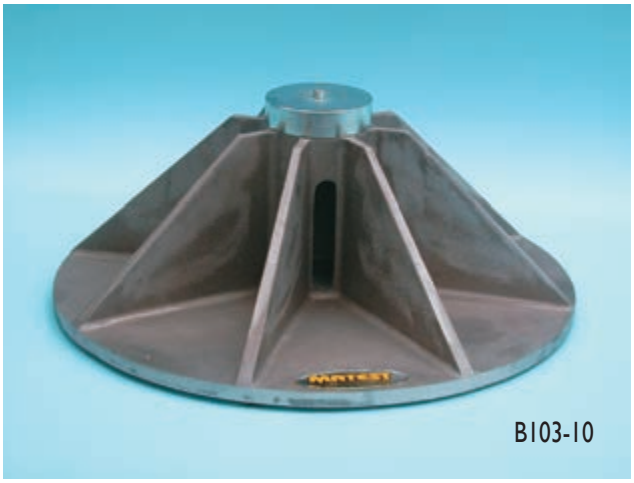
B100-02

Benkelman indicator gauge calibration unit, complete for mod. B100 and B102.

B103-10

Bearing plate 600 mm dia. 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.
(Standard:CNR N. 146, method A)
The plate foresees also three screwed lateral holes for three point measurements of the bearing capacity of a soil in-situ
(Standards: CNR N. 146 method B / BS 1377:9 / CNR N. 92 ASTM D1195, D1196)
Supplied complete with coupling device to the hydraulic jack.
Weight: 25 kg



B103-10

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. B100 and 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

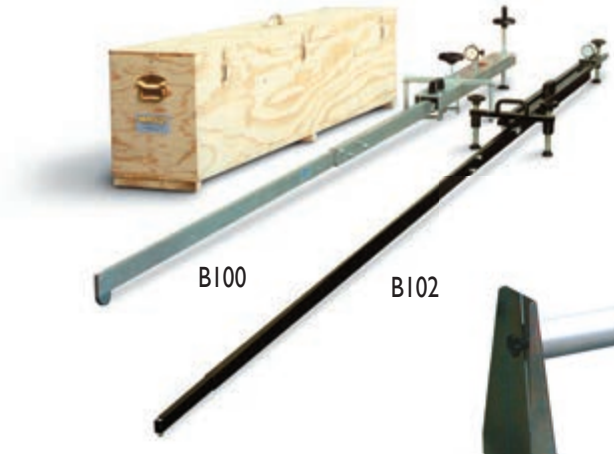
B103-05 KIT

B100

ACCESSORIES:

B100 Benkelman Beam apparatus according to Standards: CNR N. 141

B102 Benkelman Beam apparatus according to Standards: NF P98-200-2 / AASHTO T256-77


B100

B102

Use examples of the aluminium bearing plate 600 mm dia. for bearing tests of a soil in-situ with the 200 kN plate bearing equipment mod S225 KIT (see pag. 425 of the catalogue)

S225 KIT + B103-10

Section C CONCRETE

The accurate and satisfactory test of fresh and hardened concrete are essential elements for any type of building realization. The final quality of the concrete utilized in the structure depends from many variables like: workability, consistency, setting, time, volumic mass, air content, compressive strength, temperature, linear variations, etc.

Matest proposes a complete range of testing and research equipment on concrete to satisfy practically all the above quality variables, in compliance with the EN, ASTM and the most known International Standards. In the second part of this section a complete range of instruments is available for non-destructive tests, to investigate and evaluate the progressive ageing and durability of concrete structures submitted to the chemical attacks, air pollution, time.

COMPRESSION AND FLEXURAL TESTING MACHINES

In the Concrete section we are in the position to supply the widest and most complete range of compression and flexural testing machines today available in the worldwide market, making Matest the leader manufacturer of testing machines.
The versatility and flexibility of Matest testing machines production range allow the enduser to select and combine compression/flexural groups in order to satisfy and to personalize any specific requirement.

The next pages describe:

1) General features of the compression frames with different control and measuring systems (pag. 153, 154)

2) Compression testing machines, four columns prestressed frame, conforming to Standards:
ASTM C39 / BS 1610 / UNI 6686 part 1,2 / AASHTO T22
NF P18-411 / UNE 83304 (pag. 167 ÷ 197)

3) Compression testing machines, four columns **"tested for high stability frame"**, conforming to Standards:
EN 12390-4 / and BS 1881 / DIN 51220 / UNI 6686 part 3, 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, ISO 6784, UNI 6556, DIN 1048 (pag. 199 ÷ 221)

4) Flexural testing machines, conforming to Standards: **EN 12390-5 EN 1340:4** / ASTM C78, C293 / UNI 6133 / BS 1881:118 NF P18-407 UNE 83305 / AASHTO T97 (pag. 224 ÷ 236)

5) Combined Groups for Compression, Flexural, Splitting, Block tests; cement compression/flexural frames, suitable to personalize and satisfy any specific requirement (pag. 238, 239)

COMPRESSION TESTING MACHINES

IT IS TECHNICALLY WELLKNOWN 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
  UNE 83304 / AASHTO T22 / UNI 6686 part 1, 2

  Models described at pag. 167 ÷ 197

- MACHINES WITH FOUR COLUMNS
  "TESTED FOR HIGH STABILITY FRAME"
  STANDARDS: **EN 12390-4** / BS 1881 / DIN 51220
  UNI 6686 part 3

  Models described at pag. 199 ÷ 221

GENERAL DESCRIPTION
The load frame is extremely strong and oversized to grant high rigidity and stability.
The upper head holds the precision lapped ball-seating and the compression platen.
Compression platens are surface hardened over 55 HRC and ground.
Design emphasis has been placed on simplicity both of construction and operation so that our machines are rugged, easy to use and maintain, and designed for heavy continue use.
They are designed to conform to International Specifications as: EN, ASTM, AASHTO, BS, NF, DIN, UNI, UNE.
They are available in 1300 kN, 1500 kN, 2000 kN, 3000 kN, 4000 kN, 5000 kN capacity, both hand-operated and motorized, at one or two gauges, with electronic digital display measuring system, and with automatic servocontrolled console with microprocessor.
The different versions give the possibility to test cubes, cylinders, blocks. All the machines can be equipped with safety guards.

Hydraulic system

Piston has large diameter: this allows the hydraulic circuit to work at low pressure with 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 utilized.
Motorized models foresee a dial device to visualize, pre-select and control the flow allowing an uniform load rate as requested by the Standards.
A fast approach ram action device is foreseen to avoid dead times during the stroke of the ram.
Power pump is multipiston, assuring continuity of delivery.
A movement indicator visualizes instant by instant the piston's 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 damaging the packing set.

LOAD MEASUREMENT SYSTEMS

A) GAUGES

The gauges are Bourdon tube type. They are foreseen of 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, visualisation and processing of the test data, with software and printout of results and certificate.
Resolution up to 500.000 divisions.
TOUCH-SCREEN COLOUR display, same to PC.
Technical details: see mod. C109N, pag. 158

B) C109N

BB) DIGITEC, TWO analog channels system, for the acquisition, visualisation and processing of the test data with software (accessory) and printout of results and certificate.
Technical details: see mod: C108N, pag. 155

BB) C108N

C) SERVO-PLUS Evolution, automatic servocontrolled system, to provide fully automatic tests throughout all phases, with the support of the Cyber-Plus Evolution electronic technology.
Technical details: see mod: C104N, pag. 158

C) C104N
+ C104-04

CC) AUTOTEC, automatic servocontrolled system, to provide fully automatic tests throughout all phases, with the support of the Digitec electronic technology
Technical details: see mod. C098N, pag. 155

CC) C098N

Calibration and precision

All the testing machines are calibrated with high accuracy electronic instruments and they are guaranted in CLASS "1"
(max. error ≤ than ± 1%). Also starting from 1% of the full range.
A Calibration Certificate is supplied along with the machine.

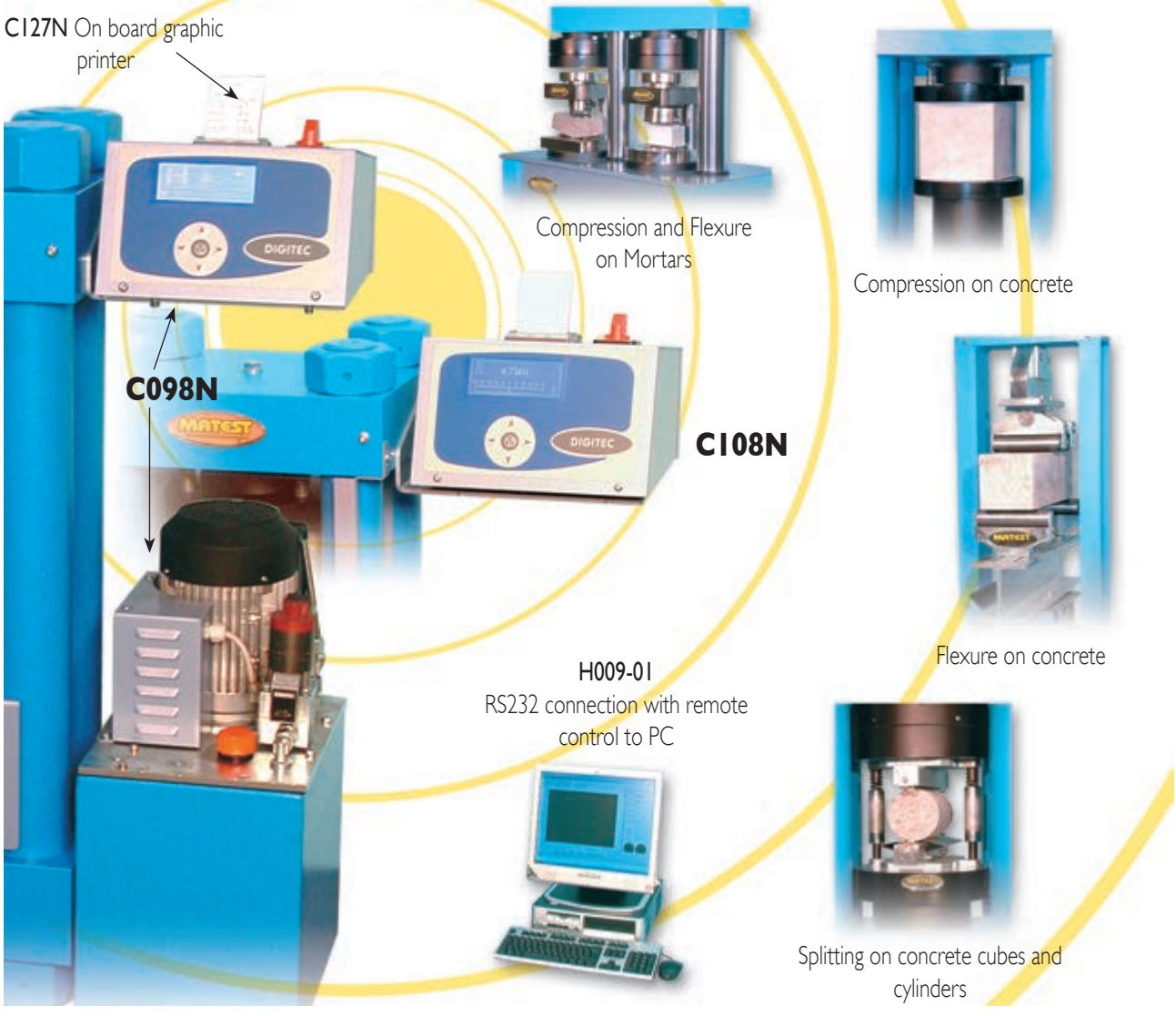
C108N DIGITEC
C098N AUTOTEC

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.

TO UPGRADE OR COMPLETE YOUR CONCRETE OR MORTAR COMPRESSION AND FLEXURE TESTING MACHINE (also from other manufacturers).

The system can manage and process the data in compliance with EN 12390 Specification and the different International Standards, for the following tests:

- Compression on concrete
- Flexure on concrete
- Splitting on concrete cubes and cylinders
- Compression and flexure on mortar
- C127N On board graphic printer
- RS232 connection with remote control to PC



Specifications Digitec / Autotec:

- **2 analogue-digital channels** connectable to two different compression/flexure frames.
- Simple and immediate set up of the parameters and test execution, menu driven. The use does not require specialised staff.
- 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: 0,5%** starting from 10% of maximum value, on request from 1% of maximum value.

Test setup

Test execution with pace rate controller

Technical structure

- 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, transducers or load cells at 2mV/V
- Automatic linearity guided algorithm with very high granted accuracy (Class 0,5)
- 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 personalisation for special sized samples.
- RS232 interface: it allows transferring the data during the test or the test results directly to PC (via Microsoft Hyperterminal) or the remote control of the system by 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.

Max load alarm setting

Channel configuration/calibration

Functions icons (test selection, file, alarms visualisation)

MODELS:

C108N

Digitec

2 Channels unit for data acquisition and elaboration, as described.
Power supply: 230V 1ph 50/60Hz
Dimensions: 230x145x240mm
Weight: 4 kg

C127N

C108N

ACCESSORIES:

C127N On board graphic printer on thermo-paper

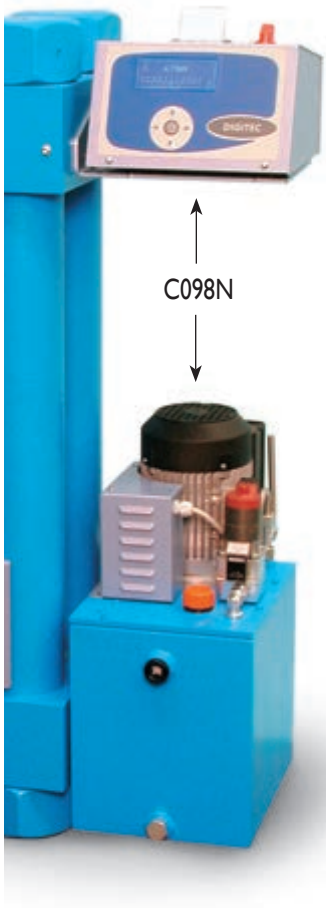
C127-11 Spare roll of thermo-paper for printer

Software
For the remote execution of the test and the automatic transfers and filing of the results on a computer

C098N

Autotec

2 Channels servo controlled system for a fully automatic execution of the test.



C098N

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: 420x290x950mm
Weight: 60 kg

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
PERSONAL COMPUTER
Complete with LCD, monitor 17", keyboard, mouse, connection cables. The supply of the PC includes the installation of the purchased software.

H009-01

C098-01N

Autotec for "two frames"

2 Channels servo controlled system, complete with three way hydraulic valve for the option to connect and use up to two testing frames.

C098-01N

C098-01N

PRESSURE TRANSDUCER
Used with both Digitec and Autotec, supplied along with proper connection cable and relative calibration certificate.
Available Models: see pg. 246

C116N

C109N CYBER-PLUS
C104NSERVO-PLUS evolution

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)

The system can manage and process the following tests:

Compression and flexure on cement

Compression on concrete

Tensile on steel

Flexure on concrete

C127N On board graphic printer

C109N

C104N

(C104-04)

Splitting test on concrete cubes and cylinders

INTERNET support

Connection to the internet for remote online assistance.

C128 USB laser printer for graphs and certificates

H009-01
PC connection. Remote control from PC.

Main Features:

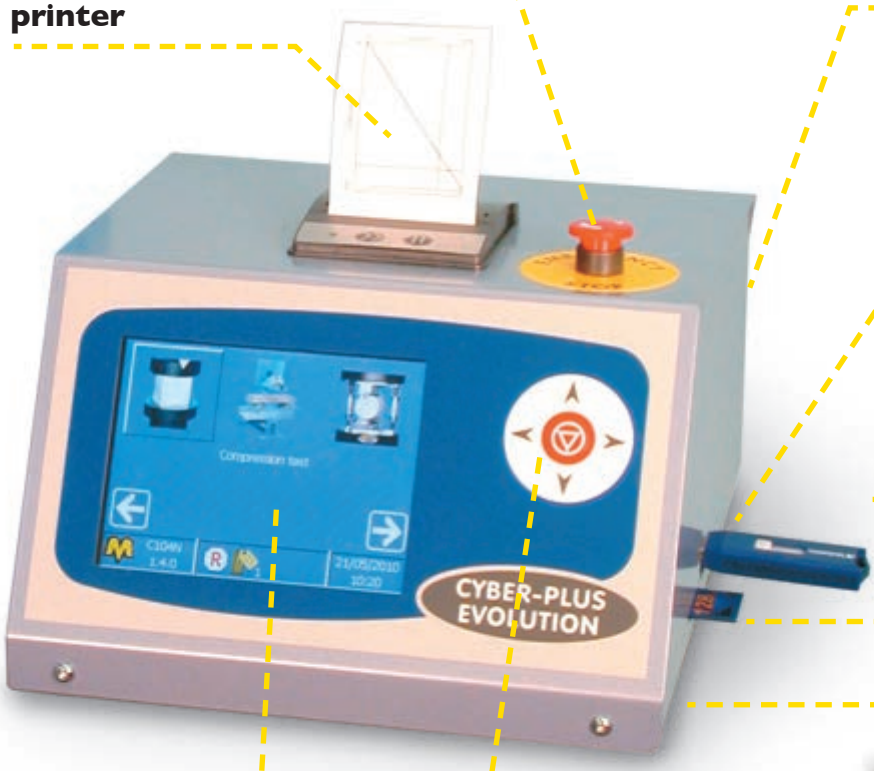
The control unit Cyber/Servo-Plus Evolution runs like a standard PC based on Windows operating system.

The touch-screen graphical icon interface allows easy set up of the parameters and immediate execution of the test.
High resolution color display, ¼ VGA, offers all the functions of a PC for the management and analysis of the data, test results, and graphs.

Safety cut out switch

8 analog inputs for connecting up to 8 load cells and transducers

Graphic on board printer



2 USB-Host ports

SD card slot (unlimited memory)

THE UNIT CAN BE OPERATED BY UTILIZING:

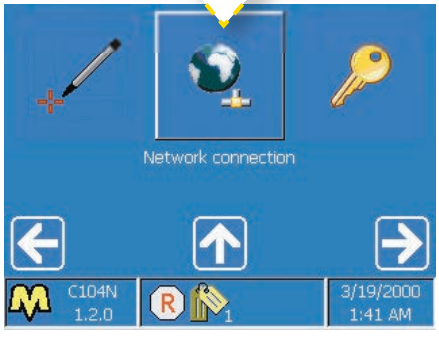
Touch-Screen display like a normal PC, ¼ VGA

Directional arrow-keys large enough for gloved or ungloved use

Connection of a key-board or mouse like a regular PC

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 a diagnostic analysis of a potential problem, the ability to execute the test from distance, and to provide updates of the software.
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

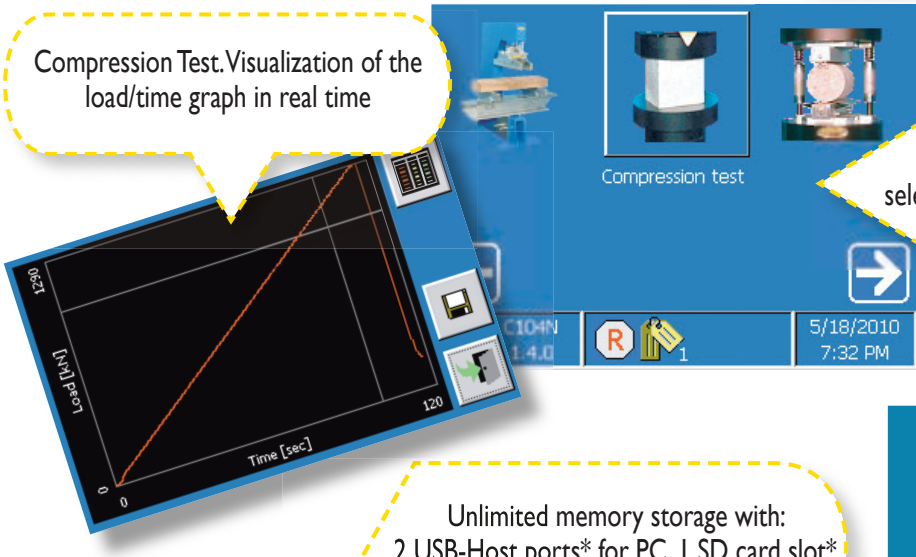
... follows...

Qwerty Touch-Screen virtual alpha-numerical keyboard, user-friendly

Traditional directional key pad with 5 arrow-keys for standard use or when wearing gloves

International settings and unlimited language selection

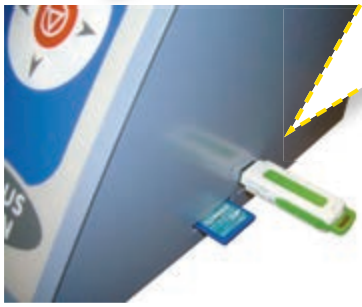
Compression Test. Visualization of the load/time graph in real time

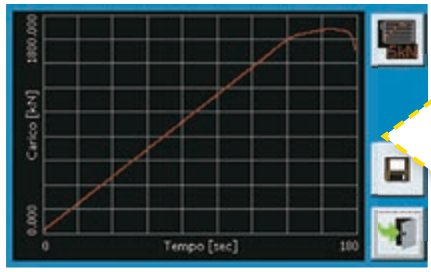


Easy and straightforward selection of the tests (compression)

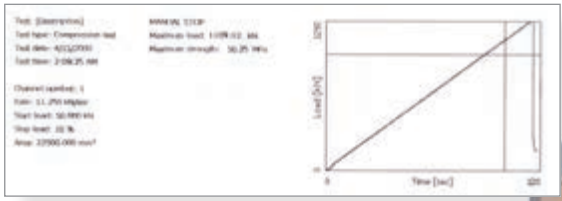
Selection examples, Elastic Modulus

Unlimited memory storage with: 2 USB-Host ports* for PC, 1 SD card slot* (*memory hardware not included)



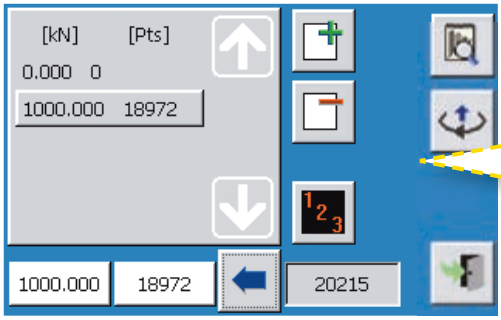


Automatic pace rate up to failure to avoid specimen's crumbling according to ASTM C39 Specification.

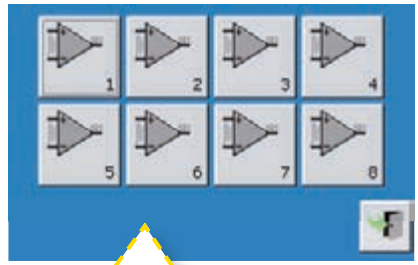


On board graphic printer

Laser printer for graphs and certificates with direct connection via USB.

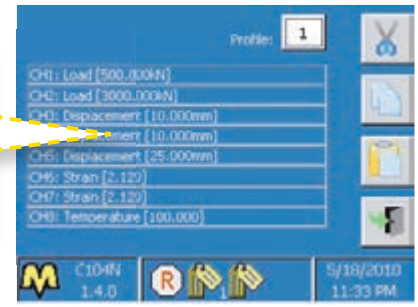


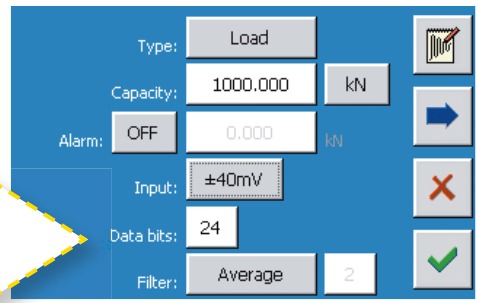
Calibration menu of a load channel. Easy set up of the calibration channel



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



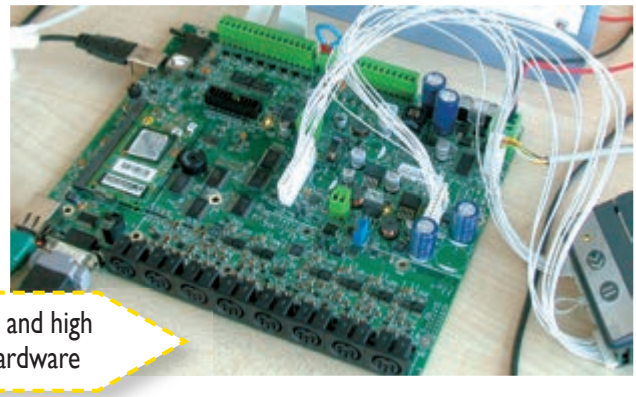


Configuration menu of a load channel. Rapid channel configuration

Direct LAN connection to the internet. Ethernet connection 100Mbit, for connecting the unit to the network

RS232 for PC connection only upon customer request

(312 MHz Processor upgradable to 806 MHz 32Bit



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 visualization (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 update 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:
UNI EN, ASTM, BS, NF, UNE, DIN etc.

... follows...

MODELS:

C109N

Cyber-Plus Evolution

8 channel unit for data acquisition and elaboration.
Power Supply: 230V 1F 50/60Hz 70W
Dimensions: 245x55x260mm
Weight: 5kg

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

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: 420x290x1120mm
Weight: 60 kg

C104N + C104-04

ACCESSORIES:

C104-04

CONSOLE HOUSING THE SERVO-PLUS EVOLUTION
The pump assembly and the digital system are encased to enhance the design and look of the machine.

C104-09

NEW

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.

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 for the automatic transfers and filing of the results on a computer

C109-10N Software for COMPRESSION test on Concrete

C109-11N Software for FLEXURAL test on Concrete

C109-12N Software for SPLTTING TEST on Concrete specimens

E163N Software for COMPRESSION test on Mortars

E164N Software for FLEXURAL test on Mortars

C123N Software "Servonet" for all the tests listed above. Suitable to be used only with the Servo-Plus Evolution system.

C104-05
ONLINE REMOTE ASSISTANCE PACKAGE
The machine features a connection to the Internet through which the Matest Customer Service team can provide real time support to analyze any potential problem, find a possible solution, and carry out a proper execution of the test.

H009-01
PERSONAL COMPUTER
Complete with LCD, monitor 17", keyboard, mouse, connection cables. The supply of the PC includes the installation of the purchased software.

H009-01

C128
Desk laser printer for graphs and certificates with direct USB connection.

C128

PRESSURE TRANSDUCER
Used with both Cyber-Plus and Servo-Plus, supplied along with proper connection cable and relative calibration certificate.
Available Models: see pg. 246

C116N

SERVO-STRAIN

SOFTWARE-FIRMWARE for the automatic servocontrolled management of the testing machine to measure:

- LOAD OR STRENGTH
- DISPLACEMENT
- STRAIN

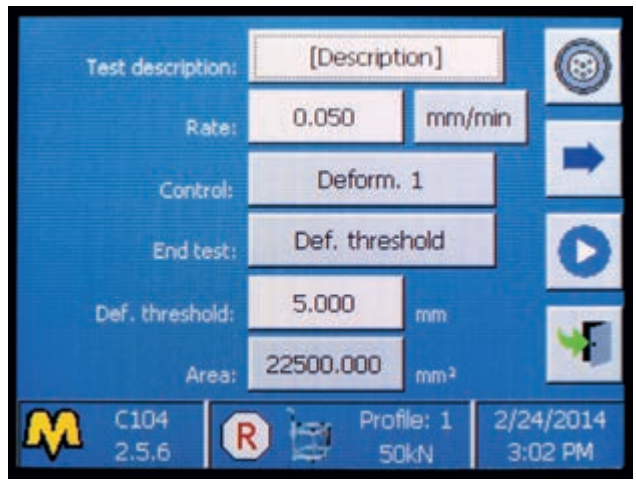
The **"servo-strain"** software/firmware can be applied **"ONLY"** to Matest **"servo-plus evolution"** testing machines.

The system is connected to displacement or strain transducers allowing to automatically perform the following tests:

- Deflection on fiber reinforced concrete beams (ASTM C1018 / EN 11039-03, 14487-1, 14488-1, 14651-05)
- Punching of sprayed concrete plate with measurement of the absorbed energy (EN 10834, 14488-3, 14488-05)
- Deformation and ductility on building materials.
- Lightweight Aggregates for concrete, mortar and grout (EN 13055-1 method 1) by using the suitable device mod. A081-01 described at pag. 44
- 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.

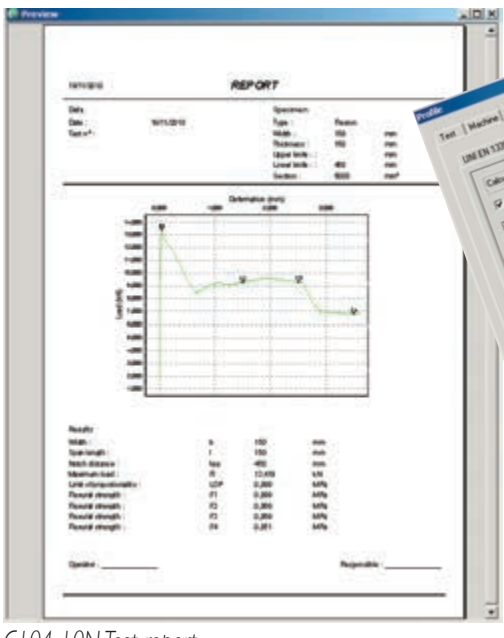


C104-10N Set up of customized compression test

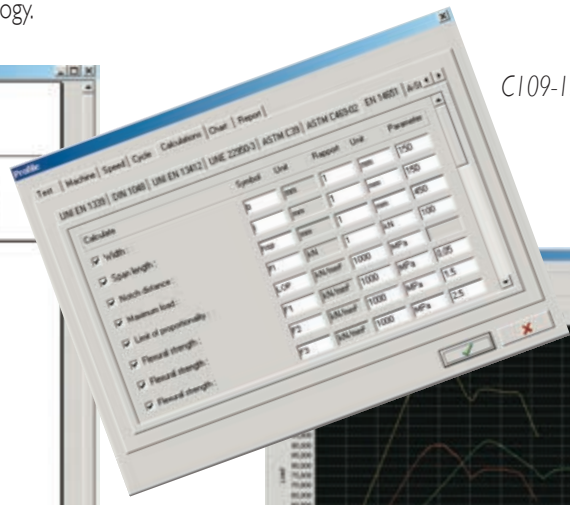
C104-10N Exemple of test result

Technical features:
See **"servo-plus evolution"** mod. C104N (pag. 158), and in addition:

- Real time Graphical/Numerical visualization of all the 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.

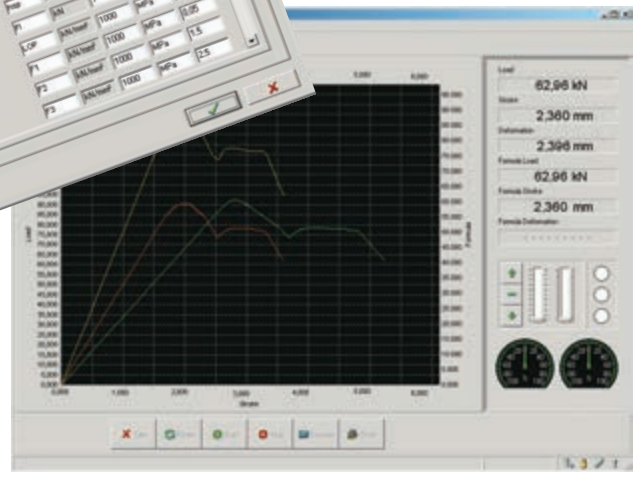


C104-10N Test report



C109-15N Calculation set up

C104-10N Test graph



SERVO-STRAIN AVAILABLE APPLICATIONS:

C104-10N

Strain, Ductility, Post-breaking behaviour
Lightweight aggregates for concrete (EN 13055-1)

Compression tests on concrete specimens, fiber reinforced concrete (FRC), concrete reinforced with polymer fiber lining (FRP), building materials, and for research and experimental tests in order to evaluate the behavior of a specimen subjected to compression stress.

With 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.

NEEDED ACCESSORIES:
S336-11
LINEAR DISPLACEMENT TRANSDUCER, strain gage technology, 10 mm travel, to permit a control between 0,03 mm/min and 2 mm/min

AS ALTERNATIVE:

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 page 453

With all the other **"Servo-Plus Evolution"** machines:

C104-31 HOLDER for displacement transducer.

NEEDED ACCESSORY:
S336-14
LINEAR DISPLACEMENT TRANSDUCER, strain gage technology, 50 mm travel.
Other models of linear displacement transducers listed at page 453

C089-10N + C104-10N

S336-14
C104-31SP

S336-14 + C104-31

C109-15N

Deflection measurement on fiber reinforced concrete beams 100x100x400(500) mm and 150x150x500(600) mm. Standards: EN 11039-03, 14487-1, 14488-1, 14651-05 / ASTM C1018

It is used with a flexural frame machine with Servo-Plus Evolution (to be selected among the models C090-07N, C091-03N) with the addition of the specific equipment required to perform the test, that is described and illustrated in detail at pag. 232

Punching test on sprayed concrete specimens with measurements of the energy absorption. Standards: EN 10834, 14488-3, 14488-05

It is used with the flexural frame machine with Servotronic model C090-07N, with the addition of the specific equipment required to perform the test, that is described and illustrated in detail at pag. 233

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
Set up of deflection

C109-15N
Test result

UTM II
File Edit View Options Help
Deformation
Load
Stroke
Deformation
SERVO PLUS
evolution
SERVO STRAIN
Deformazione
Tempo
Serie :
Carico - Corsa
Formula - Corsa
Puntatori :
Soglie :

COMPRESSION TESTING MACHINES, FOUR COLUMNS PRESTRESSED FRAME FOR PRODUCTION ROUTINE TESTS

(Models described at pag. 168 ÷ 197)

STANDARDS: ASTM C39 / BS 1610 / NF P18-411 / UNE 83304 / AASHTO T22 / UNI 6686 part 1 and 2

Technical features:

- Compression platens are 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 is foreseen of oil level and oil discharge.
- Dial speed selector to visualize, pre-select and control the oil flow.
- Power pump is multipiston assuring continuity of delivery.
- Fast approach ram device to avoid dead times.
- Ball seating is accurately machined.

Available in the following 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 **"CYBERTRONIC"** graphic display units, **"AUTOTEC"** or **"SERVO-PLUS EVOLUTION"** servo-controlled automatic systems.

COMPRESSION TESTING MACHINE 1300 kN CAPACITY

To test cylinders up to dia. 160x320 mm and cubes up to 150 mm side

STANDARDS: ASTM C39 / AASHTO T22 / UNI 6686 part 1 and 2
NF P18-411 / BS 1610 / UNE 83304

TECHNICAL SPECIFICATIONS:

- Max. vertical daylight: 336 mm
- Compression platens dia. 216 mm
- Gauges dia. 250 mm with specific resistance scales for cubes 150 mm and cylinders dia. 150 - 160 mm
- Gauges divisions: 1300 kN div. 4 kN - 600 kN div. 2 kN
- Hydraulic device to stop the piston's stroke at its max excursion to avoid pumping the piston out of the cylinder.
- Calibration accuracy: Grade 1.0
- Max. ram travel 55 mm approx.
- Power supply (motorized models): 230 V 1 ph 50 Hz 750 W
- Dimensions: 630x350x1260 mm
- Weight: 540÷580 kg

C020 + C111 + C126

C022 + C111

C024D + C127N + C121

C025A + C127N +C121

COMPRESSION 1300 kN capacity

Model	Hand Operated	Motorized	LOAD MEASURIG SYSTEM 1 Gauge	2 Gauge	Digitec mod. C108N (pag. 155)	Autotec mod. C098N (pag. 155)
C020	•		•			
C021	•			•		
C022		•	•			
C023		•		•		
C024 D		•			•	
C025 A		•				•

ACCESSORIES FOR 1300 kN MACHINES:

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)

C109-10 SOFTWARE for compression tests with Digitec machine. See pag. 14

C123 SOFTWARE "servonet" for remote control through PC of Autotec machine. See pag. 14

C119 FRAGMENT GUARDS, to CE Directive. See pag. 244
C121 SAFETY GUARDS, polycarbonate, with hinges and lock, to CE Directive. See pag. 244
C121-51 STOP SWITCH on safety guard. See pag. 244

C041-11
TESTING CHAMBER with vertical clearance of 376 mm, complete with distance piece 40 mm high, that allows to test cylinders dia. 150x300mm and 160x320mm with "capping retainers" (ASTM C1231)

C107-10 CAPPING RETAINERS (set of two) for cylinders 150mm and 6"
C107-12 CAPPING RETAINERS (set of two) for cylinders Ø 160mm
C107-20 NEOPRENE PADS (set of two) for cylinders Ø 150mm 60 shore A
C107-21 NEOPRENE PADS (set of two) for cylinders Ø 150mm 70 shore A
C107-25 NEOPRENE PADS (set of two) for cylinders Ø 160mm 60 shore A
C107-26 NEOPRENE PADS (set of two) for cylinders Ø 160mm 70 shore A

C107-10

Note: The capping retainers can be used only with the testing chamber having vertical clearance of 376 mm, mod. C041-11
Technical details: see pag. 243

C115-01
TWO WAY HYDRAULIC VALVE, connected to the motorized pumping unit of the machine to activate a second frame.
Technical details: see pag. 245

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. 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 pag. 240
AS AN ALTERNATIVE:

C097-02
DUAL LOW CAPACITY DIGITAL RANGE 0-300kN, complete with "strain gage load cell", only for digital machines.
Technical details: see pag. 240

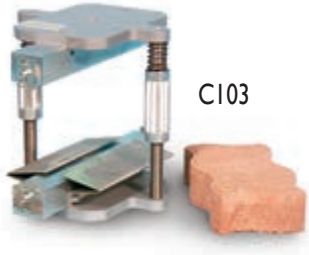
C107
AUTO-CENTERING DEVICE for cubes 100 and 150 mm side, and cylinders dia. 100 and 150 mm. Technical details: see pag. 243

C100
SPLITTING TENSILE test device for cylinders. EN 12390-6 / ASTM C496
Technical details and other models: see pag. 241

C100

C103
SPLITTING TENSILE test device for self blocking pavers and cubes. EN 1338, 12390-6. Technical details: see pag. 241

C109-12
SOFTWARE for splitting tensile tests with digital machines.
Technical details. See pag. 14


C103

C106
FLEXURAL TEST DEVICE for concrete beams.
EN 12390-5 / ASTM C78, C293 / AASHTO T97 / BS1881:118
NF P18-407 / UNI 6133.
Technical details: see pag. 242

C106

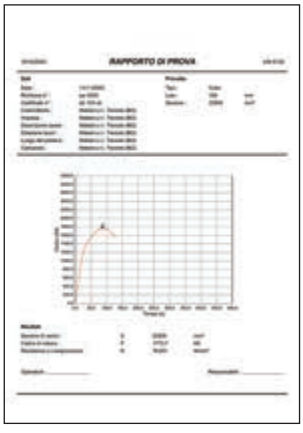
C109-11
SOFTWARE for flexural tests on concrete beams with digital machines. Technical details: see pag. 14

E170
COMPRESSION DEVICE to test cement specimens 40,1 x 40 mm.
EN 196 / ASTM C349
Technical details and other models: see pag. 242

E170

C126
BENCH to hold the compression machine.
See pag. 244

C097-01


C109-10 Software Compression

COMPRESSION TESTING MACHINE 1300 kN CAPACITY

To test cylinders up to dia. 160x320 mm and cubes up to 150 mm side

Cyber-Plus or Servo-Plus Evolution Touch Screen Digital System

STANDARDS: ASTM C39 / AASHTO T22 / UNI 6686 part 1 and 2
NF P18-411 / BS 1610 / UNE 83304

TECHNICAL SPECIFICATIONS:

- Max. vertical daylight: 336 mm
- Compression platens dia. 216 mm
- Hydraulic device to stop the piston's stroke at its max excursion to avoid pumping the piston out of the cylinder.
- Calibration accuracy: Grade 1.0
- Max. ram travel 55 mm approx.
- Power supply: 230 V 1 ph 50 Hz 750 W
- Dimensions: 630x350x1260 mm
- Weight: 540÷580 kg

C025N + C127N + C121 + C121-51 + C111 + C126

C024N + C127N + C121

ACCESSORIES:

C104-04

CONSOLE HOUSING THE SERVO-PLUS EVOLUTION

The pump assembly and the digital system are encased to enhance the design and look of the machine.

C104-05

ONLINE REMOTE ASSISTANCE PACKAGE

The machine features a connection to Internet through which Matest Customer Service provides real time support to analyze the problem, to find possible solution, and to carry out a proper test execution.

C025N + C104-04 + C127N + C111-01

COMPRESSION 1300 kN capacity

Model	Motorized	LOAD MEASURIG SYSTEM: Cyber-Plus Evolution mod. C109N (pag. 158)	LOAD MEASURIG SYSTEM: Servo-Plus Evolution mod. C104N (pag. 158)
C024 N	•	•	
C025 N	•		•

ACCESSORIES FOR 1300 kN MACHINES:

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

C127-11 THERMO-PAPER roll for printer (pack of 10 rolls)

C109-10N SOFTWARE for compression tests with Cyber-Plus Evolution machine. See pag. 14

C123N SOFTWARE "servonet" for remote control through PC of Servo-Plus Evolution machine. See pag. 14

C119 FRAGMENT GUARDS, to CE Directive. See pag. 244
C121 SAFETY GUARDS, polycarbonate, with hinges and lock, to CE Directive. See pag. 244
C121-51 STOP SWITCH on safety guard. See pag. 244

C041-11
TESTING CHAMBER with vertical clearance of 376 mm, complete with distance piece 40 mm high, that allows to test cylinders dia. 150x300mm and 160x320mm with "capping retainers" (ASTM C1231)

C107-10 CAPPING RETAINERS (set of two) for cylinders 150mm and 6"
C107-12 CAPPING RETAINERS (set of two) for cylinders Ø 160mm
C107-20 NEOPRENE PADS (set of two) for cylinders Ø 150mm 60 shore A
C107-21 NEOPRENE PADS (set of two) for cylinders Ø 150mm 70 shore A
C107-25 NEOPRENE PADS (set of two) for cylinders Ø 160mm 60 shore A
C107-26 NEOPRENE PADS (set of two) for cylinders Ø 160mm 70 shore A

C107-10

Note: The capping retainers can be used only with the testing chamber having vertical clearance of 376 mm, mod. C041-11
Technical details: see pag. 243

C115-01
TWO WAY HYDRAULIC VALVE, connected to the motorized pumping unit of the machine to activate a second frame.
Technical details: see pag. 245

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 pag. 240
AS AN ALTERNATIVE:

C097-02
DUAL LOW CAPACITY DIGITAL RANGE 0-300kN, complete with "strain gage load cell".
Technical details: see pag. 240

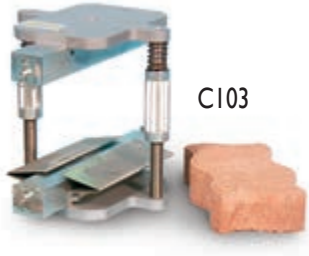
C107
AUTO-CENTERING DEVICE for cubes 100 and 150 mm side, and cylinders dia. 100 and 150 mm. Technical details: see pag. 243

C100
SPLITTING TENSILE test device for cylinders. EN 12390-6 / ASTM C496
Technical details and other models: see pag. 241

C100

C103
SPLITTING TENSILE test device for self blocking pavers and cubes. EN 1338, 12390-6. Technical details: see pag. 241

C109-12N
SOFTWARE for splitting tensile tests.
Technical details. See pag. 14


C103

C106
FLEXURAL TEST DEVICE for concrete beams.
EN 12390-5 / ASTM C78, C293 / AASHTO T97 / BS1881:118 NF P18-407 / UNI 6133.
Technical details: see pag. 242

C106

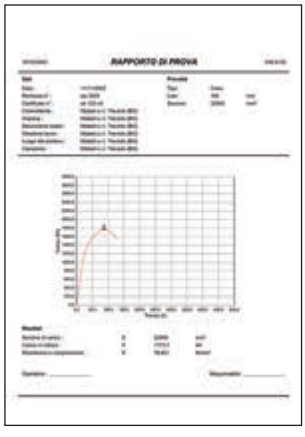
C109-11N
SOFTWARE for flexural tests on concrete beams.
Technical details: see pag. 14

E170
COMPRESSION DEVICE to test cement specimens 40,1 x 40 mm.
EN 196 / ASTM C349
Technical details and other models: see pag. 242

E170

C126
BENCH to hold the compression machine.
See pag. 244

C097-01


C109-10N Software Compression

COMPRESSION TESTING MACHINE 1500 kN CAPACITY

To test cubes up to 150 mm side and cylinders up to dia. 160x320 mm

STANDARDS: ASTM C39 / AASHTO T22 / UNI 6686 part 1 and 2 / NF P18-411 / BS 1610 / UNE 83304

TECHNICAL SPECIFICATIONS:

- Max. vertical daylight: 336 mm
- Compression platens dia. 216 mm
- Gauges dia. 250 mm with specific resistance scales for cubes 150 mm and cylinders dia. 150 and 160 mm
- Gauges divisions: 1500 kN div. 5 kN - 600 kN div. 2 kN
- Hydraulic device to stop the piston's stroke at its max excursion to avoid pumping the piston out of the cylinder.
- Calibration accuracy: Grade 1.0
- Max. ram travel 55 mm approx.
- Power supply (motorized models): 230 V 1 ph 50 Hz 750 W
- Dimensions: 630x350x1260 mm
- Weight: 540÷580 kg

C041A + C127N + C121

C040D + C127N + C121

C038 + C126 + C111

COMPRESSION 1500 kN capacity			LOAD MEASURING SYSTEM			
Model	Hand Operated	Motorized	1 Gauge	2 Gauge	Digitec mod. C108N (pag. 155)	Autotec mod. C098N (pag. 155)
C036	•		•			
C037	•			•		
C038		•	•			
C039		•		•		
C040 D		•			•	
C041 A		•				•

ACCESSORIES FOR 1500 kN MACHINES:

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)

C109-10 SOFTWARE for compression tests with Digitec machine. See pag. 14

C123 SOFTWARE "servonet" for remote control through PC of Autotec machine. See pag. 14

C119 FRAGMENT GUARDS, to CE Directive. See pag. 244
C121 SAFETY GUARDS, polycarbonate, with hinges and lock, to CE Directive. See pag. 244
C121-51 STOP SWITCH on safety guard. See pag. 244

C041-11
TESTING CHAMBER with vertical clearance of 376 mm, complete with distance piece 40 mm high, that allows to test cylinders dia. 150x300mm and 160x320mm with "capping retainers" (ASTM C1231)

C107-10 CAPPING RETAINERS (set of two) for cylinders 150mm and 6"
C107-12 CAPPING RETAINERS (set of two) for cylinders Ø 160mm
C107-20 NEOPRENE PADS (set of two) for cylinders Ø 150mm 60 shore A
C107-21 NEOPRENE PADS (set of two) for cylinders Ø 150mm 70 shore A
C107-25 NEOPRENE PADS (set of two) for cylinders Ø 160mm 60 shore A
C107-26 NEOPRENE PADS (set of two) for cylinders Ø 160mm 70 shore A

C107-10

Note: The capping retainers can be used only with the testing chamber having vertical clearance of 376 mm, mod. C041-11
Technical details: see pag. 243

C115-01
TWO WAY HYDRAULIC VALVE, connected to the motorized pumping unit of the machine to activate a second frame.
Technical details: see pag. 245

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. 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 pag. 240

AS AN ALTERNATIVE:

C097-02
DUAL LOW CAPACITY DIGITAL RANGE 0-300kN, complete with "strain gage load cell", only for digital machines.
Technical details: see pag. 240

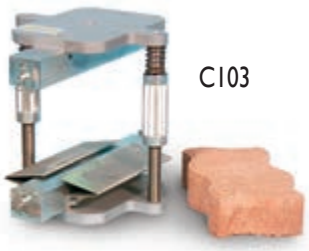
C107
AUTO-CENTERING DEVICE for cubes 100 and 150 mm side, and cylinders dia. 100 and 150 mm. Technical details: see pag. 243

C100
SPLITTING TENSILE test device for cylinders. EN 12390-6 / ASTM C496
Technical details and other models: see pag. 241

C100

C103
SPLITTING TENSILE test device for self blocking pavers and cubes. EN 1338, 12390-6. Technical details: see pag. 241

C109-12
SOFTWARE for splitting tensile tests with digital machines.
Technical details. See pag. 14


C103

C106
FLEXURAL TEST DEVICE for concrete beams.
EN 12390-5 / ASTM C78, C293 / AASHTO T97 / BS1881:118
NF P18-407 / UNI 6133.
Technical details: see pag. 242

C106

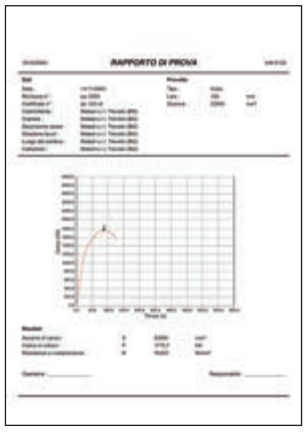
C109-11
SOFTWARE for flexural tests on concrete beams with digital machines. Technical details: see pag. 14

E170
COMPRESSION DEVICE to test cement specimens 40,1 x 40 mm.
EN 196 / ASTM C349
Technical details and other models: see pag. 242

E170

C126
BENCH to hold the compression machine.
See pag. 244

C097-01


C109-10 Software Compression

COMPRESSION TESTING MACHINE 1500 kN CAPACITY

To test cubes up to 150 mm side and cylinders up to dia. 160x320 mm

Cyber-Plus or Servo-Plus Evolution Touch Screen Digital System

STANDARDS: ASTM C39 / AASHTO T22 / UNI 6686 part 1 and 2 / NF P18-411 / BS 1610 / UNE 83304

TECHNICAL SPECIFICATIONS:

- Max. vertical daylight: 336 mm
- Compression platens dia. 216 mm
- Hydraulic device to stop the piston's stroke at its max excursion to avoid pumping the piston out of the cylinder.
- Calibration accuracy: Grade 1.0
- Max. ram travel 55 mm approx.
- Power supply: 230 V 1 ph 50 Hz 750 W
- Dimensions: 630x350x1260 mm
- Weight: 540÷580 kg

C041N + C127N + C121

C041N + C104-04 + C127N + C111

C040N + C127N + C111-01

ACCESSORIES:

C104-04

CONSOLE HOUSING THE SERVO-PLUS EVOLUTION

The pump assembly and the digital system are encased to enhance the design and look of the machine.

C104-05

ONLINE REMOTE ASSISTANCE PACKAGE

The machine features a connection to Internet through which Matest Customer Service provides real time support to analyze the problem, to find possible solution, and to carry out a proper test execution.

COMPRESSION 1500 kN capacity

Model	Motorized	LOAD MEASURIG SYSTEM: Cyber-Plus Evolution mod. C109N (pag. 158)	LOAD MEASURIG SYSTEM: Servo-Plus Evolution mod. C104N (pag. 158)
C040 N	•	•	
C041 N	•		•

ACCESSORIES FOR 1500 kN MACHINES:

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

C127-11 THERMO-PAPER roll for printer (pack of 10 rolls)

C109-10N SOFTWARE for compression tests with Cyber-Plus Evolution machine. See pag. 14

C123N SOFTWARE "servonet" for remote control through PC of Servo-Plus Evolution machine. See pag. 14

C119 FRAGMENT GUARDS, to CE Directive. See pag. 244
C121 SAFETY GUARDS, polycarbonate, with hinges and lock, to CE Directive. See pag. 244
C121-51 STOP SWITCH on safety guard. See pag. 244

C041-11
TESTING CHAMBER with vertical clearance of 376 mm, complete with distance piece 40 mm high, that allows to test cylinders dia. 150x300mm and 160x320mm with "capping retainers" (ASTM C1231)

C107-10 CAPPING RETAINERS (set of two) for cylinders 150mm and 6"
C107-12 CAPPING RETAINERS (set of two) for cylinders Ø 160mm
C107-20 NEOPRENE PADS (set of two) for cylinders Ø 150mm 60 shore A
C107-21 NEOPRENE PADS (set of two) for cylinders Ø 150mm 70 shore A
C107-25 NEOPRENE PADS (set of two) for cylinders Ø 160mm 60 shore A
C107-26 NEOPRENE PADS (set of two) for cylinders Ø 160mm 70 shore A

C107-10

Note: The capping retainers can be used only with the testing chamber having vertical clearance of 376 mm, mod. C041-11
Technical details: see pag. 243

C115-01
TWO WAY HYDRAULIC VALVE, connected to the motorized pumping unit of the machine to activate a second frame.
Technical details: see pag. 245

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 pag. 240

AS AN ALTERNATIVE:

C097-02
DUAL LOW CAPACITY DIGITAL RANGE 0-300kN, complete with "strain gage load cell". Technical details: see pag. 240

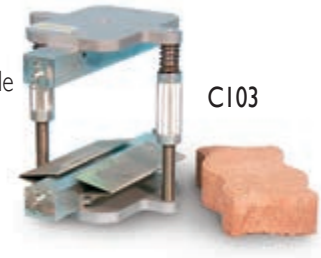
C107
AUTO-CENTERING DEVICE for cubes 100 and 150 mm side, and cylinders dia. 100 and 150 mm. Technical details: see pag. 243

C100
SPLITTING TENSILE test device for cylinders. EN 12390-6 / ASTM C496
Technical details and other models: see pag. 241

C100

C103
SPLITTING TENSILE test device for self blocking pavers and cubes. EN 1338, 12390-6. Technical details: see pag. 241

C109-12N
SOFTWARE for splitting tensile tests.
Technical details. See pag. 14


C103

C106
FLEXURAL TEST DEVICE for concrete beams.
EN 12390-5 / ASTM C78, C293 / AASHTO T97 / BS1881:118
NF P18-407 / UNI 6133.
Technical details: see pag. 242

C106

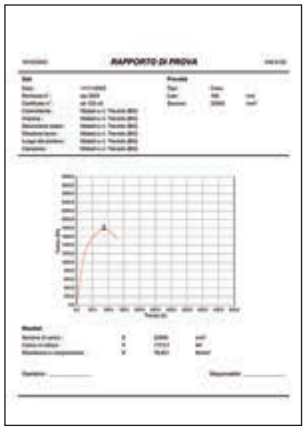
C109-11N
SOFTWARE for flexural tests on concrete beams.
Technical details: see pag. 14

E170
COMPRESSION DEVICE to test cement specimens 40,1 x 40 mm.
EN 196 / ASTM C349
Technical details and other models: see pag. 242

E170

C126
BENCH to hold the compression machine.
See pag. 244

C097-01


C109-10N Software Compression

COMPRESSION TESTING MACHINE 2000 kN CAPACITY

To test cubes up to 150 mm side and cylinders up to dia. 160x320 mm

STANDARDS: ASTM C39 / AASHTO T22 / UNI 6686 part 1 and 2 / NF P18-411 / BS 1610 / UNE 83304

TECHNICAL SPECIFICATIONS:

- Max. vertical daylight: 336 mm
- Compression platens dia. 216 mm
- Gauges dia. 250 mm with specific resistance scales for cubes 150 mm and cylinders dia. 150 and 160 mm
- Gauges divisions: 2000 kN div. 5 kN - 600 kN div. 2 kN
- Hydraulic device to stop the piston's stroke at its max excursion to avoid pumping the piston out of the cylinder.
- Calibration accuracy: Grade 1.0
- Max. ram travel 55 mm approx.
- Power supply (motor models): 230 V 1 ph 50 Hz 750 W
- Dimensions: 690x400x1320 mm
- Weight: 650÷700 kg

C055D + C127N + C111

C056A + C127N - C111

C053 + C119-03

COMPRESSION 2000 kN capacity

Model	Hand Operated	Motorized	LOAD MEASURING SYSTEM 1 Gauge	2 Gauge	Digitec mod. C108N (pag. 155)	Autotec mod. C098N (pag. 155)
C051	•		•			
C052	•			•		
C053		•	•			
C054		•		•		
C055 D		•			•	
C056 A		•				•

ACCESSORIES FOR 2000 kN MACHINES:

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 mm 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 dia. 160x320 mm do not require any distance piece.

C112-10 UPPER+LOWER LARGE COMPRESSION PLATENS 245x510x55 mm WITH SEAT BALL to test "also" blocks and cubes 200 mm side

C127N GRAPHIC PRINTER on thermo-paper on board for digital models
C127-11 THERMO-PAPER roll for printer (pack of 10 rolls)

C109-10 SOFTWARE for compression tests with Digitec machine. See pag. 14

C123 SOFTWARE "servonet" for remote control through PC of Autotec machine. See pag. 14

C119-03 FRAGMENT GUARDS, to CE Directive. See pag. 244
C121-05 SAFETY GUARDS, polycarbonate, with hinges and lock, to CE Directive. See pag. 244
C121-51 STOP SWITCH on safety guard. See pag. 244

C056-11
TESTING CHAMBER with vertical clearance of 376 mm, complete with distance piece 40 mm high, that allows to test cylinders dia. 150x300mm and 160x320mm with "capping retainers" (ASTM C1231)

C107-10 CAPPING RETAINERS (set of two) for cylinders 150mm and 6"
C107-12 CAPPING RETAINERS (set of two) for cylinders Ø 160mm
C107-20 NEOPRENE PADS (set of two) for cylinders Ø 150mm 60 shore A
C107-25 NEOPRENE PADS (set of two) for cylinders Ø 160mm 60 shore A

C107-10

Note: The capping retainers can be used only with the testing chamber having vertical clearance of 376 mm, mod. C056-11
Technical details: see pag. 243

C115-01
TWO WAY HYDRAULIC VALVE, connected to the motorized pumping unit of the machine to activate a second frame.
Technical details: see pag. 245

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. 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 pag. 240

AS AN ALTERNATIVE:

C097-02
DUAL LOW CAPACITY DIGITAL RANGE 0-300kN, complete with "strain gage load cell", only for digital machines.
Technical details: see pag. 240

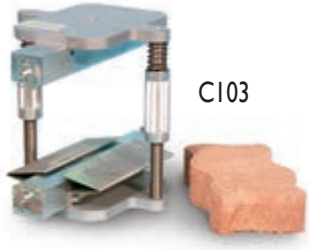
C107
AUTO-CENTERING DEVICE for cubes 100 and 150 mm side and cylinders dia. 100 and 150 mm. Technical details: see pag. 243

C100

C100
SPLITTING TENSILE test device for cylinders. EN 12390-6 / ASTM C496
Technical details and other models: see pag. 241

C103
SPLITTING TENSILE test device for self blocking pavers and cubes. EN 1338, 12390-6. Technical details: see pag. 241

C109-12
SOFTWARE for splitting tensile tests with digital machines.
Technical details: see pag. 14


C103

C106
FLEXURAL TEST DEVICE for concrete beams. EN 12390-5 / ASTM C78, C293 / AASHTO T97 / BS 1881:118 / NF P18-407 / UNI 6133
Technical details: see pag. 242

C106

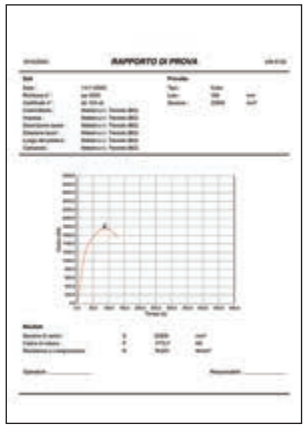
C109-11
SOFTWARE for flexural tests on concrete beams with digital machines. Technical details: see pag. 14

E170
COMPRESSION DEVICE to test cement specimens 40,1 x 40 mm. EN 196 / ASTM C349. Technical details and other models: see pag. 242

E170

C126
BENCH to hold the compression machine.
See pag. 244

C097-01


C109-10 Software Compression

COMPRESSION TESTING MACHINE 2000 kN CAPACITY

To test cubes up to 150 mm side and cylinders up to dia. 160x320 mm

Cyber-Plus or Servo-Plus Evolution Touch Screen Digital System

STANDARDS: ASTM C39 / AASHTO T22 / UNI 6686 part 1 and 2 / NF P18-411 / BS 1610 / UNE 83304

TECHNICAL SPECIFICATIONS:

- Max. vertical daylight: 336 mm
- Compression platens dia. 216 mm
- Hydraulic device to stop the piston's stroke at its max excursion to avoid pumping the piston out of the cylinder.
- Calibration accuracy: Grade 1.0
- Max. ram travel 55 mm approx.
- Power supply: 230 V 1 ph 50 Hz 750 W
- Dimensions: 690x400x1320 mm
- Weight: 650÷700 kg

C104-04

C056N + C127N + C121-05

C055N + C127N

C056N + C127N + C111

ACCESSORIES:

C104-04

CONSOLE HOUSING THE SERVO-PLUS EVOLUTION

The pump assembly and the digital system are encased to enhance the design and look of the machine.

C104-05

ONLINE REMOTE ASSISTANCE PACKAGE

The machine features a connection to Internet through which Matest Customer Service provides real time support to analyze the problem, to find possible solution, and to carry out a proper test execution.

COMPRESSION 2000 kN capacity

Model	Motorized	LOAD MEASURIG SYSTEM: Cyber-Plus Evolution mod. C109N (pag. 158)	LOAD MEASURIG SYSTEM: Servo-Plus Evolution mod. C104N (pag. 158)
C055 N	•	•	
C056 N	•		•

ACCESSORIES FOR 2000 kN MACHINES:

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 mm 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 dia. 160x320 mm do not require any distance piece.

C112-10 UPPER+LOWER LARGE COMPRESSION PLATENS 245x510x55 mm WITH SEAT BALL to test "also" blocks and cubes 200 mm side

C127N GRAPHIC PRINTER on thermo-paper on board

C127-11 THERMO-PAPER roll for printer (pack of 10 rolls)

C109-10N SOFTWARE for compression tests with Cyber-Plus Evolution machine. See pag. 14

C123N SOFTWARE "servonet" for remote control through PC of Servo-Plus Evolution machine. See pag. 14

C119-03 FRAGMENT GUARDS, to CE Directive. See pag. 244
C121-05 SAFETY GUARDS, polycarbonate, with hinges and lock, to CE Directive. See pag. 244
C121-51 STOP SWITCH on safety guard. See pag. 244

C056-11
TESTING CHAMBER with vertical clearance of 376 mm, complete with distance piece 40 mm high, that allows to test cylinders dia. 150x300mm and 160x320mm with "capping retainers" (ASTM C1231)

C107-10 CAPPING RETAINERS (set of two) for cylinders 150mm and 6"
C107-12 CAPPING RETAINERS (set of two) for cylinders Ø 160mm
C107-20 NEOPRENE PADS (set of two) for cylinders Ø 150mm 60 shore A
C107-25 NEOPRENE PADS (set of two) for cylinders Ø 160mm 60 shore A

C107-10

Note: The capping retainers can be used only with the testing chamber having vertical clearance of 376 mm, mod. C056-11
Technical details: see pag. 243

C115-01
TWO WAY HYDRAULIC VALVE, connected to the motorized pumping unit of the machine to activate a second frame.
Technical details: see pag. 245

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 pag. 240

AS AN ALTERNATIVE:

C097-02
DUAL LOW CAPACITY DIGITAL RANGE 0-300kN, complete with "strain gage load cell".
Technical details: see pag. 240

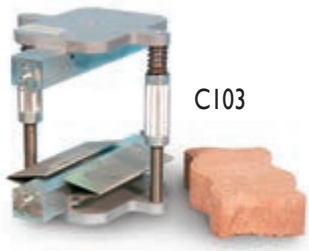
C107
AUTO-CENTERING DEVICE for cubes 100 and 150 mm side and cylinders dia. 100 and 150 mm. Technical details: see pag. 243

C100

C100
SPLITTING TENSILE test device for cylinders. EN 12390-6 / ASTM C496
Technical details and other models: see pag. 241

C103
SPLITTING TENSILE test device for self blocking pavers and cubes. EN 1338, 12390-6. Technical details: see pag. 241

C109-12N
SOFTWARE for splitting tensile tests.
Technical details: see pag. 14


C103

C106
FLEXURAL TEST DEVICE for concrete beams. EN 12390-5 / ASTM C78, C293 / AASHTO T97 / BS 1881:118 / NF P18-407 / UNI 6133
Technical details: see pag. 242

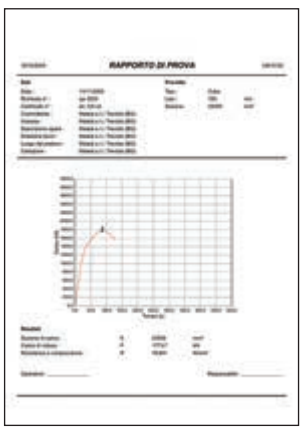
C106

C109-11N
SOFTWARE for flexural tests on concrete beams.
Technical details: see pag. 14

E170
COMPRESSION DEVICE to test cement specimens 40,1 x 40 mm. EN 196 / ASTM C349. Technical details and other models: see pag. 242

E170

C126
BENCH to hold the compression machine.
See pag. 244



C097-01

C109-10N Software Compression

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 / UNI 6686 part 1 and 2 / NF P18-411 / BS 1610
UNE 83304

TECHNICAL SPECIFICATIONS:

- Max. vertical daylight: 282 mm
- Compression platens dia. 287 mm
- Gauges dia. 250 mm with specific resistance scales for cubes 150 mm and cylinders dia. 150 and 160 mm
- Gauges divisions: 2000 kN div. 5 kN - 600 kN div. 2 kN
- Hydraulic device to stop the piston's stroke at its max excursion to avoid pumping the piston out of the cylinder.
- Calibration accuracy: Grade 1.0
- Max. ram travel 55 mm approx.
- Power supply (motor models): 230 V 1 ph 50 Hz 750 W
- Dimensions: 690x400x1320 mm
- Weight: 670÷720 kg

C058-05A + C127N + C111-26

C058-04D + C127N + C111-26

C058-03 + C126

COMPRESSION 2000 kN capacity

Model	Hand Operated	Motorized	LOAD MEASURING SYSTEM: 1 Gauge	2 Gauge	Digitec mod. C108N (pag. 155)	Autotec mod. C098N (pag. 155)
C058	•		•			
C058-01	•			•		
C058-02		•	•			
C058-03		•		•		
C058-04 D		•			•	
C058-05 A		•				•

ACCESSORIES FOR 2000 kN MACHINES:

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

C110-20

C110-20 LOWER COMPRESSION PLATEN, hardened over 55 HRC, Ø 165x50 mm to test cubes 100 mm side (as an alternative to the distance piece 50 mm high)

Note: Cylinders having Ø 160 x 320 mm do not require any distance piece.

C112-10 UPPER+LOWER LARGE COMPRESSION PLATENS 245x510x55 mm 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)

C109-10 SOFTWARE for compression tests with Digitec machine. See pag. 14

C123 SOFTWARE "servonet" for remote control through PC of Autotec machine. See pag. 14

C119-03 FRAGMENT GUARDS, to CE Directive. See pag. 244

C121-05 SAFETY GUARDS, polycarbonate, with hinges and lock, to CE Directive. See pag. 244

C121-51
STOP SWITCH on safety guard.
See pag. 244

C115-01
TWO WAY HYDRAULIC VALVE, connected to the motorized pumping unit of the machine to activate a second frame.
Technical details: see pag. 245

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 pag. 240

C097-01

AS AN ALTERNATIVE:

C097-02
DUAL LOW CAPACITY DIGITAL RANGE 0-300kN, complete with "strain gage load cell", only for digital machines.
Technical details: see pag. 240

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. Applicable only on digital machines.

C107-01
AUTO-CENTERING DEVICE for cubes 100 and 150 mm side and cylinders dia. 100 mm
Technical details: see pag. 243

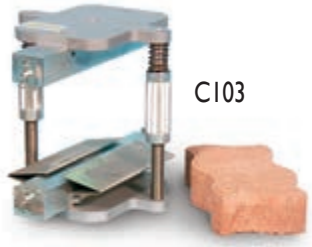
C107-01

C100
SPLITTING TENSILE test device for cylinders. EN 12390-6 / ASTM C496
Technical details and other models: see pag. 241

C100

C103
SPLITTING TENSILE test device for self blocking pavers and cubes. EN 1338, 12390-6
Technical details: see pag. 241

C109-12
SOFTWARE for splitting tensile tests with digital machines.
Technical details: see pag. 14


C103

C106
FLEXURAL TEST DEVICE for concrete beams. EN 12390-5 / ASTM C78, C293 / AASHTO T97 / BS 1881:118 / NF P18-407 / UNI 6133
Technical details: see pag. 242

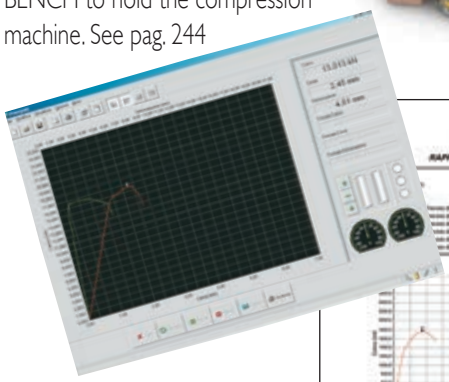
C109-11
SOFTWARE for flexural tests on concrete beams with digital machines.
Technical details: see pag. 14

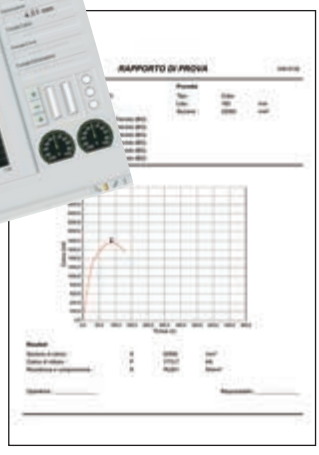
C106

E170
COMPRESSION DEVICE to test cement specimens 40,1 x 40 mm. EN 196 / ASTM C349
Technical details and other models: see pag. 242

C126
BENCH to hold the compression machine. See pag. 244

E170


C123
Software "servonet"


C109-10 Software Compression

COMPRESSION TESTING MACHINE 2000 kN CAPACITY

To test cubes up to 200 mm side and cylinders up to 280 mm height

Cyber-Plus or Servo-Plus Evolution Touch Screen Digital System

STANDARDS: ASTM C39 / AASHTO T22 / UNI 6686 part 1 and 2 / NF P18-411 / BS 1610 / UNE 83304

TECHNICAL SPECIFICATIONS:

- Max. vertical daylight: 282 mm
- Compression platens dia. 287 mm
- Hydraulic device to stop the piston's stroke at its max excursion to avoid pumping the piston out of the cylinder.
- Calibration accuracy: Grade 1.0
- Max. ram travel 55 mm approx.
- Power supply : 230 V 1 ph 50 Hz 750 W
- Dimensions: 690x400x1320 mm
- Weight: 670÷720 kg

C058-05N + C104-04 + C127N + C111-26

C058-04N + C127N + C111-26

C058-05N + C127N

ACCESSORIES:

C104-04

CONSOLE HOUSING THE SERVO-PLUS EVOLUTION

The pump assembly and the digital system are encased to enhance the design and look of the machine.

C104-05

ONLINE REMOTE ASSISTANCE PACKAGE

The machine features a connection to Internet through which Matest Customer Service provides real time support to analyze the problem, to find possible solution, and to carry out a proper test execution.

COMPRESSION 2000 kN capacity

Model	Motorized	LOAD MEASURING SYSTEM: Cyber-Plus Evolution mod. C109N (pag. 158)	LOAD MEASURING SYSTEM: Servo-Plus Evolution mod. C104N (pag. 158)
C058-04 N	•	•	
C058-05 N	•		•

ACCESSORIES FOR 2000 kN MACHINES:

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

C110-20

C110-20 LOWER COMPRESSION PLATEN, hardened over 55 HRC, Ø 165x50 mm to test cubes 100 mm side (as an alternative to the distance piece 50 mm high)

Note: Cylinders having Ø 160 x 320 mm do not require any distance piece.

C112-10 UPPER+LOWER LARGE COMPRESSION PLATENS 245x510x55 mm WITH SEAT BALL to test "also" blocks.

C127N GRAPHIC PRINTER on thermo-paper on board

C127-11 THERMO-PAPER roll for printer (pack of 10 rolls)

C109-10N SOFTWARE for compression tests with Cyber-Plus Evolution machine. See pag. 14

C123N SOFTWARE "servonet" for remote control through PC of Servo-Plus Evolution machine. See pag. 14

C119-03 FRAGMENT GUARDS, to CE Directive. See pag. 244

C121-05 SAFETY GUARDS, polycarbonate, with hinges and lock, to CE Directive. See pag. 244

C121-51 STOP SWITCH on safety guard. See pag. 244

C115-01
TWO WAY HYDRAULIC VALVE, connected to the motorized pumping unit of the machine to activate a second frame.
Technical details: see pag. 245

C115-01

C097-01
DUAL LOW CAPACITY DIGITAL RANGE, complete with "appropriate pressure transducer".
Recommended range 0-250kN
Technical details: see pag. 240

C097-01

AS AN ALTERNATIVE:

C097-02
DUAL LOW CAPACITY DIGITAL RANGE 0-300kN, complete with "strain gage load cell".
Technical details: see pag. 240

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.

C107-01
AUTO-CENTERING DEVICE for cubes 100 and 150 mm side and cylinders dia. 100 mm
Technical details: see pag. 243

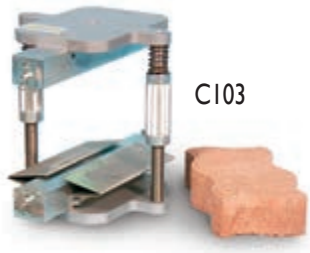
C107-01

C100
SPLITTING TENSILE test device for cylinders. EN 12390-6 / ASTM C496
Technical details and other models: see pag. 241

C100

C103
SPLITTING TENSILE test device for self blocking pavers and cubes. EN 1338, 12390-6
Technical details: see pag. 241

C109-12N
SOFTWARE for splitting tensile tests.
Technical details: see pag. 14


C103

C106
FLEXURAL TEST DEVICE for concrete beams. EN 12390-5 / ASTM C78, C293 / AASHTO T97 / BS 1881:118 / NF P18-407 / UNI 6133
Technical details: see pag. 242

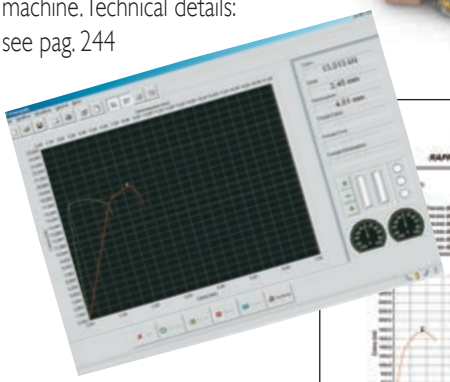
C106

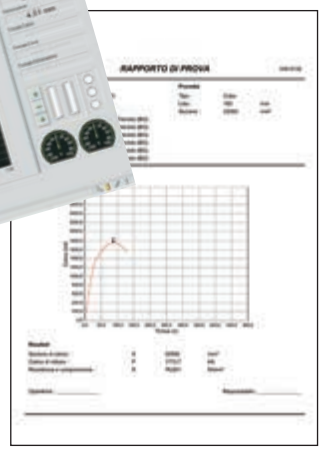
C109-11N
SOFTWARE for flexural tests on concrete beams.
Technical details: see pag. 14

E170
COMPRESSION DEVICE to test cement specimens 40,1 x 40 mm. EN 196 / ASTM C349
Technical details and other models: see pag. 242

C126
BENCH to hold the compression machine. Technical details: see pag. 244

E170


C123 N
Software "servonet"


C109-10N Software Compression

COMPRESSION TESTING MACHINE 2000 kN CAPACITY

To test blocks max. 500x300 mm, cubes up to 300 mm side and cylinders up to dia. 160x320 mm

STANDARDS: **EN 772-1** / ASTM C39, E447 / AASHTO T22 / UNI 6686 part 1 and 2 / NF P18-411 / BS 1610, 6073 / UNE 83304

TECHNICAL SPECIFICATIONS:

- Max. vertical daylight: 336 mm
- Compression platens 510x320x55 mm
- Gauges dia. 250 mm with specific resistance scales for cubes 150 mm and cylinders dia. 150 and 160 mm
- Gauges divisions: 2000 kN div. 5 kN
  600 kN div. 2 kN
- Hydraulic device to stop the piston's stroke at its max excursion to avoid pumping the piston out of the cylinder
- Calibration accuracy: Grade 1.0
- Max. ram travel 55 mm approx.
- Power supply (motorized models):
  230 V 1 ph 50 Hz 750 W
- Dimensions: 870x600x1400 mm
- Weight: 850÷900 kg

C077D + C127N + C105 + C111-08 + C121-01

C078A + C127N + C105 + C111-08 + C121-01

C075 + C111-05 + C121-01

COMPRESSION 2000 kN capacity			LOAD MEASURING SYSTEM			
Model	Hand Operated	Motorized	1 Gauge	2 Gauge	Digitec mod. C108N (pag. 155)	Autotec mod. C098N (pag. 155)
C073	•		•			
C074	•			•		
C075		•	•			
C076		•		•		
C077 D		•			•	
C078 A		•				•

ACCESSORIES FOR 2000 kN BLOCKS MACHINES:

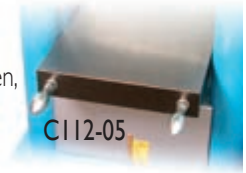
C111-31 DISTANCE PIECE, 20 mm high for cylinders Ø 150x300 mm
C111-04 DISTANCE PIECE, 126 mm high for cubes 200 mm side
C111-05 DISTANCE PIECES, 126+50 mm high for cubes 200 and 150 mm side
C111-06 DISTANCE PIECES 126+50+50 mm high for cubes 200, 150 and 100 mm side
C111-22 DISTANCE PIECE 50 mm high
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 pag. 247

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 pag. 247


C112-05

AS AN ALTERNATIVE:

C105 CENTRAL SCREW, to get easier the adjustment between the big sized compression platens.
Technical details: see pag. 240

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)

C109-10 SOFTWARE for compression tests with Digitec machine. See pag. 14

C123 SOFTWARE "servonet" for remote control through PC of Autotec machine. See pag. 14

C121-01 SAFETY GUARDS, polycarbonate, with hinges and lock, to CE Directive. See pag. 244
C121-51 STOP SWITCH on safety guard. See pag. 244

C107-10

C107-10 CAPPING RETAINERS (set of two) for cylinders 150 mm and 6"
C107-20 NEOPRENE PADS (set of two) for cylinders Ø150 mm 60 shore A

C110-30
UPPER COMPRESSION PLATEN+SPHERICAL SEAT, to fix on the testing machine, to obtain an increased vertical clearance of the testing chamber and to meet the ASTM C39 and AASHTO T22
Platen dimensions: dia. 165 x 30 mm
Weight : 10 kg approx.
Technical details: see pag. 243

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 pag. 245

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 pag. 240

AS AN ALTERNATIVE:

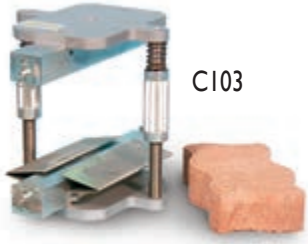
C097-02 DUAL LOW CAPACITY DIGITAL RANGE 0-300kN, complete with "strain gage load cell", only for digital machines. Technical details: see pag. 240

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. Applicable only on digital machines.

C100
SPLITTING TENSILE test device for cylinders. EN 12390-6 / ASTM C496
Technical details and other models: see pag. 241

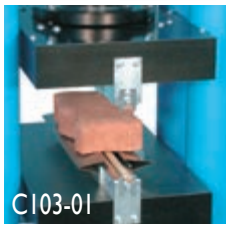
C100

C103
SPLITTING TENSILE test device for self blocking pavers and cubes. EN 1338, 12390-6
Technical details: see pag. 241


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. 241


C103-01

C109-12
SOFTWARE for splitting tensile tests with digital machines.
Technical details: see pag. 14

C106
FLEXURAL TEST DEVICE for concrete beams. EN 12390-5 / ASTM C78, C293 / AASHTO T97 / BS 1881:118 / NF P18-407 / UNI 6133
Technical details: see pag. 242

C106

C109-11
SOFTWARE for flexural tests on concrete beams with digital machines.
Technical details: see pag. 14

E170 COMPRESSION DEVICE to test cement specimens 40,1 x 40 mm. EN 196 / ASTM C349
Technical details and other models: see pag. 242

C126 BENCH to hold the compression machine.
Technical details: see pag. 244

COMPRESSION TESTING MACHINE 2000 kN CAPACITY

To test blocks max. 500x300 mm, cubes up to 300 mm side and cylinders up to dia. 160x320 mm

Cyber-Plus or Servo-Plus Evolution Touch Screen Digital System

STANDARDS: **EN 772-1** / ASTM C39, E447 / AASHTO T22 / UNI 6686 part 1 and 2 / NF P18-411 / BS 1610, 6073 UNE 83304

TECHNICAL SPECIFICATIONS:

- Max. vertical daylight: 336 mm
- Compression platens 510x320x55 mm
- Hydraulic device to stop the piston's stroke at its max excursion to avoid pumping the piston out of the cylinder
- Calibration accuracy: Grade 1.0
- Max. ram travel 55 mm approx.
- Power supply: 230 V 1 ph 50 Hz 750 W
- Dimensions: 870x600x1400 mm
- Weight: 850÷900 kg

C078N + C127N + C105 + C111-08 + C121-08

C077N + C127N + C105 + C111-08 + C121-08

C078N + C104-04 + C105 + C111-08 + C121-01 + C127N

ACCESSORIES:

C104-04

CONSOLE HOUSING THE SERVO-PLUS EVOLUTION

The pump assembly and the digital system are encased to enhance the design and look of the machine.

C104-05

ONLINE REMOTE ASSISTANCE PACKAGE

The machine features a connection to Internet through which Matest Customer Service provides real time support to analyze the problem, to find possible solution, and to carry out a proper test execution.

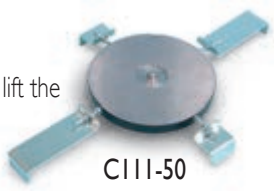
COMPRESSION 2000 kN capacity

Model	Motorized	LOAD MEASURING SYSTEM: Cyber-Plus Evolution mod. C109N (pag. 158)	LOAD MEASURING SYSTEM: Servo-Plus Evolution mod. C104N (pag. 158)
C077 N	•	•	
C078 N	•		•

ACCESSORIES FOR 2000 kN BLOCKS MACHINES:

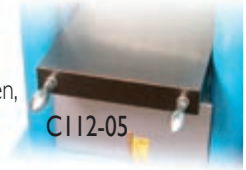
C111-31 DISTANCE PIECE, 20 mm high for cylinders Ø 150x300 mm
C111-04 DISTANCE PIECE, 126 mm high for cubes 200 mm side
C111-05 DISTANCE PIECES, 126+50 mm high for cubes 200 and 150 mm side
C111-06 DISTANCE PIECES 126+50+50 mm high for cubes 200, 150 and 100 mm side
C111-22 DISTANCE PIECE 50 mm high
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 pag. 247


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 pag. 247


C112-05

AS AN ALTERNATIVE:

C105 CENTRAL SCREW, to get easier the adjustment between the big sized compression platens.
Technical details: see pag. 240

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
C127-11 THERMO-PAPER roll for printer (pack of 10 rolls)

C109-10N SOFTWARE for compression tests with Cyber-Plus Evolution machine. See pag. 14
C123N SOFTWARE "servonet" for remote control through PC of Servo-Plus Evolution machine. See pag. 14

C121-01 SAFETY GUARDS, polycarbonate, with hinges and lock, to CE Directive. See pag. 244
C121-51 STOP SWITCH on safety guard. See pag. 244

C107-10

C107-10 CAPPING RETAINERS (set of two) for cylinders 150 mm and 6"
C107-20 NEOPRENE PADS (set of two) for cylinders Ø150 mm 60 shore A

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 and AASHTO T22 Specifications.
Platen dimensions: dia. 165 x 30 mm
Weight : 10 kg approx.
Technical details: see pag. 243

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 pag. 245

C097-01

C097-01 DUAL LOW CAPACITY DIGITAL RANGE, complete with "appropriate pressure transducer". Recommended range 0-250kN. Technical details: see pag. 240

AS AN ALTERNATIVE:

C097-02 DUAL LOW CAPACITY DIGITAL RANGE 0-300kN, complete with "strain gage load cell".
Technical details: see pag. 240

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.

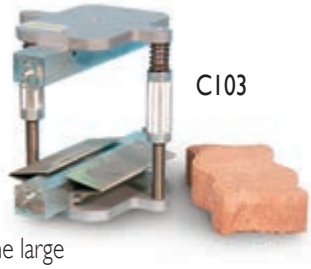
C100
SPLITTING TENSILE test device for cylinders. EN 12390-6 / ASTM C496
Technical details and other models: see pag. 241

C100

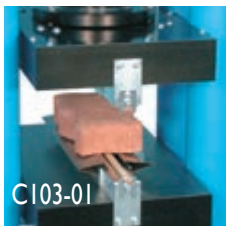
C103
SPLITTING TENSILE test device for self blocking pavers and cubes. EN 1338, 12390-6
Technical details: see pag. 241

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. 241


C103

C109-12N
SOFTWARE for splitting tensile tests.
Technical details: see pag. 14


C103-01

C106
FLEXURAL TEST DEVICE for concrete beams. EN 12390-5 / ASTM C78, C293 / AASHTO T97 BS 1881:118 / NF P18-407 / UNI 6133
Technical details: see pag. 242

C106

C109-11N
SOFTWARE for flexural tests on concrete beams.
Technical details: see pag. 14

E170 COMPRESSION DEVICE to test cement specimens 40,1 x 40 mm. EN 196 / ASTM C349
Technical details and other models: see pag. 242

C126 BENCH to hold the compression machine.
Technical details: see pag. 244

COMPRESSION TESTING MACHINE 3000 kN CAPACITY

To test cubes up to 200 mm side and cylinders up to dia. 160x320 mm

STANDARDS: ASTM C39 / AASHTO T22 / UNI 6686 part 1 and 2 / NF P18-411 / BS 1610 / UNE 83304

TECHNICAL SPECIFICATIONS:

- Max. vertical daylight: 336 mm
- Compression platens dia. 287 mm
- Gauges dia. 250 mm with specific resistance scales for cubes 150 mm and cylinders dia. 150 and 160 mm
- Gauges divisions: 3000 kN div. 10 kN 600 kN div. 2 kN
- Hydraulic device to stop the piston's stroke at its max excursion to avoid pumping the piston out of the cylinder.
- Calibration accuracy: Grade 1.0
- Max. ram travel 55 mm approx.
- Power supply (motorized models): 230 V 1 ph 50 Hz 750 W
- Dimensions: 860x470x1450 mm
- Weight: 1050÷1120 kg

C070D + C127N + C111-05

C071A + C127N + C111-05

C068 + C111-05 + C121-07

COMPRESSION 3000 kN capacity

Model	Hand Operated	Motorized	LOAD MEASURING SYSTEM 1 Gauge	2 Gauge	Digitec mod. C108N (pag. 155)	Autotec mod. C098N (pag. 155)
C066	•		•			
C067	•			•		
C068		•	•			
C069		•		•		
C070 D		•			•	
C071 A		•				•

ACCESSORIES FOR 3000 kN MACHINES:

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, 150 mm side
C111-06 DISTANCE PIECES, 126+50+50 mm high for cubes 200, 150 and 100 mm side
C111-07 DISTANCE PIECES, 50+50 mm high for cylinders Ø 110x220 mm

C111-07 + C111-31
DISTANCE PIECES, high 50+50+20 mm for cylinders Ø 100x200 mm

C111-22 DISTANCE PIECE 50 mm high

C110-20

C110-20 LOWER COMPRESSION PLATEN, hardened over 55 HRC, Ø 165x50 mm to test cubes 100 mm side (as an alternative to the distance piece 50 mm high)
Note: Cylinders having Ø 160 x 320 mm do not require any distance piece.

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)

C109-10 SOFTWARE for compression tests with Digitec machine. See pag. 14

C123 SOFTWARE "servonet" for remote control through PC of Autotec machine. See pag. 14

C119-05 FRAGMENT GUARDS, to CE Directive. See pag. 244
C121-07 SAFETY GUARDS, polycarbonate, with hinges and lock, to CE Directive. See pag. 244
C121-51 STOP SWITCH on safety guard. See pag. 244

C107-10 CAPPING RETAINERS (set of two) for cylinders 150mm and 6"
C107-12 CAPPING RETAINERS (set of two) for cylinders Ø 160mm

C107-20 NEOPRENE PADS (set of two) for cylinders Ø 150mm 60 shore A

C107-25 NEOPRENE PADS (set of two) for cylinders Ø 160mm 60 shore A

C107-10

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 and AASHTO T22 Specifications.
Platen dimensions: dia. 165 x 30 mm
Weight: 10 kg approx.
Technical details: see pag. 243

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 pag. 245

C097-01 DUAL LOW CAPACITY DIGITAL RANGE, complete with "appropriate pressure transducer", only for digital machines. Recommended range 0-250kN.
Technical details: see pag. 240

AS AN ALTERNATIVE:

C097-02 DUAL LOW CAPACITY DIGITAL RANGE 0-300kN, complete with "strain gage load cell", only for digital machines. Technical details: see pag. 240

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. Applicable only on digital machines.

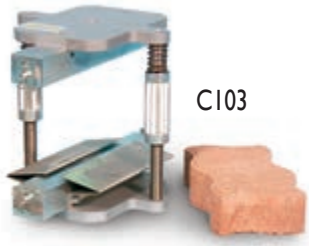
C107-01
AUTO-CENTERING DEVICE for cubes 100 and 150 mm side and cylinders Ø 100 and 150 mm.
Technical details: see pag. 243

C100
SPLITTING TENSILE test device for cylinders. EN 12390-6 / ASTM C496
Technical details and other models: see pag. 241

C100

C103
SPLITTING TENSILE test device for self blocking pavers and cubes. EN 1338, 12390-6.
Technical details: see pag. 241

C109-12
SOFTWARE for splitting tensile tests with digital machines.
Technical details: see pag. 14


C103

C106
FLEXURAL TEST DEVICE for concrete beams. EN 12390-5 / ASTM C78, C293 / AASHTO T97 / BS 1881:118 / NF P18-407 / UNI 6133
Technical details: see pag. 242

C109-11
SOFTWARE for flexural tests on concrete beams with digital machines.
Technical details: see pag. 14

C106

E170
COMPRESSION DEVICE to test cement specimens 40,1 x 40 mm. EN 196 / ASTM C349. Technical details and other models: see pag. 242

E170

C126
BENCH to hold the compression machine.
Technical details: see pag. 244

C115-01

C097-02

COMPRESSION TESTING MACHINE 3000 kN CAPACITY

To test cubes up to 200 mm side and cylinders up to dia. 160x320 mm

Cyber-Plus or Servo-Plus Evolution Touch Screen Digital System

STANDARDS: ASTM C39 / AASHTO T22 / UNI 6686 part 1 and 2 / NF P18-411 / BS 1610 / UNE 83304

TECHNICAL SPECIFICATIONS:

- Max. vertical daylight: 336 mm
- Compression platens dia. 287 mm
- Hydraulic device to stop the piston's stroke at its max excursion to avoid pumping the piston out of the cylinder.
- Calibration accuracy: Grade 1.0
- Max. ram travel 55 mm approx.
- Power supply: 230 V 1 ph 50 Hz 750 W
- Dimensions: 860x470x1450 mm
- Weight: 1050÷1120 kg

C071N + C127N + C111-05

C070N + C127N + C111-05 + C121-07

C071N + C127N + C111-05 + C121-07

ACCESSORIES:

C104-04

CONSOLE HOUSING THE SERVO-PLUS EVOLUTION

The pump assembly and the digital system are encased to enhance the design and look of the machine.

C104-04

C104-05

ONLINE REMOTE ASSISTANCE PACKAGE

The machine features a connection to Internet through which Matest Customer Service provides real time support to analyze the problem, to find possible solution, and to carry out a proper test execution.

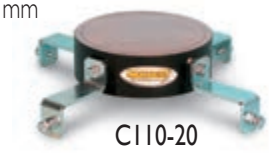
COMPRESSION 3000 kN capacity

Model	Motorized	LOAD MEASURING SYSTEM: Cyber-Plus Evolution mod. C109N (pag. 158)	LOAD MEASURING SYSTEM: Servo-Plus Evolution mod. C104N (pag. 158)
C070 N	•	•	
C071 N	•		•

ACCESSORIES FOR 3000 kN MACHINES:

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, 150 mm side
C111-06 DISTANCE PIECES, 126+50+50 mm high for cubes 200, 150 and 100 mm side
C111-07 DISTANCE PIECES, 50+50 mm high for cylinders Ø 110x220 mm
C111-07 + C111-31 DISTANCE PIECES, high 50+50+20 mm for cylinders Ø 100x200 mm

C111-22 DISTANCE PIECE 50 mm high


C110-20

C110-20 LOWER COMPRESSION PLATEN, hardened over 55 HRC, Ø 165x50 mm to test cubes 100 mm side (as an alternative to the distance piece 50 mm high)
Note: Cylinders having Ø 160 x 320 mm do not require any distance piece.

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

C127-11 THERMO-PAPER roll for printer (pack of 10 rolls)

C109-10N SOFTWARE for compression tests with Cyber-Plus Evolution machine. See pag. 14
C123N SOFTWARE "servonet" for remote control through PC of Servo-Plus Evolution machine. See pag. 14

C119-05 FRAGMENT GUARDS, to CE Directive. See pag. 244
C121-07 SAFETY GUARDS, polycarbonate, with hinges and lock, to CE Directive. See pag. 244
C121-51 STOP SWITCH on safety guard. See pag. 244

C107-10 CAPPING RETAINERS (set of two) for cylinders 150mm and 6"
C107-12 CAPPING RETAINERS (set of two) for cylinders Ø 160mm

C107-20 NEOPRENE PADS (set of two) for cylinders Ø 150mm 60 shore A

C107-25 NEOPRENE PADS (set of two) for cylinders Ø 160mm 60 shore A

C107-10

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 and AASHTO T22 Specifications.
Platen dimensions: dia. 165 x 30 mm
Weight: 10 kg approx.
Technical details: see pag. 243

C115-01

C115-01
TWO WAY HYDRAULIC VALVE, connected to the motorized pumping unit of the machine to activate a second frame.
Technical details: see pag. 245

C097-01 DUAL LOW CAPACITY DIGITAL RANGE, complete with "appropriate pressure transducer". Recommended range 0-250kN.
Technical details: see pag. 240

AS AN ALTERNATIVE:

C097-02 DUAL LOW CAPACITY DIGITAL RANGE 0-300kN, complete with "strain gage load cell".
Technical details: see pag. 240

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.

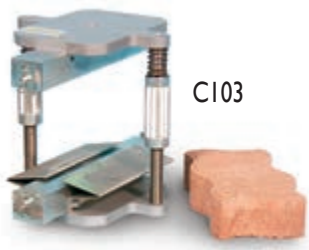
C107-01
AUTO-CENTERING DEVICE for cubes 100 and 150 mm side and cylinders Ø 100 and 150 mm. Technical details: see pag. 243

C100
SPLITTING TENSILE test device for cylinders. EN 12390-6 / ASTM C496
Technical details and other models: see pag. 241

C100

C103
SPLITTING TENSILE test device for self blocking pavers and cubes. EN 1338, 12390-6.
Technical details: see pag. 241

C109-12N
SOFTWARE for splitting tensile tests.
Technical details: see pag. 14


C103

C106
FLEXURAL TEST DEVICE for concrete beams.
EN 12390-5 / ASTM C78, C293 / AASHTO T97 / BS 1881:118 / NF P18-407 / UNI 6133
Technical details: see pag. 242

C109-11N
SOFTWARE for flexural tests on concrete beams.
Technical details: see pag. 14

C106

E170
COMPRESSION DEVICE to test cement specimens 40,1 x 40 mm. EN 196 / ASTM C349. Technical details and other models: see pag. 242

C126
BENCH to hold the compression machine.
Technical details: see pag. 244

C097-01

C097-02

COMPRESSION TESTING MACHINE 3000 kN CAPACITY

To test blocks max. 500x300 mm, cubes up to 300 mm side and cylinders up to dia. 160x320 mm

STANDARDS: **EN 772-1** / ASTM C39, E447 / AASHTO T22 / UNI 6686 part 1 and 2 / NF P18-411 / BS 1610, 6073 / UNE 83304

TECHNICAL SPECIFICATIONS:

- Max. vertical daylight between platens: 336 mm
- Compression platens: 510 x 320xh 55 mm
- Gauges dia. 250 mm with specific resistance scales for cubes 150 mm and cylinders dia. 150 and 160 mm
- Gauges divisions: 3000 kN div. 10 kN - 600 kN div. 2 kN
- Hydraulic device to stop the piston's stroke at its max excursion to avoid pumping the piston out of the cylinder
- Calibration accuracy: Grade 1.0
- Max. ram travel 55 mm approx.
- Power supply (motor models): 230 V 1 ph 50 Hz 750 W
- Dimensions: 900x600x1500 mm
- Weight : 1150÷1220 kg

C079-05D + C127N + C111-22

C079-06A + C127N + C111-22

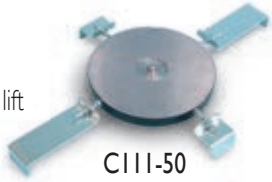
C079-04 + C111-22

COMPRESSION 3000 kN capacity			LOAD MEASURING SYSTEM			
Model	Hand Operated	Motorized	1 Gauge	2 Gauge	Digitec mod. C108N (pag. 155)	Autotec mod. C098N (pag. 155)
C079-01	•		•			
C079-02	•			•		
C079-03		•	•			
C079-04		•		•		
C079-05 D		•			•	
C079-06 A		•				•

ACCESSORIES FOR 3000 kN BLOCKS MACHINES:

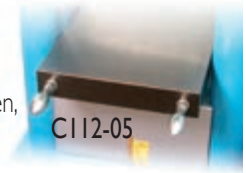
C111-31 DISTANCE PIECE, 20 mm high for cylinders Ø 150x300 mm
C111-04 DISTANCE PIECE, 126 mm high for cubes 200 mm side
C111-05 DISTANCE PIECES, 126+50 mm high for cubes 200 and 150 mm side
C111-06 DISTANCE PIECES 126+50+50 mm high for cubes 200, 150 and 100 mm side
C111-22 DISTANCE PIECE 50 mm high
Note: The cylinders dia. 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 pag. 247


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 pag. 247


C112-05

AS AN ALTERNATIVE:

C105 CENTRAL SCREW, to get easier the adjustment between the big sized compression platens.
Technical details: see pag. 240

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)

C109-10 SOFTWARE for compression tests with Digitec machine. See pag. 14

C123 SOFTWARE "servonet" for remote control through PC of Autotec machine. See pag. 14

C121-08 SAFETY GUARDS, polycarbonate, with hinges and lock, to CE Directive. See pag. 244
C121-51 STOP SWITCH on safety guard. See pag. 244

C107-10

C107-10 CAPPING RETAINERS (set of two) for cylinders 150mm and 6"
C107-20 NEOPRENE PADS (set of two) for cylinders Ø150mm 60 shore A

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 and AASHTO T22 Specifications.
Platen dimensions: dia. 165 x 30 mm
Weight : 10 kg approx.
Technical details: see pag. 243

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 pag. 245

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 pag. 240

AS AN ALTERNATIVE:

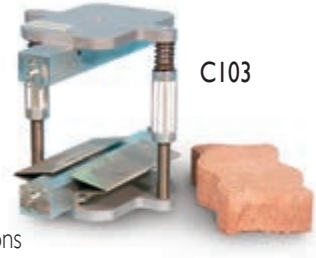
C097-02 DUAL LOW CAPACITY DIGITAL RANGE 0-300kN, complete with "strain gage load cell", only for digital machines. Technical details: see pag. 240

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. Applicable only on digital machines.

C100

C100
SPLITTING TENSILE test device for cylinders. EN 12390-6 / ASTM C496
Technical details and other models: see pag. 241

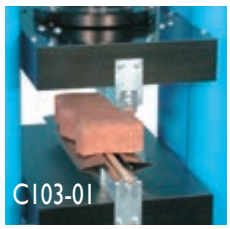
C103
SPLITTING TENSILE test device for self blocking pavers and cubes. EN 1338, 12390-6
Technical details: see pag. 241


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 pag. 241

C109-12
SOFTWARE for splitting tensile tests with digital machines.
Technical details see pag. 14


C103-01

C106
FLEXURAL TEST DEVICE for concrete beams. EN 12390-5 / ASTM C78, C293 / AASHTO T97 / BS 1881:118 / NF P18-407 / UNI 6133
Technical details: see pag. 242

C106

C109-11
SOFTWARE for flexural tests on concrete beams with digital machines. Technical details: see pag. 14

E170 COMPRESSION DEVICE to test cement specimens 40,1 x 40 mm. EN 196 / ASTM C349
Technical details and other models: see pag. 242

C126 BENCH to hold the compression machine. See pag. 244

COMPRESSION TESTING MACHINE 3000 kN CAPACITY

To test blocks max. 500x300 mm, cubes up to 300 mm side and cylinders up to dia. 160x320 mm

Cyber-Plus or Servo-Plus Evolution Touch Screen Digital System

STANDARDS: **EN 772-1** / ASTM C39, E447 / AASHTO T22 / UNI 6686 part 1 and 2 / NF P18-411
BS 1610, 6073 / UNE 83304

TECHNICAL SPECIFICATIONS:

- Max. vertical daylight between platens: 336 mm
- Compression platens: 510 x 320xh 55 mm
- Hydraulic device to stop the piston's stroke at its max excursion to avoid pumping the piston out of the cylinder
- Calibration accuracy: Grade 1.0
- Max. ram travel 55 mm approx.
- Power supply: 230 V 1 ph 50 Hz 750 W
- Dimensions: 900x600x1500 mm
- Weight :1150÷1220 kg

C079-06N + C127N + C111-22

C079-06N + C104-04 + C127N + C111-22

C079-05N + C127N + C111-22

ACCESSORIES:

C104-04

CONSOLE HOUSING THE SERVO-PLUS EVOLUTION

The pump assembly and the digital system are encased to enhance the design and look of the machine.

C104-05

ONLINE REMOTE ASSISTANCE PACKAGE

The machine features a connection to Internet through which Matest Customer Service provides
real time support to analyze the problem, to find possible solution, and to carry out a proper test execution.

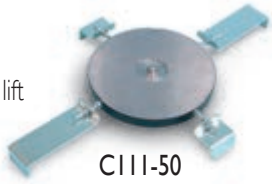
COMPRESSION 3000 kN capacity

Model	Motorized	LOAD MEASURING SYSTEM: Cyber-Plus Evolution mod. C109N (pag. 158)	LOAD MEASURING SYSTEM: Servo-Plus Evolution mod. C104N (pag. 158)
C079-05 N	•	•	
C079-06 N	•		•

ACCESSORIES FOR 3000 kN BLOCKS MACHINES:

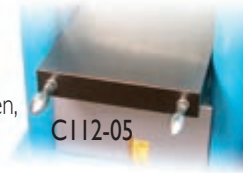
C111-31 DISTANCE PIECE, 20 mm high for cylinders Ø 150x300 mm
C111-04 DISTANCE PIECE, 126 mm high for cubes 200 mm side
C111-05 DISTANCE PIECES, 126+50 mm high for cubes 200 and 150 mm side
C111-06 DISTANCE PIECES 126+50+50 mm high for cubes 200, 150 and 100 mm side
C111-22 DISTANCE PIECE 50 mm high
Note: The cylinders dia. 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 pag. 247


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 pag. 247


C112-05

AS AN ALTERNATIVE:

C105 CENTRAL SCREW, to get easier the adjustment between the big sized compression platens.
Technical details: see pag. 240

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
C127-11 THERMO-PAPER roll for printer (pack of 10 rolls)

C109-10N SOFTWARE for compression tests with Cyber-Plus Evolution machine. See pag. 14
C123N SOFTWARE "servonet" for remote control through PC of Servo-Plus Evolution machine. See pag. 14

C121-08 SAFETY GUARDS, polycarbonate, with hinges and lock, to CE Directive. See pag. 244

C121-51 STOP SWITCH on safety guard. See pag. 244

C107-10 CAPPING RETAINERS (set of two) for cylinders 150mm and 6"

C107-20 NEOPRENE PADS (set of two) for cylinders Ø150mm 60 shore A

C107-10

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 and AASHTO T22 Specifications.
Platen dimensions: dia. 165 x 30 mm
Weight : 10 kg approx.
Technical details: see pag. 243

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 pag. 245

C097-01 DUAL LOW CAPACITY DIGITAL RANGE, complete with "appropriate pressure transducer". Recommended range 0-250kN. Technical details: see pag. 240

AS AN ALTERNATIVE:

C097-01

C097-02
DUAL LOW CAPACITY DIGITAL RANGE 0-300kN, complete with "strain gage load cell".
Technical details: see pag. 240

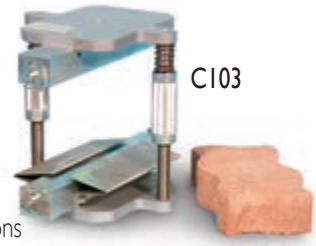
C097-05 CLASS 1, starting from 1% of the full range. With a special calibration procedure it is possible to grant Class 1 practically on the full range of the compression machine.

C100
SPLITTING TENSILE test device for cylinders. EN 12390-6 / ASTM C496
Technical details and other models: see pag. 241

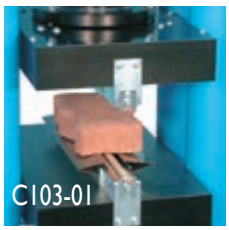
C100

C103
SPLITTING TENSILE test device for self blocking pavers and cubes. EN 1338, 12390-6
Technical details: see pag. 241

AS AN ALTERNATIVE:


C103

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 pag. 241


C103-01

C109-12N
SOFTWARE for splitting tensile tests.
Technical details see pag. 14

C106
FLEXURAL TEST DEVICE for concrete beams. EN 12390-5 / ASTM C78, C293 / AASHTO T97 / BS 1881:118 / NF P18-407 / UNI 6133
Technical details: see pag. 242

C106

C109-11N
SOFTWARE for flexural tests on concrete beams.
Technical details: see pag. 14

E170 COMPRESSION DEVICE to test cement specimens 40,1 x 40 mm. EN 196 / ASTM C349
Technical details and other models: see pag. 242

C126 BENCH to hold the compression machine. See pag. 244

COMPRESSION TESTING MACHINE 5000 kN CAPACITY

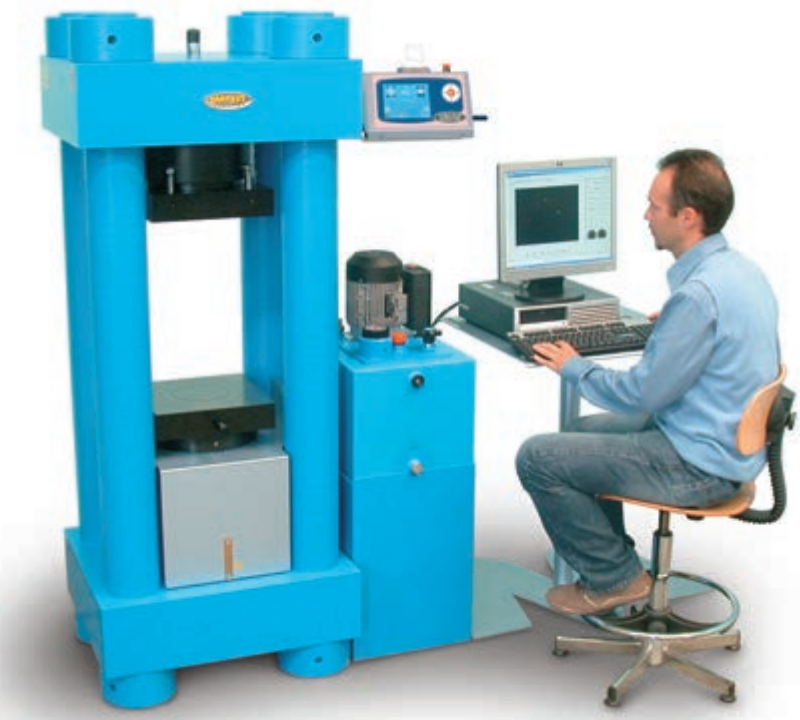
To test cubes up to 300 mm side and cylinders up to dia. 250x500 mm

Cyber-Plus or Servo-Plus Evolution Touch Screen Digital System

STANDARDS: BS 1610 / UNI 6686 part 1 and 2 / NF P18-411 / ASTM C39 / AASHTO T22 / UNE 83304

TECHNICAL SPECIFICATIONS:

- Max. vertical daylight: 530 mm
- Compression platens 310x310 mm
- Calibration accuracy: Grade 1.0
- Max. ram travel 60 mm approx.
- Hydraulic device to stop the piston's stroke at its max excursion to avoid pumping the piston out of the cylinder.
- Power supply: 230 V 1 ph 50 Hz 750 W
- Dimensions: 1200x900X1900 mm
- Weight: 2800÷2900 kg



C086-02N + C127N + H009-01

C086-03N + C127N + C086-10

ACCESSORY:

C104-05

ONLINE REMOTE ASSISTANCE PACKAGE

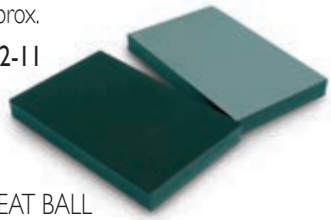
The machine features a connection to Internet through which Matest Customer Service provides real time support to analyze the problem, to find possible solution, and to carry out a proper test execution.

COMPRESSION 5000 kN capacity

Model	Motorized	LOAD MEASURING SYSTEM: Cyber-Plus Evolution mod. C109N (pag. 158)	LOAD MEASURING SYSTEM: Servo-Plus Evolution mod. C104N (pag. 158)
C086-02 N	•	•	
C086-03 N	•		•

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)

C109-10N SOFTWARE for compression tests with Cyber-Plus Evolution machine. See pag. 14

C123N SOFTWARE "servonet" for remote control through PC of Servo-Plus Evolution machine. See pag. 14

C121-04 SAFETY GUARDS, polycarbonate, with hinges and lock, to CE Directive. See pag. 244

C121-51 STOP SWITCH on safety guard. See pag. 244

C115-01
TWO WAY HYDRAULIC VALVE, connected to the motorized pumping unit of the machine to activate a second frame.
Technical details: see pag. 245

C097-01
DUAL LOW CAPACITY DIGITAL RANGE, complete with "appropriate pressure transducer".
Recommended range 0-250kN
Technical details: see pag. 240

C115-01

AS AN ALTERNATIVE:

C097-02
DUAL LOW CAPACITY DIGITAL RANGE
0-300kN, complete with "strain gage load cell".
Technical details: see pag. 240

C097-01

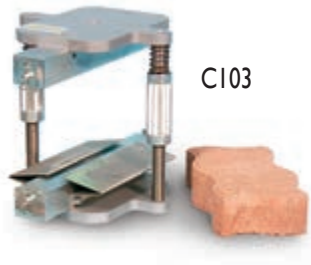
C097-05
CLASS 1, starting from 1% of the full range.
With a special calibration procedure it is possible to grant Class 1 practically on the full range of the compression machine.

C100
SPLITTING TENSILE test device for cylinders. EN 12390-6 /ASTM C496
Technical details and other models: see pag. 241

C100

C103
SPLITTING TENSILE test device for self blocking pavers and cubes.
EN 1338, 12390-6
Technical details: see pag. 241

C109-12N
SOFTWARE for splitting tensile tests with digital machines.
Technical details: see pag. 14

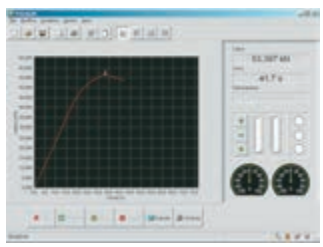

C103

C106
FLEXURAL TEST DEVICE for concrete beams.
EN 12390-5 / ASTM C78, C293 / AASHTO T97 / BS 1881:118 / NP F18-407 / UNI 6133
Technical details: see pag. 242

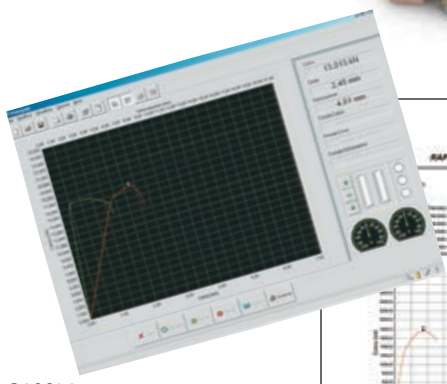
C106

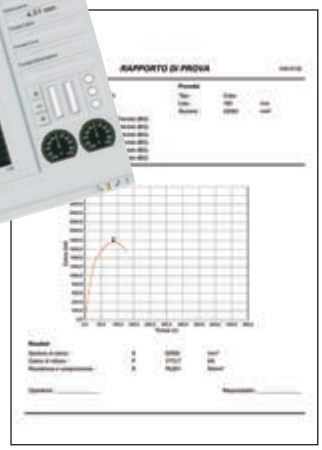
C109-11N
SOFTWARE for flexural tests on concrete beams
Technical details: see pag. 14

E170
COMPRESSION DEVICE to test cement specimens 40,1 x 40 mm.
EN 196 / ASTM C349. Technical details and other models: see pag. 242


C109-11N Software Flexural

E170


C123N
Software "servonet"


C109-10N Software Compression

17/05/2007

REPORT

Data	
Date :	17/05/2007
Request n° :	1705
Certificate n° :	17052007
Laboratory :	Matest
Site :	Matest
Temperature :	20 °C

Load (kN)

Results

Width :
Height :
Distance :
Maximum load :
Strength :

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's 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 pag. 251)

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's 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 "elastic modulus" determination.
Described and pictured in the next pages 200 ÷ 221

COMPRESSION TESTING MACHINE 2000 kN CAPACITY "TESTED FOR HIGH STABILITY"

To test cubes up to 200 mm side and cylinders up to dia. 160x320 mm

STANDARDS: **EN 12390-4** / BS 1881:115 / UNI 6686 part 3 / DIN 51220, 51302 / ASTM C39 / NF P18-411 AASHTO T22 / UNE 83304

TECHNICAL SPECIFICATIONS:

- Max. vertical daylight: 334,5 mm
- Compression platens dia. 287x60 mm
- Gauges dia. 250 mm with specific resistance scales for cubes 150 mm and cylinders dia. 150 and 160 mm
- Gauges divisions: 2000 kN div. 5 kN - 600 kN div. 2 kN
- Calibration accuracy: Grade 1.0
- Max. ram travel 60 mm approx.
- Hydraulic device to stop the piston's stroke at its max excursion, to avoid pumping the piston out of the cylinder.
- Power supply: 230 V 1 ph 50 Hz 750 W
- Dimensions: 690x400x1400 mm
- Weight: 850÷920 kg

C089-04A + C127N + C121-06 + C111-13

C089-02D + C127N + C121-06 + C111-13

C089 + C111-24

COMPRESSION 2000 kN High Stability

Model	Motorized	LOAD MEASURING SYSTEM			
		1 Gauge	2 Gauge	Digitec mod. C108N (pag. 155)	Autotec mod. C098N (pag. 155)
C089	•	•			
C089-01	•		•		
C089-02 D	•			•	
C089-04 A	•				•

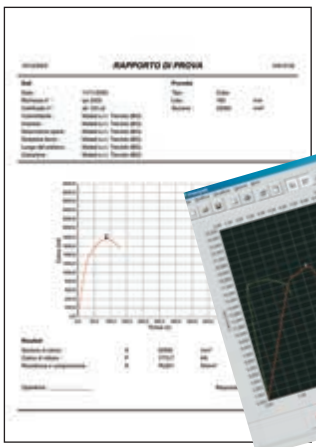
ACCESSORIES FOR 2000 kN MACHINES:

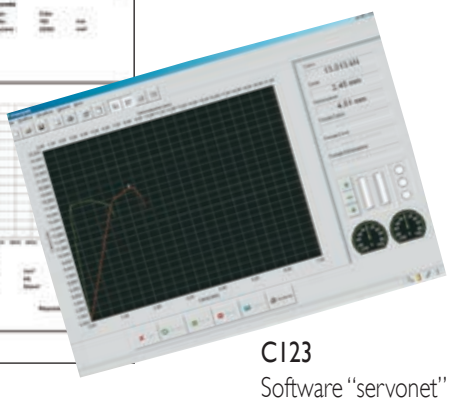
C111-32 DISTANCE PIECE, 20 mm high for cylinders Ø 150x300 mm
C111-12 DISTANCE PIECE, 73+50 mm high for cubes 200 mm side
C111-13 DISTANCE PIECES, 73+50+50 mm high for cubes 200 and 150 mm side
C111-14 DISTANCE PIECES, 73+50+50+50 mm high for cubes 200, 150 and 100 mm side
C111-15 DISTANCE PIECES, 50+50 mm high for cylinders Ø 110x220 mm
C111-24 DISTANCE PIECE 50 mm high
C111-25 DISTANCE PIECE 73 mm high
C110-20 LOWER COMPRESSION PLATEN, hardened and rectified, dia. 165x50 mm to test cubes 100 mm (as an alternative to the distance piece 50 mm high)

C110-20

Note: Cylinders having Ø 160 x 320 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)
C109-10 SOFTWARE for compression tests with Digitec machine. See pag. 14
C123 SOFTWARE "servonet" for remote control through PC of Autotec machine. See pag. 14


C109-10
Software Compression


C123
Software "servonet"

C119-04 FRAGMENT GUARDS, to CE Directive. See pag. 244
C121-06 SAFETY GUARDS, polycarbonate, with hinges and lock, to CE Directive. See pag. 244
C121-51 STOP SWITCH on safety guard. See pag. 244

C107-10

C107-10 CAPPING RETAINERS (set of two) for cylinders Ø 150mm and 6"
C107-20 NEOPRENE PADS (set of two) for cylinders Ø 150mm 60 shore A

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 and AASHTO T22 Specifications. Platen dimensions: dia. 165 x 30 mm. Weight : 10 kg approx. Technical details: see pag. 243

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 pag. 245

C097-01
DUAL LOW CAPACITY DIGITAL RANGE, complete with "appropriate pressure transducer", only for digital machines. Recommended range 0-250kN Technical details: see pag. 240

C097-02

AS AN ALTERNATIVE:

C097-02
DUAL LOW CAPACITY DIGITAL RANGE 0-300kN, complete with "strain gage load cell", only for digital machines. Technical details: see pag. 240

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. 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 pag. 240

C107-01 AUTO-CENTERING DEVICE for cubes 100 and 150 mm side and cylinders dia. 100 and 150 mm. Technical details: see pag. 243

C100
SPLITTING TENSILE test device for cylinders. EN 12390-6 / ASTM C496 Technical details and other models: see pag. 241

C100

C109-12 SOFTWARE for splitting tensile tests with digital machines. Technical details: see pag. 14

C106
FLEXURAL TEST DEVICE for concrete beams. EN 12390-5 / ASTM C78, C293 / AASHTO T97 / BS 1881:118 / NF P18-407 / UNI 6133. Technical details: see pag. 242

C109-11 SOFTWARE for flexural tests on concrete beams with digital machines. Technical details: see pag. 14
E170 COMPRESSION DEVICE to test cement specimens 40,1 x 40 mm. EN 196 / ASTM C349. Technical details and other models: see pag. 242
C126 BENCH to hold the compression machine. Technical details: see pag. 244

COMPRESSION TESTING MACHINE 2000 kN CAPACITY "TESTED FOR HIGH STABILITY"

To test cubes up to 200 mm side and cylinders up to dia. 160x320 mm

Cyber-Plus or Servo-Plus Evolution Touch Screen Digital System

STANDARDS: **EN 12390-4** / BS 1881:115 / UNI 6686, part3 / DIN 51220, 51302 / ASTM C39
NF P18-411 / AASHTO T22 / UNE 83304

TECHNICAL SPECIFICATIONS:

- Max. vertical daylight: 334,5 mm
- Compression platens dia. 287x60 mm
- Calibration accuracy: Grade 1.0
- Max. ram travel 60 mm approx.
- Hydraulic device to stop the piston's stroke at its max excursion, to avoid pumping the piston out of the cylinder.
- Power supply: 230 V 1 ph 50 Hz 750 W
- Dimensions: 690x400x1400 mm
- Weight: 850÷920 kg

C089-02N + C127N + C111-13

C089-04N + C104-04 + C127N + C111-13 + C121-06

C089-04N + C127N + C111-13

ACCESSORIES:

C104-04
CONSOLE HOUSING THE SERVO-PLUS EVOLUTION
The pump assembly and the digital system are encased to enhance the design and look of the machine.

C104-05
ONLINE REMOTE ASSISTANCE PACKAGE
The machine features a connection to Internet through which Matest Customer Service provides real time support to analyze the problem, to find possible solution, and to carry out a proper test execution.

COMPRESSION 2000 kN High Stability

Model	Motorized	LOAD MEASURING SYSTEM: Cyber-Plus Evolution mod. C109N (pag. 158)	LOAD MEASURING SYSTEM: Servo-Plus Evolution mod. C104N (pag. 158)
C089-02 N	•	•	
C089-04 N	•		•

ACCESSORIES FOR 2000 kN MACHINES:

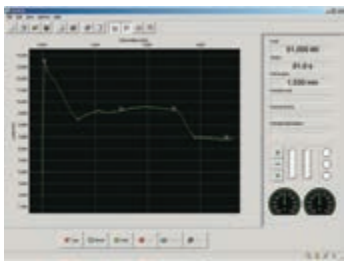
C111-32 DISTANCE PIECE, 20 mm high for cylinders Ø 150x300 mm
C111-12 DISTANCE PIECE, 73+50 mm high for cubes 200 mm side
C111-13 DISTANCE PIECES, 73+50+50 mm high for cubes 200 and 150 mm side
C111-14 DISTANCE PIECES, 73+50+50+50 mm high for cubes 200, 150 and 100 mm side
C111-15 DISTANCE PIECES, 50+50 mm high for cylinders Ø 110x220 mm
C111-24 DISTANCE PIECE 50 mm high
C111-25 DISTANCE PIECE 73 mm high
C110-20 LOWER COMPRESSION PLATEN, hardened and rectified, dia. 165x50 mm to test cubes 100 mm (as an alternative to the distance piece 50 mm high)

C110-20

Note: Cylinders having Ø 160 x 320 mm 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)
C109-10N SOFTWARE for compression tests with Cyber-Plus Evolution machine. See pag. 14
C123N SOFTWARE "servonet" for remote control through PC of Servo-Plus Evolution machine. See pag. 14

C104-10N
SERVO-STRAIN
Servocontrolled Software, system of:
- Load or Strength
- Displacement
- Strain


C104-10N

This system can be used only with Servo-Plus Evolution machine mod. C089-04N
Technical details see pag. 164

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, UNI 6556, ASTM C469 ISO 1920-10, DIN 1048.
Technical details: see pag. 220

C107-10

C119-04 FRAGMENT GUARDS to CE Directive. See pag. 244
C121-06 SAFETY GUARDS, polycarbonate and aluminium frame, complete with hinges and lock, to CE Directive. See pag. 244
C121-51 STOP SWITCH on safety guard. See pag. 244
C107-10 CAPPING RETAINERS (set of two) for cylinders Ø 150mm and 6"
C107-21 NEOPRENE PADS (set of two) for cylinders Ø 150mm 70 shore A

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 and AASHTO T22 Specifications.
Platen dimensions: dia. 165 x 30 mm. Weight : 10 kg approx.
Technical details: see pag. 243

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 pag. 245

C115-01

C097-01
DUAL LOW CAPACITY DIGITAL RANGE, complete with "appropriate pressure transducer".
Recommended range 0-250kN
Technical details: see pag. 240

AS AN ALTERNATIVE:

C097-01

C097-02
DUAL LOW CAPACITY DIGITAL RANGE 0-300kN, complete with "strain gage load cell". Technical details: see pag. 240

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 pag. 240

C107-01 AUTO-CENTERING DEVICE for cubes 100 and 150 mm side and cylinders Ø 100 and 150 mm
Technical details: see pag. 243
C100 SPLITTING TENSILE test device for cylinders.
EN 12390-6 / ASTM C496
Technical details and other models: see pag. 241
C109-12N SOFTWARE for splitting tensile tests.
Technical details: see pag. 14

C106
FLEXURAL TEST DEVICE for concrete beams. EN 12390-5 / ASTM C78, C293 / AASHTO T97 / BS 1881:118 / NF P18-407 / UNI 6133. Technical details: see pag. 242

C109-11N SOFTWARE for flexural tests on concrete beams with digital machines. Technical details: see pag. 14

E170
COMPRESSION DEVICE to test cement specimens 40,1 x 40 mm. EN 196 / ASTM C349
Technical details and other models: pag. 242

E170

C126
BENCH to hold the compression machine.
Technical details: pag. 244

COMPRESSION TESTING MACHINE 2000 kN CAPACITY "TESTED FOR HIGH STABILITY"

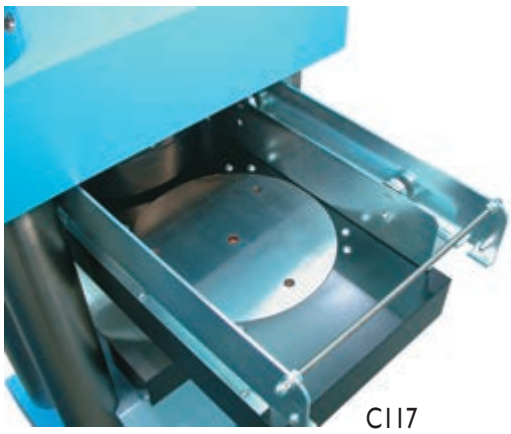
To test blocks max. 500x300 mm, cubes up to 200 mm side and cylinders up to dia. 160x320 mm

STANDARDS: **EN 12390-4, EN 772-1** / BS 1881:115, 6073 / UNI 6686 part 3 / DIN 51220, 51302 / NF P18-411 / ASTM C39, E447 AASHTO T22 / UNE 83304

TECHNICAL SPECIFICATIONS:

- Max. vertical daylight to test blocks: 283 mm
- Compression platens for blocks: 510x320x55 mm
- Max. vertical daylight to test cubes and cylinders: 334,5 mm
- Compression platens to test cubes and cylinders: dia. 287x60 mm
- Gauges dia. 250 mm with specific resistance scales for cubes 150 mm and cylinders dia. 150 and 160 mm
- Gauges divisions: 2000 kN div. 10 kN - 600 kN div. 2 kN
- Calibration accuracy: Grade 1.0
- Max. ram travel 60 mm approx.
- Hydraulic device to stop the piston's stroke at its max excursion, to avoid pumping the piston out of the cylinder.
- Power supply: 230 V 1 ph 50 Hz 750 W
- Dimensions: 750x520x1500 mm
- Weight: 1000÷1070 kg

C089-21D + C127N



C117

C089-22A + C127N

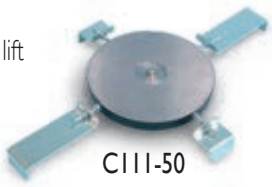
COMPRESSION 2000 kN High Stability Blocks

Model	Motorized	LOAD MEASURING SYSTEM			
		1 Gauge	2 Gauge	Digitec mod. C108N (pag. 155)	Autotec mod. C098N (pag. 155)
C089 B	•	•			
C089-01 B	•		•		
C089-21 D	•			•	
C089-22 A	•				•

ACCESSORIES FOR 2000 kN BLOCKS MACHINES:

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: Cylinders having Ø 160 x 320 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 pag. 247


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 pag. 247

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.

C127N GRAPHIC PRINTER on thermo-paper on board for digital models
C127-11 THERMO-PAPER roll for printer (pack of 10 rolls)

C109-10 SOFTWARE for compression tests with Digitec machine. See pag. 14
C123 SOFTWARE "servonet" for remote control through PC of Autotec machine. See pag. 14

C121-10 SAFETY GUARDS, polycarbonate, with hinges and lock, to CE Directive. See pag. 244

C121-51 STOP SWITCH on safety guard. See pag. 244

C115-01
TWO WAY HYDRAULIC VALVE, connected to the motorized pumping unit of the machine to activate a second frame.
Technical details: see pag. 245

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. Applicable only on digital machines.

C115-01

C097-08
OFFICIAL ACCREDIA
(Equivalent UKAS, ENAC, DAKKS, SAS, COFRAC etc.)
HARDNESS CERTIFICATE of upper and lower compression platens. Minimum hardness: 55 HRC. See pag. 240

C097-01

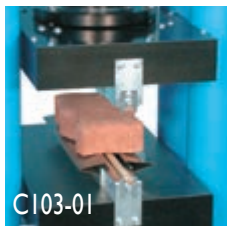
C097-01
DUAL LOW CAPACITY DIGITAL RANGE, complete with "appropriate pressure transducer", only for digital machines.
Recommended range 0-250kN. Technical details: see pag. 240

AS AN ALTERNATIVE:

C097-02
DUAL LOW CAPACITY DIGITAL RANGE 0-300kN, complete with "strain gage load cell", only for digital machines.
Technical details: see pag. 240

C100 SPLITTING TENSILE test device for cylinders.
EN 12390-6 / ASTM C496
Technical details and other models: see pag. 241

C103
SPLITTING TENSILE test device for self blocking pavers and cubes.
EN 1338, 12390-6
Technical details: see pag. 241


C103-01

AS AN ALTERNATIVE:

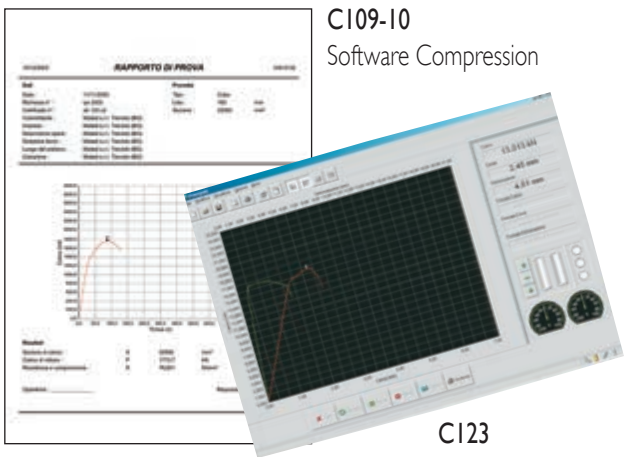
C103-01
SPLITTING TENSILE test device for self blocking pavers and cubes max. dimensions 300 x 500 mm.
EN 1338, 12390-6. Technical details: see pag. 241

C109-12 SOFTWARE for splitting tensile tests with digital machines. Technical details: see pag. 14

C106
FLEXURAL TEST DEVICE for concrete beams. EN 12390-5 / ASTM C78, C293 / AASHTO T97 / BS 1881:118 / NF P18-407 / UNI 613
Technical details: see pag. 242

C109-11
SOFTWARE for flexural tests on concrete beams with digital machines.
Technical details: see pag. 14

C106



C109-10
Software Compression

C123
Software "servonet"

E170
COMPRESSION DEVICE to test cement specimens 40,1 x 40 mm. EN 196 / ASTM C349
Technical details and other models: see pag. 242

E170

C126
BENCH to hold the compression machine. Technical details: see pag. 244

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 dia. 160x320 mm

Cyber-Plus or Servo-Plus Evolution Touch Screen Digital System

STANDARDS: **EN 12390-4, EN 772-1** / BS 1881:115, 6073 / UNI 6686 part 3 / DIN 51220, 51302 / NF P18-411 ASTM C39, E447 / AASHTO T22 / UNE 83304

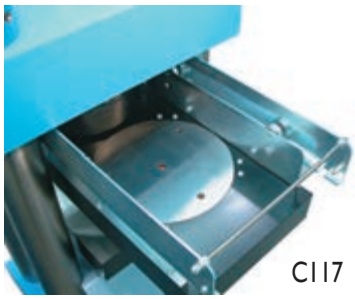
TECHNICAL SPECIFICATIONS:

- Max. vertical daylight to test blocks: 283 mm
- Compression platens for blocks: 510x320x55 mm
- Max. vertical daylight to test cubes and cylinders: 334,5 mm
- Compression platens to test cubes and cylinders: dia. 287x60 mm
- Calibration accuracy: Grade 1.0
- Max. ram travel 60 mm approx.
- Hydraulic device to stop the piston's stroke at its max excursion, to avoid pumping the piston out of the cylinder.
- Power supply: 230 V 1 ph 50 Hz 750 W
- Dimensions: 750x520x1500 mm
- Weight: 1000÷1070 kg

C089-21N + C127N

C089-22N + C104-04 + C127N

C089-22N + C127N



C117

ACCESSORIES:

C104-04

CONSOLE HOUSING THE SERVO-PLUS EVOLUTION

The pump assembly and the digital system are encased to enhance the design and look of the machine.

C104-05

ONLINE REMOTE ASSISTANCE PACKAGE

The machine features a connection to Internet through which Matest Customer Service provides real time support to analyze the problem, to find possible solution, and to carry out a proper test execution.

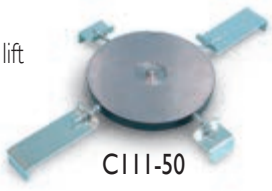
COMPRESSION 2000 kN High Stability Blocks

Model	Motorized	LOAD MEASURING SYSTEM: Cyber-Plus Evolution mod. C109N (pag. 158)	LOAD MEASURING SYSTEM: Servo-Plus Evolution mod. C104N (pag. 158)
C089-21 N	•	•	
C089-22 N	•		•

ACCESSORIES FOR 2000 kN BLOCKS MACHINES:

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
C111-24 DISTANCE PIECE 50 mm high
C111-25 DISTANCE PIECE 73 mm high
Note: Cylinders having Ø 160 x 320 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 pag. 247


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 pag. 247

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.

C127N GRAPHIC PRINTER on thermo-paper on board

C127-11 THERMO-PAPER roll for printer (pack of 10 rolls)

C109-10N SOFTWARE for compression tests with Cyber-Plus Evolution machine. See pag. 14

C123N SOFTWARE "servonet" for remote control through PC of Servo-Plus Evolution machine. See pag. 14

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 pag. 164

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, UNI 6556, ASTM C469 ISO 1920-10, DIN 1048. Technical details: see pag. 220

C121-10 SAFETY GUARDS, polycarbonate, with hinges and lock, to CE Directive. See pag. 244

C121-51 STOP SWITCH on safety guard. See pag. 244

C115-01 TWO WAY HYDRAULIC VALVE, connected to the motorized pumping unit of the machine to activate a second frame. Technical details: see pag. 245

C097-01
DUAL LOW CAPACITY DIGITAL RANGE, complete with "appropriate pressure transducer". Recommended range 0-250kN.
Technical details: see pag. 240

C097-01

AS AN ALTERNATIVE:

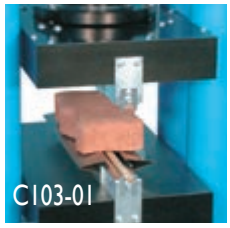
C097-02
DUAL LOW CAPACITY DIGITAL RANGE 0-300kN, complete with "strain gage load cell". Technical details: see pag. 240

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 pag. 240

C100
SPLITTING TENSILE test device for cylinders.
EN 12390-6 / ASTM C496
Technical details and other models: see pag. 241

C103
SPLITTING TENSILE test device for self blocking pavers and cubes.
EN 1338, 12390-6
Technical details: see pag. 241


C103-01

AS AN ALTERNATIVE:

C103-01
SPLITTING TENSILE test device for self blocking pavers and cubes max. dimensions 300 x 500 mm.
EN 1338, 12390-6. Technical details: see pag. 241

C109-12N
SOFTWARE for splitting tensile tests. Technical details: see pag. 14

C106
FLEXURAL TEST DEVICE for concrete beams. EN 12390-5 / ASTM C78, C293 / AASHTO T97 / BS 1881:118 / NF P18-407 / UNI 613
Technical details: see pag. 242

C109-11N
SOFTWARE for flexural tests on concrete beams.
Technical details: see pag. 14

C106

E170
COMPRESSION DEVICE to test cement specimens 40,1 x 40 mm. EN 196 / ASTM C349
Technical details and other models: see pag. 242

E170

C126
BENCH to hold the compression machine. Technical details: see pag. 244

COMPRESSION TESTING MACHINE 3000 kN CAPACITY "TESTED FOR HIGH STABILITY"

To test cubes up to 200 mm side and cylinders up to dia. 160x320 mm

STANDARDS: **EN 12390-4** / BS 1881:115 / UNI 6686 part 3 / DIN 51220, 51302 / ASTM C39 / NF P18-411 AASHTO T22 / UNE 83304

TECHNICAL SPECIFICATIONS:

- Max. vertical daylight 334,5 mm
- Compression platens dia. 287x60 mm
- Gauges dia. 250 mm with specific resistance scales for cubes 150 mm and cylinders dia. 150 and 160 mm
- Gauges divisions: 3000 kN div. 10 kN - 600 kN div. 2 kN
- Calibration accuracy: Grade 1.0
- Max. ram travel 60 mm approx.
- Hydraulic device to stop the piston's stroke at its max excursion, to avoid pumping the piston out of the cylinder.
- Power supply: 230 V 1 ph 50 Hz 750 W
- Dimensions: 750x450x1500 mm
- Weight: 1200÷1250 kg

C089-08D + C127N + C111-13 + C121-07 + C121-51

C089-10A + C127N + C111-13 + C121-07 + C121-51

C089-06+C111-13

COMPRESSION 3000 kN High Stability

Model	Motorized	LOAD MEASURING SYSTEM			
		1 Gauge	2 Gauge	Digitec mod. C108N (pag. 155)	Autotec mod. C098N (pag. 155)
C089-06	•	•			
C089-07	•		•		
C089-08 D	•			•	
C089-10 A	•				•

ACCESSORIES FOR 3000 kN MACHINES:

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

C110-20 LOWER COMPRESSION PLATEN, hardened and rectified, dia. 165x50 mm to test cubes 100 mm (as an alternative to the distance piece 50 mm high)

C110-20

Note: Cylinders having Ø 160 x 320 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)

C109-10 SOFTWARE for compression tests with Digitec machine. See pag. 14
C123 SOFTWARE "servonet" for remote control through PC of Autotec machine. See pag. 14

C119-05 FRAGMENT GUARDS, polycarbonate, to CE safety Directive. See pag. 244
C121-07 SAFETY GUARDS, polycarbonate, with hinges and lock, to CE Directive. See pag. 244
C121-51 STOP SWITCH on safety guard. See pag. 244

C107-10 CAPPING RETAINERS (set of two) for cylinders Ø 150mm and 6"
C107-20 NEOPRENE PADS (set of two) for cylinders Ø 150mm 60 shore A

C110-30
UPPER COMPRESSION PLATEN + SPHERICAL SEAT, to fix on the testing machine in replacement of the standard assembly, to obtain an increased vertical clearance of the testing chamber and to meet the ASTM C39 and AASHTO T22 Specifications.
Platen dimensions: dia. 165 x 30 mm. Weight : 10 kg approx.
Technical details: pag. 243

C115-01
TWO WAY HYDRAULIC VALVE, connected to the motorized pumping unit of the machine to activate a second frame.
Technical details: see pag. 245

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 pag. 240

C097-01

AS AN ALTERNATIVE:

C097-02 DUAL LOW CAPACITY DIGITAL RANGE 0-300kN, complete with "strain gage load cell", only for digital machines. Technical details: see pag. 240

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. 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 pag. 240

C107-01
AUTO-CENTERING DEVICE for cubes 100 and 150 mm side and cylinders dia. 100 and 150 mm. Technical details: see pag. 243

C100
SPLITTING TENSILE test device for cylinders. EN 12390-6 / ASTM C496
Technical details and other models: see pag. 241

C100

C103
SPLITTING TENSILE test device for self blocking pavers and cubes.
EN 1338, 12390-6
Technical details: see pag. 241

C109-12 SOFTWARE for splitting tensile tests with digital machines. Technical details: see pag. 14

C106
FLEXURAL TEST DEVICE for concrete beams. EN 12390-5 / ASTM C78, C293 / AASHTO T97 / BS 1881:118 / NF P18-407 / UNI 6133
Technical details: see pag. 242

C106

C109-11
SOFTWARE for flexural tests on concrete beams with digital machines.
Technical details: see pag. 14

E170
COMPRESSION DEVICE to test cement specimens 40,1 x 40 mm. EN 196 / ASTM C349
Technical details and other models: see pag. 242

E170

C126
BENCH to hold the compression machine. Technical details: pag. 244

COMPRESSION TESTING MACHINE 3000 kN CAPACITY "TESTED FOR HIGH STABILITY"

To test cubes up to 200 mm side and cylinders up to dia. 160x320 mm

Cyber-Plus or Servo-Plus Evolution Touch Screen Digital System

STANDARDS: **EN 12390-4** / BS 1881:115 / UNI 6686 part 3 / DIN 51220, 51302
ASTM C39 / NF P18-411 / AASHTO T22 / UNE 83304

TECHNICAL SPECIFICATIONS:

- Max. vertical daylight 334,5 mm
- Compression platens dia. 287x60 mm
- Calibration accuracy: Grade 1.0
- Max. ram travel 60 mm approx.
- Hydraulic device to stop the piston's stroke at its max excursion, to avoid pumping the piston out of the cylinder.
- Power supply: 230 V 1 ph 50 Hz 750 W
- Dimensions: 750x450x1500 mm
- Weight: 1200÷1250 kg

C089-10 N + C104-04 + C127N + C111-12 + C121-07

C089-08N + C127N + C111-13 + C121-07 + C121-51

C089-10N + C127N + C111-12 + C121-07

ACCESSORIES:

C104-04
CONSOLE HOUSING THE SERVO-PLUS EVOLUTION
The pump assembly and the digital system are encased to enhance the design and look of the machine.

C104-05
ONLINE REMOTE ASSISTANCE PACKAGE
The machine features a connection to Internet through which Matest Customer Service provides real time support to analyze the problem, to find possible solution, and to carry out a proper test execution.

COMPRESSION 3000 kN High Stability

Model	Motorized	LOAD MEASURING SYSTEM: Cyber-Plus Evolution mod. C109N (pag. 158)	LOAD MEASURING SYSTEM: Servo-Plus Evolution mod. C104N (pag. 158)
C089-08 N	•	•	
C089-10 N	•		•

ACCESSORIES FOR 3000 kN MACHINES:

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

C110-20 LOWER COMPRESSION PLATEN, hardened and rectified, dia. 165x50 mm to test cubes 100 mm (as an alternative to the distance piece 50 mm high)

C110-20

Note: Cylinders having Ø 160 x 320 mm 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)

C109-10N SOFTWARE for compression tests with Cyber-Plus Evolution machine. See pag. 14

C123N SOFTWARE "servonet" for remote control through PC of Servo-Plus Evolution machine. See pag. 14

C104-10N
SERVO-STRAIN
Servocontrolled Software, system of:
- Load or Strength
- Displacement
- Strain

C104-10N

This system can be used only with Servo-Plus Evolution machine mod. C089-10N
Technical details see pag. 164

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, UNI 6556, ASTM C469 ISO 1920-10, DIN 1048. Technical details: see pag. 220

C121-07
SAFETY GUARDS, polycarbonate, complete with hinges and lock, to CE. Directive. See pag. 244

C121-51 STOP SWITCH on safety guard. See pag. 244

C107-10 CAPPING RETAINERS (set of two) for cylinders Ø 150mm and 6"

C107-20 NEOPRENE PADS (set of two) for cylinders Ø 150mm 60 shore A

C107-10

C110-30
UPPER COMPRESSION PLATEN + SPHERICAL SEAT, to fix on the testing machine in replacement of the standard assembly, to obtain an increased vertical clearance of the testing chamber and to meet the ASTM C39 and AASHTO T22 Specifications.
Platen dimensions: dia. 165 x 30 mm. Weight : 10 kg approx.
Technical details: see pag. 243

C115-01
TWO WAY HYDRAULIC VALVE, connected to the motorized pumping unit of the machine to activate a second frame.
Technical details: see pag. 245

C115-01

C097-01
DUAL LOW CAPACITY DIGITAL RANGE, complete with "appropriate pressure transducer".
Recommended range 0-250kN. Technical details: see pag. 240

AS AN ALTERNATIVE:

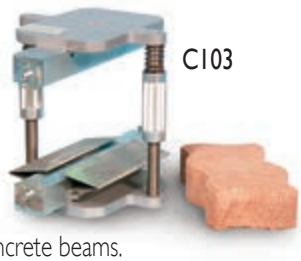
C097-02 DUAL LOW CAPACITY DIGITAL RANGE 0-300kN, complete with "strain gage load cell".
Technical details: see pag. 240

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 pag. 240

C107-01
AUTO-CENTERING DEVICE for cubes 100 and 150 mm side and cylinders dia. 100 and 150 mm. Technical details: see pag. 243

C103
SPLITTING TENSILE test device for self blocking pavers and cubes.
EN 1338, 12390-6
Technical details: see pag. 241


C103

C109-12N
SOFTWARE for splitting tensile tests. Technical details: see pag. 12

C106
FLEXURAL TEST DEVICE for concrete beams.
EN 12390-5 / ASTM C78, C293 / AASHTO T97 / BS 1881:118 / NF P18-407 / UNI 6133. Technical details: see pag. 242

C109-11N
SOFTWARE for flexural tests on concrete beams with digital machines.
Technical details: see pag. 14

C106

E170
COMPRESSION DEVICE to test cement specimens 40,1 x 40 mm. EN 196 / ASTM C349
Technical details and other models: see pag. 242

E170

C126
BENCH to hold the compression machine. Technical details: see pag. 244

COMPRESSION TESTING MACHINE 3000 kN CAPACITY "TESTED FOR HIGH STABILITY"

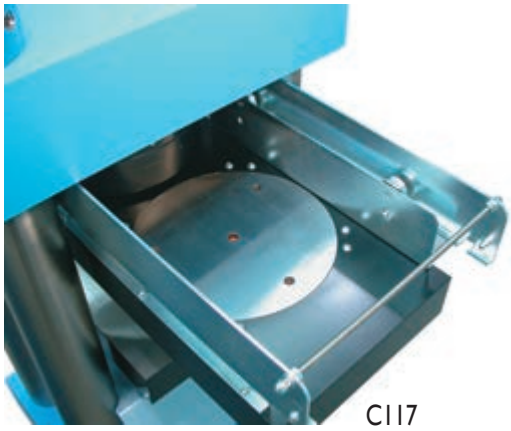
To test blocks max. 500x300 mm, cubes up to 200 mm side and cylinders up to dia. 160x320 mm

STANDARDS: **EN 12390-4, EN 772-1** / BS 1881:115, 6073 / UNI 6686 part 3 / DIN 51220, 51302 / NF P18-411 / ASTM C39, E447 AASHTO T22 / UNE 83304

TECHNICAL SPECIFICATIONS:

- Max. vertical daylight to test blocks: 283 mm
- Compression platens for blocks: 510x320x55 mm
- Max. vertical daylight to test cubes and cylinders: 334,5 mm
- Compression platens to test cubes and cylinders: dia. 287x60 mm
- Gauges dia. 250 mm with specific resistance scales for cubes 150 mm and cylinders dia. 150 and 160 mm
- Gauges divisions: 3000 kN div. 10 kN - 600 kN div. 2 kN
- Calibration accuracy: Grade 1.0
- Max. ram travel 60 mm approx.
- Hydraulic device to stop the piston's stroke at its max excursion, to avoid pumping the piston out of the cylinder.
- Power supply: 230 V 1 ph 50 Hz 750 W
- Dimensions: 750x520x1500 mm
- Weight: 1350÷1400 kg

C089-19A + C127N



C117

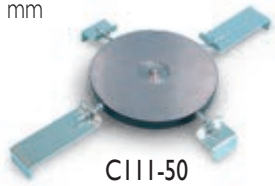
C089-17D + C127N

COMPRESSION 3000 kN High Stability Blocks

Model	Motorized	LOAD MEASURING SYSTEM			
		1 Gauge	2 Gauge	Digitec mod. C108N (pag. 155)	Autotec mod. C098N (pag. 155)
C089-15	•	•			
C089-16	•		•		
C089-17 D	•			•	
C089-19 A	•				•

ACCESSORIES FOR 3000 kN BLOCKS MACHINES:

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: Cylinders having Ø 160 x 320 mm do not require any distance piece.


C111-50

C111-50
DISTANCE PIECE
It eliminates the heavy procedure to lift the lower rectangular platen and to add distance pieces.
Technical details: see pag. 247

C112-05

AS AN ALTERNATIVE:

C112-05
KIT of 4 HANDLES to lift the lower platen, making the positioning of distance pieces easier. Technical details: see pag. 247

C117
SLIDING RAIL CARRIAGE, for an easy removal of the upper block platen, to perform tests on blocks or on standard cubes and cylinders.

C127N GRAPHIC PRINTER on thermo-paper on board for digital models
C127-11 THERMO-PAPER roll for printer (pack of 10 rolls)

C109-10 SOFTWARE for compression tests with Digitec machine. See pag. 14
C123 SOFTWARE "servonet" for remote control through PC of Autotec machine. See pag. 14

C121-08 SAFETY GUARDS, polycarbonate, with hinges and lock, to CE Directive. See pag. 244
C121-51 STOP SWITCH on safety guard. See pag. 244

C115-01
TWO WAY HYDRAULIC VALVE, connected to the motorized pumping unit of the machine to activate a second frame.
Technical details: see pag. 245

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 pag. 240

AS AN ALTERNATIVE:

C097-01

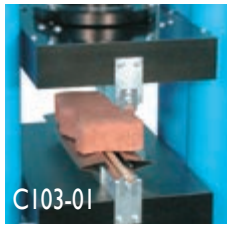
C097-02
DUAL LOW CAPACITY DIGITAL RANGE 0-300kN, complete with "strain gage load cell", only for digital machines.
Technical details: see pag. 240

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. 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 pag. 240

C100 SPLITTING TENSILE test device for cylinders.
EN 12390-6 / ASTM C496
Technical details and other models: see pag. 241

C103
SPLITTING TENSILE test device for self blocking pavers and cubes.
EN 1338, 12390-6
Technical details: see pag. 241


C103-01

AS AN ALTERNATIVE:

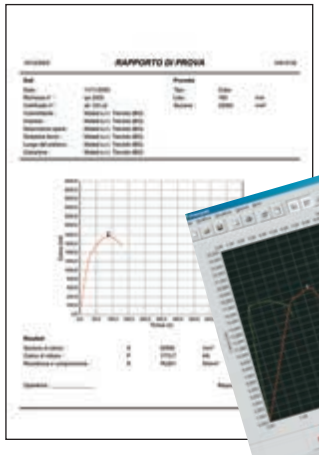
C103-01
SPLITTING TENSILE test device for self blocking pavers and cubes max. dimensions 300 x 500 mm.
EN 1338, 12390-6. Technical details: see pag. 241

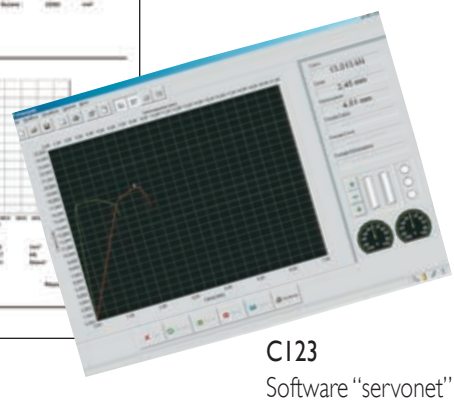
C109-12 SOFTWARE for splitting tensile tests with digital machines. Technical details: see pag. 14

C106
FLEXURAL TEST DEVICE for concrete beams. EN 12390-5 / ASTM C78, C293 / AASHTO T97 / BS 1881:118 / NF P18-407 / UNI 6133
Technical details: see pag. 242

C106

C109-11
SOFTWARE for flexural tests on concrete beams with digital machines.
Technical details: see pag. 14


C109-10
Software Compression


C123
Software "servonet"

E170
COMPRESSION DEVICE to test cement specimens 40,1 x 40 mm. EN 196 / ASTM C349
Technical details and other models: see pag. 242

E170

C126
BENCH to hold the compression machine. Technical details: see pag. 244

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 dia. 160x320 mm

Cyber-Plus or Servo-Plus Evolution Touch Screen Digital System

STANDARDS: **EN 12390-4, EN 772-1** / BS 1881:115, 6073 / UNI 6686, part 3 / DIN 51220, 51302 / NF P18-411 ASTM C39, E447 / AASHTO T22 / UNE 83304

TECHNICAL SPECIFICATIONS:

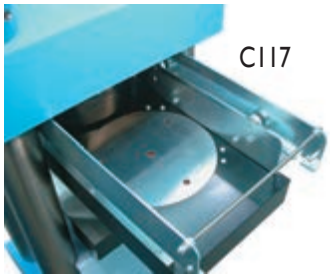
- Max. vertical daylight to test blocks: 283 mm
- Compression platens for blocks: 510x320x55 mm
- Max. vertical daylight to test cubes and cylinders: 334,5 mm
- Compression platens to test cubes and cylinders: dia. 287x60 mm
- Calibration accuracy: Grade 1.0
- Max. ram travel 60 mm approx.
- Hydraulic device to stop the piston's stroke at its max excursion, to avoid pumping the piston out of the cylinder.
- Power supply: 230 V 1 ph 50 Hz 750 W
- Dimensions: 750x520x1500 mm
- Weight: 1350÷1400 kg

C089-19N + C104-04 + C127N

ACCESSORIES:

C104-04
CONSOLE HOUSING THE SERVO-PLUS EVOLUTION
The pump assembly and the digital system are encased to enhance the design and look of the machine.

C104-05
ONLINE REMOTE ASSISTANCE PACKAGE
The machine features a connection to Internet through which Matest Customer Service provides real time support to analyze the problem, to find possible solution, and to carry out a proper test execution.



C117

C089-17N + C127N

C089-19N + C127N

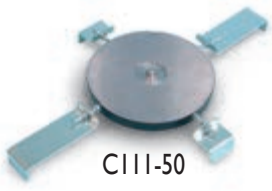
COMPRESSION 3000 kN High Stability Blocks

Model	Motorized	LOAD MEASURING SYSTEM: Cyber-Plus Evolution mod. C109N (pag. 158)	LOAD MEASURING SYSTEM: Servo-Plus Evolution mod. C104N (pag. 158)
C089-17 N	•	•	
C089-19 N	•		•

ACCESSORIES FOR 3000 kN BLOCKS MACHINES:

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
C111-24 DISTANCE PIECE 50 mm high
C111-25 DISTANCE PIECE 73 mm high
Note: Cylinders having Ø 160 x 320 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 pag. 247


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 pag. 247

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.

C127N GRAPHIC PRINTER on thermo-paper on board

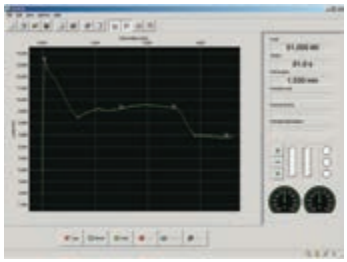
C127-11 THERMO-PAPER roll for printer (pack of 10 rolls)

C109-10N SOFTWARE for compression tests with Cyber-Plus Evolution machine. See pag. 14

C123N SOFTWARE "servonet" for remote control through PC of Servo-Plus Evolution machine. See pag. 14

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 pag. 164


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, UNI 6556, ASTM C469 ISO 1920-10, DIN 1048. Technical details: see pag. 220

C121-08 SAFETY GUARDS, polycarbonate, with hinges and lock, to CE Directive. See pag. 244

C121-51 STOP SWITCH on safety guard. See pag. 244

C115-01 TWO WAY HYDRAULIC VALVE, connected to the motorized pumping unit of the machine to activate a second frame. Technical details: see pag. 245

C097-01
DUAL LOW CAPACITY DIGITAL RANGE, complete with "appropriate pressure transducer". Recommended range 0-250kN.
Technical details: see pag. 240

C097-01

AS AN ALTERNATIVE:

C097-02
DUAL LOW CAPACITY DIGITAL RANGE 0-300kN, complete with "strain gage load cell". Technical details: see pag. 240

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.

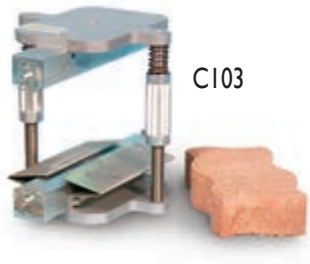
C097-08
OFFICIAL ACCREDIA (Equivalent UKAS, ENAC, DAKKS, SAS, COFRAC etc.) HARDNESS CERTIFICATE of upper and lower compression platens. Minimum hardness: 55 HRC. See pag. 240

C100 SPLITTING TENSILE test device for cylinders.
EN 12390-6 / ASTM C496
Technical details and other models: see pag. 241

C100

C103-01
SPLITTING TENSILE test device for self blocking pavers and cubes, max. dimensions 300x500 mm.
EN 1338, 12390-6
Technical details: see pag. 241

C109-12N
SOFTWARE for splitting tensile tests.
Technical details: see pag. 14


C103

C106
FLEXURAL TEST DEVICE for concrete beams.
EN 12390-5 / ASTM C78, C293 / AASHTO T97 / BS 1881:118 / NF P18-407 / UNI 6133.
Technical details: see pag. 242

C109-11N
SOFTWARE for flexural tests on concrete beams.
Technical details: see pag. 14

C106

E170
COMPRESSION DEVICE to test cement specimens 40,1 x 40 mm.
EN 196 / ASTM C349
Technical details and other models: see pag. 242

E170

C126
BENCH to hold the compression machine. Technical details: see pag. 244

COMPRESSION TESTING MACHINE 4000 kN CAPACITY "TESTED FOR HIGH STABILITY"

To test cubes up to 200 mm side and cylinders up to dia. 250x500 mm

Cyber-Plus or Servo-Plus Evolution Touch Screen Digital System

NEW

STANDARDS: **EN 12390-4** / BS 1881:115 / UNI 6686 part 3 / DIN 51220, 51302
ASTM C39 / NF P18-411 / AASHTO T22 / UNE 83304

TECHNICAL SPECIFICATIONS:

- Max. vertical daylight: 590 mm
- Compression platens dia. 287x60 mm
- Calibration accuracy: Grade 1.0
- Max. ram travel 60 mm approx.
- Hydraulic device to stop the piston's stroke at its max excursion, to avoid pumping the piston out of the cylinder.
- Power supply: 230 V 1 ph 50 Hz 750 W
- Dimensions: 1200x900x1900 mm
- Weight: 2800÷2900 kg

C088-11N

C088-10N

ACCESSORIES:

C104-05

ONLINE REMOTE ASSISTANCE PACKAGE

The machine features a connection to Internet through which Matest Customer Service provides real time support to analyze the problem, to find possible solution, and to carry out a proper test execution.

COMPRESSION 4000 kN High Stability

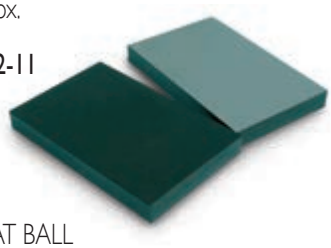
Model	Motorized	LOAD MEASURING SYSTEM: Cyber-Plus Evolution mod. C109N (pag. 158)	LOAD MEASURING SYSTEM: Servo-Plus Evolution mod. C104N (pag. 158)
C088-10 N	•	•	
C088-11 N	•		•

ACCESSORIES FOR 4000 kN MACHINES:

C086-10 DISTANCE PIECE 50 mm high
C086-11 DISTANCE PIECE 25 mm high

Note: Vertical daylight of the compression platens is 590 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)

C109-10N SOFTWARE for compression tests with Cyber-Plus Evolution machine. See pag. 14

C123N SOFTWARE "servonet" for remote control through PC of Servo-Plus Evolution machine. See pag. 14

C104-10N

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 pag. 164

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, UNI 6556, ASTM C469 ISO 1920-10, DIN 1048.
Technical details: see pag. 220

C121-04 SAFETY GUARDS, polycarbonate, with hinges and lock, to CE Directive. See pag. 244

C121-51 STOP SWITCH on safety guard. See pag. 244

C115-01
TWO WAY HYDRAULIC VALVE, connected to the motorized pumping unit of the machine to activate a second frame.
Technical details: see pag. 245

C115-01

C097-01
DUAL LOW CAPACITY DIGITAL RANGE, complete with "appropriate pressure transducer".
Recommended range 0-250kN
Technical details: see pag. 240

C097-01

AS AN ALTERNATIVE:

C097-02
DUAL LOW CAPACITY DIGITAL RANGE 0-300kN, complete with "strain gage load cell".
Technical details: see pag. 240

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 pag. 240

C107-01
AUTO-CENTERING DEVICE for cubes 100 and 150 mm side and cylinders dia. 100 and 150 mm. Technical details: see pag. 243

C103
SPLITTING TENSILE test device for self blocking pavers and cubes. EN 1338, 12390-6
Technical details: see pag. 241

C103

C109-12N
SOFTWARE for splitting tensile tests. Technical details: see pag. 12

C106
FLEXURAL TEST DEVICE for concrete beams.
EN 12390-5 / ASTM C78, C293 / AASHTO T97 / BS 1881:118 / NF P18-407 / UNI 6133. Technical details: see pag. 242

C109-11N
SOFTWARE for flexural tests on concrete beams with digital machines.
Technical details: see pag. 14

C106

E170
COMPRESSION DEVICE to test cement specimens 40,1 x 40 mm. EN 196 / ASTM C349
Technical details and other models: see pag. 242

E170

COMPRESSION TESTING MACHINES 3000 kN AND 5000 kN CAPACITY "TESTED FOR HIGH STABILITY"

This oversized isostatic high stability stiffness frame grants extreme performances and is the ideal for central and research laboratories for tests on high strength specimens, "explosive samples", rock and ceramic samples, etc.

Cyber-Plus or Servo-Plus Evolution Touch Screen Digital System

STANDARDS: **EN 12390-4** / BS 1881:115 / DIN 51220, 51223, 51302 / UNI 6686 part 3 / NF P18-411

TECHNICAL SPECIFICATIONS:

- **High stiffness frame: 0,3mm at max. load**
- Four chromed columns dia. 150 mm (dia. 180 mm for 5000 kN version)
- Compression platens dia. 316 x 60 mm
- Platens hardness : 60 HRC
- Max. vertical daylight: 411 mm
- Light between columns: 321 mm
- Max. ram travel: 100 mm
- Hydraulic pressure: 360Bar at 3000kN (or 5000 kN)
- Ball seating in oil bath with null end float and up to 3° inclination
- Safety guards to CE Directive polycarbonate and aluminium made
- Grade of accuracy "1"
- Frame size 3000 kN: 725 x 710 x h 1570 mm
- Frame size 5000 kN: 750 x 750 x h 1700 mm
- Power supply: 230V 1ph 50Hz 750W
- Weight frame 3000 kN: 2500 kg
- Weight frame 5000 kN: 4000 kg

C088-01N

C087-01N

COMPRESSION 3000/5000 kN High Stability

Model	Code	Motorized	LOAD MEASURING SYSTEM	
			Cyber-Plus Evolution mod. C109N (pag. 158)	Servo-Plus Evolution mod. C104N (pag. 158)
3000 kN	**C087 N**	•	•	
3000 kN	**C087-01 N**	•		•
5000 kN	**C088 N**	•	•	
5000 kN	**C088-01 N**	•		•

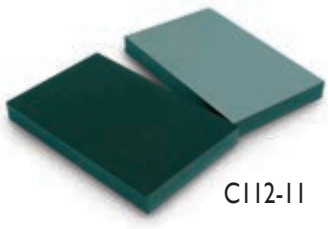
ACCESSORIES FOR 3000 kN and 5000 kN MACHINES:

C087-11 DISTANCE PIECE 50 mm high
C087-12 DISTANCE PIECE 25 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
UPPER+LOWER LARGE COMPRESSION PLATENS+SEAT BALL 310x510x55 mm, to test "also" blocks. It is necessary to foresee also the sliding rail carriage mod. C117

C117
SLIDING RAIL CARRIAGE, for an easy removal of the large block upper platen.


C112-11

C117

C127N
GRAPHIC PRINTER on thermo-paper on board

C127-11 THERMO-PAPER roll for printer (pack of 10 rolls)

C109-10N SOFTWARE for compression tests with Cyber-Plus Evolution machine. See pag. 14

C123N SOFTWARE "servonet" for remote control through PC of Servo-Plus Evolution machine. See pag. 14

C104-10N
SERVO-STRAIN
Servocontrolled Software, system of:
- Load or Strength
- Displacement
- Strain

C104-10N

This system can be used only with Servo-Plus Evolution machine mod. C087-01N and C088-01N
Technical details see pag. 164

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. UNI 6556, ASTM C469, ISO 6784, DIN 1048.
Technical details: see pag. 220

C115-01
TWO WAY HYDRAULIC VALVE, connected to the motorized pumping unit of the machine to activate a second frame.
Technical details: see pag. 245

C115-01

C097-01
DUAL LOW CAPACITY DIGITAL RANGE, complete with "appropriate pressure transducer". Recommended range 0-250kN. Technical details: see pag. 240

C097-01

AS AN ALTERNATIVE:

C097-02
DUAL LOW CAPACITY DIGITAL RANGE 0-300kN, complete with "strain gage load cell".
Technical details: see pag. 240

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 pag. 240

C100

C100
SPLITTING TENSILE test device for cylinders. EN 12390-6 / ASTM C496
Technical details and other models: see pag. 241

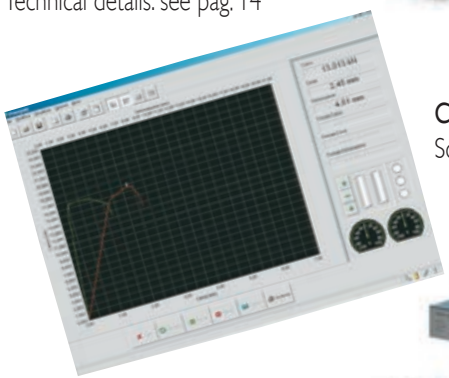
C109-12N
SOFTWARE for splitting tensile tests.
Technical details: see pag. 14

C103

C106
FLEXURAL TEST DEVICE for concrete beams. EN 12390-5 / ASTM C78, C293 / AASHTO T97 / BS 1881:118 / NF P18-407 / UNI 6133
Technical details: see pag. 242

C106

C109-11N
SOFTWARE for flexural tests on concrete beams.
Technical details: see pag. 14


C123N
Software "servonet"

E170

E170
COMPRESSION DEVICE to test cement specimens 40,1 x 40 mm. EN 196 / ASTM C349
Technical details and other models: see pag. 242

C125N + C089-04N + H009-01

C125N

Determination of the secant compression ELASTIC MODULUS on concrete System: Automatic with pace rate control also when releasing the load

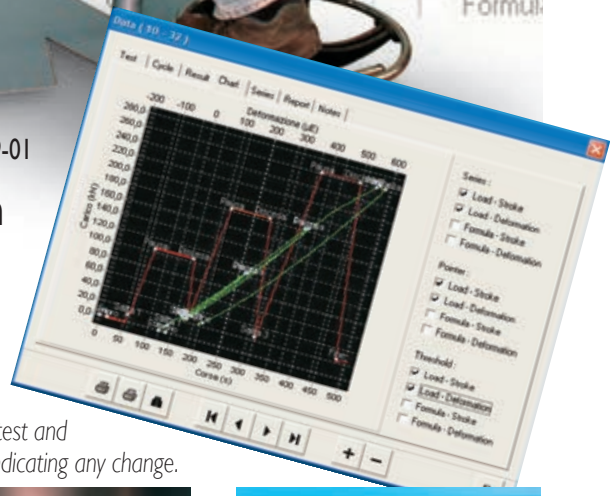
STANDARDS: **EN 12390-13** / ISO 1920-10:2010 / UNI 6556
ASTM C469 / DIN 1048

It can be used with a MATEST high stability frame with capacity of 2000 or 3000 or 5000 kN 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 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.



Screen during a test and marker indicating any change.

C125-13

C134

- Data acquisition and processing software UTM2 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 personalise the test profile, that will be effected in a completely automatic way by the testing machine.

The user can introduce a list of 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 by means of the communication port RJ (Network Connection) to a Personal Computer, that can be already by the end user or supplied separately all the data of the test. These data will be processed by the software and transformed in a graph load/deformation and load/time, following the International Standards.
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 accessory).

ACCESSORY:

C125-01N
SOFTWARE FOR ELASTIC MODULUS TESTS ON ROCKS
STANDARDS: ASTM D3148, D2938, D5407, D2264,
UNI 9724-8 – 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:

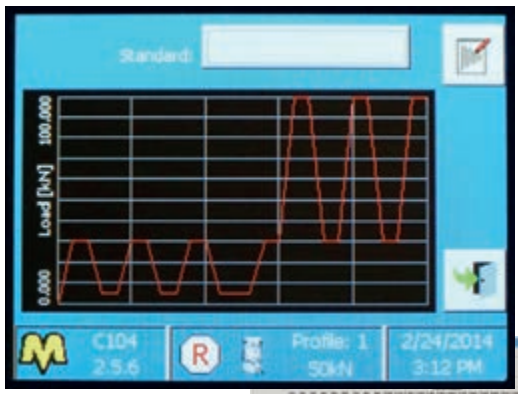
B) EXTENSOMETERS /COMPRESSOMETERS, electronic, universal, mechanical frame, mod. C134 (see accessories)

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 pag. 222

C134

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



Test graph to EN 12390-13

ACCESSORIES:

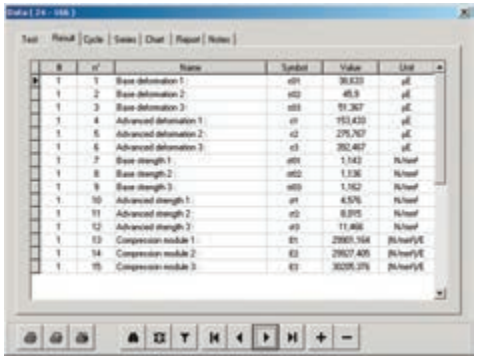
A) EXTENSOMETERS (STRAIN GAGES), SINGLE USE, ELECTRIC
Pack of 10 pieces
Available models:
C125-10 Electric extensometer, base length 10 mm
C125-11 Electric extensometer, base length 20 mm
C125-12 Electric extensometer, base length 30 mm
C125-13 Electric extensometer, base length 60 mm

Test with longitudinal and transversal deformations

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


Test data

... follows...

DETERMINATION OF THE SECANT COMPRESSION ELASTIC MODULUS TEST ON CONCRETE AND MORTAR SPECIMENS

C134
Electronic Universal EXTENSOMETER/COMPRESSOMETER

STANDARDS: ASTM C469 / ISO 6784 / BS 1881:121 / DIN 1048:1

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 fixed 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 fixing system through two elastic adjustable straps.
The instrument is equipped of a mechanical knob to lock and unlock the displacement transducer, allowing to maintain safe the selected base length during the fixing action 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 reducing length block.
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 of 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 ASTM C469, ISO 1920-10:2010, UNI 6556 Specifications (see page 220)
- 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.

C134 with case

C130-05
FIRMWARE for Elastic Modulus test on Concrete, Mortar and Rock specimens.
Automatic data and processing acquisition, load/deformation graphic 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 ASTM C469 or ISO 1920-10:2010 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

C131N + S375

C130N + S375

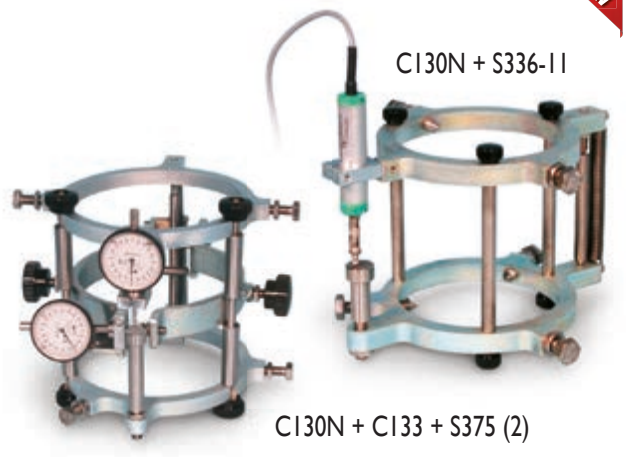
AVAILAB LE MODELS:

C130N COMPRESSOMETER for cylinders dia. 150x300mm; dia. 160x320mm; dia. 6"x12"

C131N COMPRESSOMETER for cylinders dia. 100x200mm; dia. 112,8x220mm; dia. 4"x8" NEW

C132N COMPRESSOMETER for cubes 150 mm side. NEW

C132-01N COMPRESSOMETER for cubes 200 mm side. NEW



C130N + S336-11

C130N + C133 + S375 (2)

C133

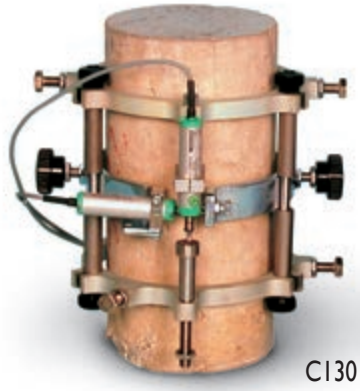
Compressometer-Extensometer

STANDARD: ASTM C469

To measure both axial deformation and diametrical extension of cylinder specimens dia. 150x300mm, 160x320mm, 8"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).



C130 N + C133 + S336-11(2)

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 pag. 453

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 1920-10:2010, UNI 6556 Specifications (see page 220)
- 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 and Mortar specimens.

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 ASTM C469 or ISO 1920-10:2010 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

- 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 as prescribed by **EN 12390-5** Spec., or centre point loading by simply removing one upper roller and placing the other in the centre.

WE PROPOSE DIFFERENT FLEXURAL FRAMES:

C090 SERIE

C091 SERIE

- **C090** Serie with frame to perform flexural tests on concrete beam specimens having max. dimensions of 150x150x750 mm conforming to the Specifications: **EN 12390-5** UNI 6133 / ASTM C78, C293 / AASHTO T97 BS 1881:118 / UNE 83305 / NF P18-407 DIN 51227
See pag. 226

- **C091** Serie with "**open sided frame**" to perform flexural tests on concrete beam specimens having max. dimensions of 200x200x800 mm conforming to the a.m. Specifications, and in addition to perform tests on:
  - Flat blocks (max. width 600 mm) conforming to the BS 6073-1
  - Flagstones and Kerbs conforming to **EN 1340:2004** / BS 7263-1
  - Kerbs conforming to the NF P98-302
  - Any type of beam having max. size 600xh250 mm (lower rollers max. length 1325 mm)

See pag. 228

C090-06 SERIE

- **C090-06** Serie with high stiffness flexure frame 200 kN capacity to perform tests on concrete beams max. dimensions 150x150x750 mm, and in addition tests on:
  - Flat blocks, max. width 600 mm (BS 6073-1)
  - Flagstones and Kerbs (BS 7263, NF P98-302)
  - Any type of beam having max. width 600 mm and max. height 150 mm
  - Energy absorption on sprayed concrete samples (**EN 14488-3**, **14488-7**, UNI 10834)

See pag. 230

- **C093** Serie 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 550xh550 mm (adjustable distance between lower rollers up to max. 1325 mm)

See pag. 234

C093 SERIE

It is also possible, by using suitable accessories, to perform the following tests:

Ductility on fiber reinforced concrete (FRC), and concrete with polymer fibre lining (FRP)
Standards: EN 14651, 11039-2 / ASTM C1018 (see pag. 232)

Measurement of deflection on concrete beams 100x100x400/500 mm and 150x150x600 mm.
Standard: ASTM C1018 (see pag. 232)

- Compression test on portions of 40.1x40x160 mm mortar prisms broken in flexure conforming to EN 196, DIN 1164 Specifications (compression devices mod. E170, E170-01 - see pag. 242)
- Compression tests on 50 mm mortar cubes, conforming to ASTM C109 (Compression device mod. E171 - see pag. 242)
- Compression tests on 70 mm mortar cubes, conforming to BS 4550 (Compression device mod. E171-01 - see pag. 242)
- Splitting tensile test on cylindrical specimens dia. 100, 150, 160 mm conforming to EN 12390/6 / NF P18-408 / BS 1881:117 ASTM C496 / UNI 6135 (Device mod. C101-01 - see pag. 241)
- Splitting tensile test on concrete cubes and concrete block pavers, conforming to EN 12390/6, 1338 (Device mod. C103 - see pag. 241)

FLEXURAL TESTING MACHINE 150 kN CAPACITY

To perform flexural tests on concrete beam specimens max. dimensions 150x150x600 (750) mm

STANDARDS: **EN 12390-5** / ASTM C78, C293 / AASHTO T97 / BS 1881:118 / NF P18-407 / UNE 83305 / UNI 6133 / DIN 51227

TECHNICAL SPECIFICATIONS:

- Max. vertical daylight between upper/lower rollers: 160 mm
- Rollers dimensions: dia. 40x160 mm
- Complete with 4 adjustable and articulated rollers for two point loading
- Distance between lower rollers adjustable from 100 to 455 mm
- Distance between upper rollers adjustable from 40 to 155 mm
- Possibility to easily place in the centre one upper roller for centre point loading
- Rollers are hardened, casehardened and rectified
- Graduated scales are foreseen to get easy roller's adjustment
- Gauge diameter 250 mm and div. 0.5 kN
- Max. ram travel 50 mm approx.
- Calibration accuracy: grade 1.0
- Hydraulic device to stop the piston's stroke at its max excursion, to avoid pumping the piston out of the cylinder
- Power supply (motorized models): 230 V 1 ph 50 Hz 750 W
- Dimensions: 540x460x960 mm
- Weight: 180÷240 kg.

C090-03N + C104-04 + C127N

C090-02N + C127N

C090-02D + C127N

C090-01 + C111-16

FLEXURAL 150 kN capacity

Model	Hand Operated	Motorized	Gauge	LOAD MEASURING SYSTEM: Cyber-Plus Evolution mod. C109N (pag. 158)	Servo-Plus Evolution mod. C104N (pag. 158)	Digitec mod. C108N (pag. 155)	Autotec mod. C098N (pag. 155)
C090	•		•				
C090-01		•	•				
C090-02 N		•		•			
C090-03 N		•			•		
C090-02 D		•				•	
C090-03 A		•					•

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

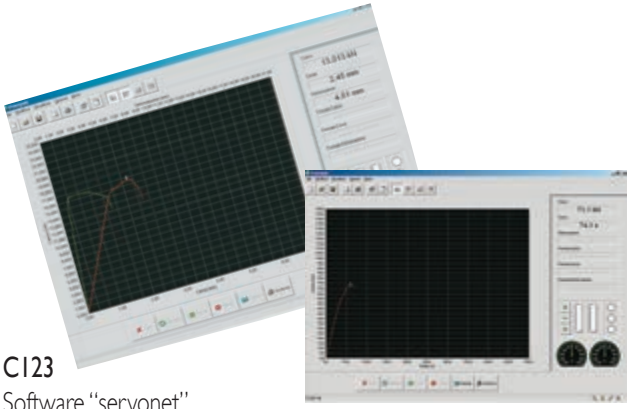
C127-11 THERMO-PAPER roll for printer (pack of 10 rolls)

C109-11N SOFTWARE for flexure tests with Cyber-Plus Evolution machine (see pag. 14)

C109-11 SOFTWARE for flexure tests with Digitec machine (see pag. 14)

C123 SOFTWARE "servonet" for remote control through PC of Autotec machine (see pag. 14)

C123N SOFTWARE "servonet" for remote control through PC of Servo-Plus Evolution machine (see pag. 14)



C123
Software "servonet"

C109-11 Software Flexure

C115-01
TWO WAY HYDRAULIC VALVE, connected to the motorized pumping unit of the machine to activate a second frame.
Technical details: see pag. 245

C115-01

C104-04
CONSOLE HOUSING THE SERVO-PLUS EVOLUTION, the pump assembly are encased to enhance the design of the machine.

C097-01
DUAL LOW CAPACITY DIGITAL RANGE, complete with "appropriate pressure transducer", only for digital machines.
Range selectable from 10kN to 100kN
Technical details: see pag. 240

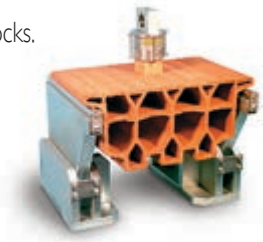
C097-01

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.
Applicable only on digital machines.

C100

C100
SPLITTING TENSILE test device for cylinders. EN 12390-6 / ASTM C496
Technical details and other models: see pag. 241

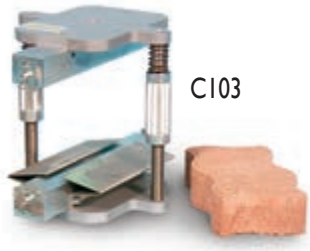
C093-11
DEVICE for flexural tests on clay blocks.
STANDARD: UNI 9730-3
Technical details: see pag. 249



C093-11

C109-16N
SOFTWARE for flexural tests on clay blocks (see pag. 14)

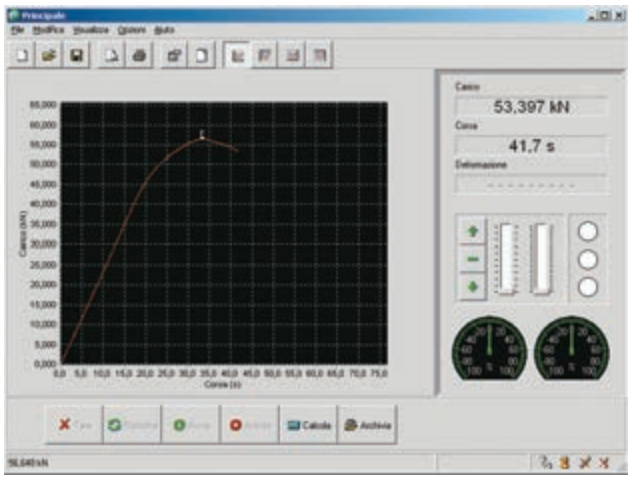
C103
SPLITTING TENSILE test device for self blocking pavers and cubes. EN 1338, 12390-6
Technical details: see pag. 241



C103

C109-12 SOFTWARE for splitting tensile tests with Digitec machines. Technical details: see pag. 14

C109-12N SOFTWARE for splitting tensile tests with Cyber-Plus Evolution machine. Technical details: see pag. 14



C109-12 Graphic of splitting tensile test execution

E170
COMPRESSION DEVICE to test cement specimens 40,1 x 40 mm.
EN 196 / ASTM C349
Technical details and other models: see pag. 242

E170

E172-01
FLEXURE DEVICE for cement 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 pag. 352

E172-01

C126
BENCH to hold the compression machine. Technical details: see pag. 244

C126

FLEXURAL TESTING MACHINE 150kN CAPACITY "OPEN SIDED FRAME"

To perform flexural tests on concrete beam specimens max. dimensions 200x200x800mm, flat blocks, flagstones, kerbs, tiles, slabs, masonry units, and any type of material having max. size 600x250 mm (lower rollers max. length 1325 mm)

STANDARDS: **EN 12390-5 / EN 1340:4** / ASTM C78, C293 / AASHTO T97 / BS1881 :118, BS 6073-1, BS 7263 / UNE 83305 NF P18-407, P98-302 / DIN 51227 / UNI 6133

TECHNICAL SPECIFICATIONS :

- **"Open sided frame"** for an easy and fast positioning of the specimen between the rollers
- Max. vertical daylight between upper/lower rollers: 260 mm, with possibility to select intermediate daylights positions of 210, 160, 110 and 60 mm
- Rollers dimensions: dia. 40 x 613 mm
- Possibility to easily place in the centre one upper roller for centre point loading
- Graduated scales are foreseen to get easy roller's adjustment
- Gauge diameter 250 mm and div. 0,5 kN
- Ram travel 110mm approx.
- Calibration accuracy: grade 1.0
- Simple action piston with counterweights to optimise frictions
- Power supply: 230V 1ph 50Hz 750W
- Dimensions: 1400 x 1200 xh 1430 mm
- Weight: 350 kg

C091-02D + C127N + C091-12

C091-02N
+ C127N + C091-12

C091-03N + C127N + C091-12

THE FRAME IS SUPPLIED **"WITHOUT"** UPPER/LOWER ROLLERS GROUP,TO BE ORDERED SEPARATELY
(Possibility to choose between different types of rollers-group. See accessories).

FLEXURAL 150 kN capacity

Model	Motorized	LOAD MEASURING SYSTEM				
		Gauge	Cyber-Plus Evolution mod. C109N (pag. 158)	Servo-Plus Evolution mod. C104N (pag. 158)	Digitec mod. C108N (pag. 155)	Autotec mod. C098N (pag. 155)
C091-01	•	•				
C091-02 N	•		•			
C091-03 N	•			•		
C091-02 D	•				•	
C091-03 A	•					•

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.

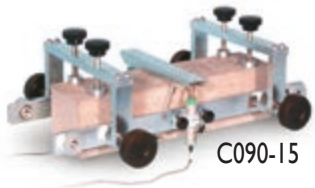
C091-14
ROLLERS GROUP: lower adjustable from 75 to 1325 mm, and **"only one"** upper central roller for single point method.

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, 1339**

C090-15
DEFLECTION MEASUREMENT TEST on fiber reinforced concrete beams 100x100x400(500) mm and 150x150x500(600) mm
STANDARDS: **EN 11039-02, 14487-1, 14488-3**
ASTM C1609, C1609M
The test is performed with the specific equipment (deflection measurement device, displacement transducers) described at pag. 232 and the automatic servocontrolled system of load and displacement **Servoplus** (see pag. 164)

C109-15N
Software for deflection measurement test on fiber reinforced concrete (see pag. 14


C090-15

C093-11

C093-11 DEVICE for flexural tests on clay blocks for flooring.
STANDARD: UNI 9730-3

C109-16N
SOFTWARE for flexural tests on clay blocks (see pag. 14)

C127N GRAPHIC PRINTER on thermo-paper on board for digital models

C127-11 THERMO-PAPER roll for printer (pack of 10 rolls)

C109-11 SOFTWARE for flexure tests with Digitec and Cyber-Plus Evolution machines. See pag. 14

C123 SOFTWARE "servonet" for remote control through PC of Autotec and Servo-Plus Evolution machines. See pag. 14

C115-01

C115-01
TWO WAY HYDRAULIC VALVE, connected to the motorized pumping unit of the machine to activate a second frame.
Technical details: see pag. 245

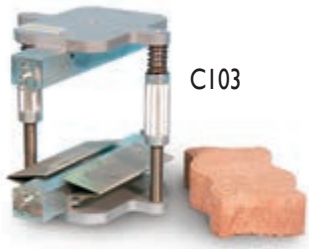
C097-01
DUAL LOW CAPACITY DIGITAL RANGE, complete with "appropriate pressure transducer", only for digital machines. Range selectable from 10kN to 100kN.
See pag. 240

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. Applicable only on digital machines.

C100
SPLITTING TENSILE test device for cylinders. EN 12390-6 / ASTM C496 Technical details and other models: see pag. 241

C103
SPLITTING TENSILE test device for self blocking pavers and cubes. EN 1338, 12390-6
Technical details: see pag. 241


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 pag. 241

C109-12
SOFTWARE for splitting tensile tests with digital machines.
Technical details: see pag. 14

C103-02

E170

E170
COMPRESSION DEVICE to test cement specimens 40,1 x 40 mm.
EN 196 / ASTM C349
Technical details and other models: see pag. 242

E172-01

E172-01
FLEXURE DEVICE for cement 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 pag. 352

Flexural frame "high stiffness" stability CAPACITY 200 kN

To perform 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.

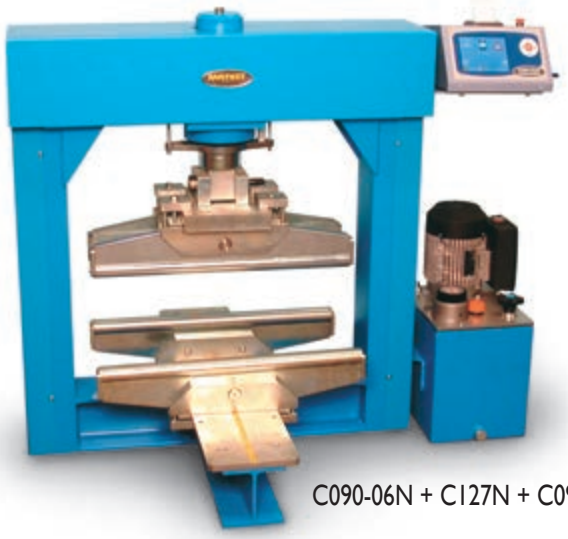
STANDARDS: **EN 12390-5 / EN 1340:4 /** BS 1881:118, 6073-1, 7263 / ASTM C78, C293 / AASHTO T97 / NF P18-407, P98-302 / UNE 83305 DIN 51227

TECHNICAL SPECIFICATIONS:

- High stiffness frame with minimum deflection at maximum load (0,9 mm)
- Capacity load: 200 kN
- Max. vertical daylight between upper/lower rollers: 160 mm
- Ram travel: 110 mm, to obtain minimun daylight of 50 mm
- Horizontal daylight of the testing chamber: 720 mm
- Graduated scales are foreseen to get easy roller's adjustment
- Simple action piston with counterweights to optimize frictions
- Power supply: 230V 1ph 50Hz 750W
- Dimensions: 990 x 970 xh 1105 mm
- Weight : 190 - 250 kg

C090-07N + C127N + C104-04 + C090-13

THE FRAME IS SUPPLIED "**WITHOUT**" UPPER/LOWER ROLLERS GROUP, TAMPER, BASE SUPPORT ETC. TO BE ORDERED SEPARATELY (see accessories).



C090-06N + C127N + C090-13

C090-07A + C127N + C090-13

FLEXURAL 200 kN capacity High Stiffness

Model	Capacity kN	LOAD MEASURING SYSTEM			
		Cyber-Plus Evolution mod. C109N (pag. 158)	Servo-Plus Evolution mod. C104N (pag. 158)	Digitec mod. C108N (pag. 155)	Autotec mod. C098N (pag. 155)
C090-06 N	200	•			
C090-07 N	200		•		
C090-06 D	200			•	
C090-07 A	200				•

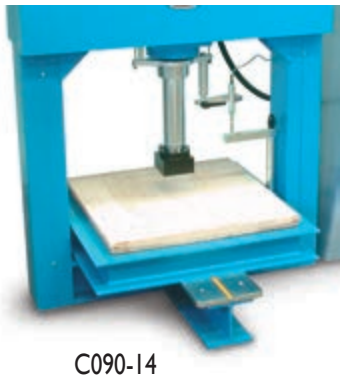
ACCESSORIES FOR FLEXURAL 200 kN "HIGH STIFFNESS":

Rollers, dia. 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.

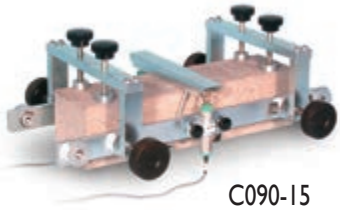
ACCESSORY FOR C090-13:
C090-21
ROLLERS-HOLDERS (lowers only) 613 mm long, to be installed on the C090-13 group in order to modify the max. vertical daylight at 60 mm and min. at -50 mm to test tiles, slabs etc. with max. thickness of 50 mm and flexibility up to -45 mm.

C090-14
ENERGY ABSORPTION TEST on sprayed concrete specimens.
STANDARDS: **EN 14488-5, comparable to EN 10834**
The test is performed with the specific equipment (square base 700x700 mm, loading element, displacement transducer) described at pag. 203 and the Software/ Firmware automatic system of load and displacement **Servo Strain** (pag. 164)


C090-14

C090-15
DEFLECTION MEASUREMENT TEST on fiber reinforced concrete beams 100x100x400(500) mm and 150x150x500(600) mm
STANDARDS: **EN 11039-02, 14487-1, 14488-3** / ASTM C1609, C1609M
The test is performed with the specific equipment (deflection measurement device, displacement transducers) described at pag. 202 and the Software/Firmware automatic system of load and displacement **Servo Strain** (pag. 164)

C109-15N
SOFTWARE for energy absorption test on sprayed concrete specimens and deflection measurement tests on fiber reinforced concrete beams (see pag. 14)


C090-15

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, 1339

C091-13

C093-11
DEVICE for flexural tests on clay blocks for flooring.
STANDARD: UNI 9730-3

C093-11

C109-16N SOFTWARE for flexural tests on clay blocks (see pag. 14)

C127N GRAPHIC PRINTER on thermo-paper on board

C127-11 THERMO-PAPER roll for printer (pack of 10 rolls)

C109-11 SOFTWARE for flexure tests with Digitec and Cyber-Plus Evolution machines. See pag. 14

C123
SOFTWARE "servonet" for remote control through PC of Autotec and Servo-Plus Evolution machines. See pag. 14

C097-01

C097-01
DUAL LOW CAPACITY DIGITAL RANGE, complete with "appropriate pressure transducer". Range selectable from 10kN to 100kN.
Technical details: see pag. 240

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.

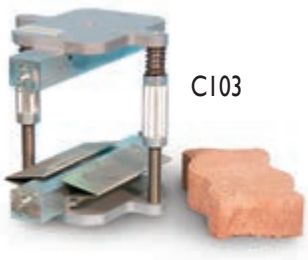
C100
SPLITTING TENSILE test device for cylinders. EN 12390-6 / ASTM C496
Technical details and other models: see pag. 241

C100

C103
SPLITTING TENSILE test device for self blocking pavers and cubes. EN 1338, 12390-6
Technical details: see pag. 241

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 pag. 241


C103

C109-12
SOFTWARE for splitting tensile tests.
Technical details: see pag. 14

E170
COMPRESSION DEVICE to test cement specimens 40,1 x 40 mm.
EN 196 / ASTM C349
Technical details and other models: see pag. 242

C103-02

E172-01
FLEXURE DEVICE for cement 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 pag. 352

Measurement of deflection on fibre reinforced concrete beams 100x100x400(500) mm and 150x150x500(600) mm during flexure test.

STANDARD: ASTM C1609, C1609M, comparable to UNI 14651

Determination of toughness, first crack strength (crack opening) and ductility of fibre reinforced concrete. STANDARD: EN 11039-2

Flexural strengths (first peak, ultimate and residual) of fibre reinforced beam specimens. STANDARD: EN 14488-3

The equipment can be used **"only"** with the flexure Servo-Plus Evolution testing machines mod:

- **C091-03N** Flexure **"open-side"** machine, 150kN capacity
- **C090-07N** Flexure **"high stiffness"** frame 200kN capacity connected to the Software/Firmware **"Servo-Strain"** mod. C109-15N (see pag. 164) for the automatic management of load and displacement.

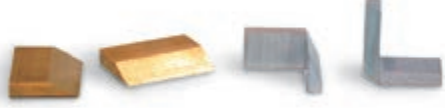
The equipment consists of:

C090-15
DEFLECTION MEASUREMENT DEVICE
STANDARD: ASTM C1609, C1609M
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 to be selected between the above listed models.
The test is performed by applying a flexural load to the concrete beam with load and displacement control and with the automatic deflection measurement of the loaded specimen.
It is possible to test fiber 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's holders, vertically fixed 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

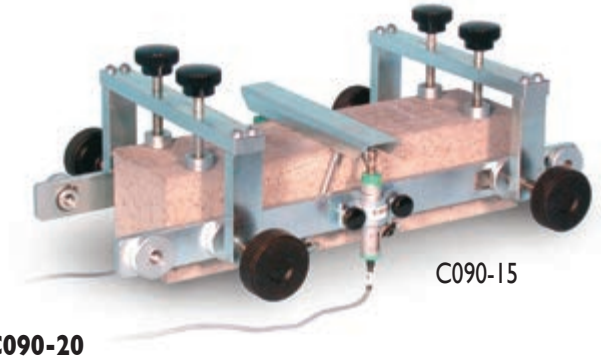
S336-11
DISPLACEMENT TRANSDUCER, high precision.
STANDARD: ASTM C1609, C1609M
To be fixed to the device C090-15 for the measurement of deflection and determination of toughness on fibre reinforced concrete beams. Travel: 10 mm
Complete with cable and connector.
Two transducers are required.

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 pag. 14)

C109-14N
FIRMWARE/SOFTWARE for flexural stengths (first peak, ultimate and residual) EN 14488-3



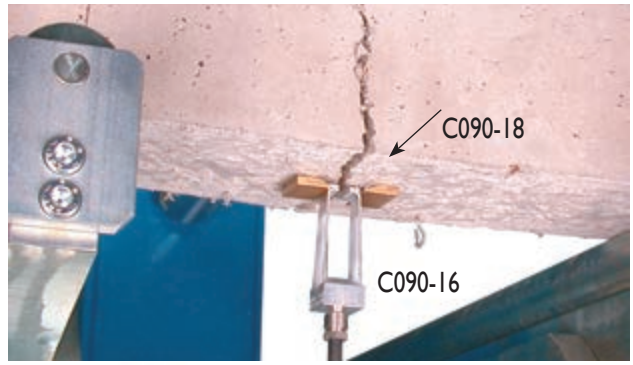
C090-18 C090-20



C090-15

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
STANDARD: EN 11039-2
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.



C090-18 DATUM BLOCK, to be glued on the concrete beam lower side for the first crack strength test (CMOD).
Pack of 24 pieces.

C090-07N + C090-13 + C109-15N + C090-15 + S336-11

Energy absorption test on sprayed concrete specimens, according to:
Standards: **EN 14488-05, comparable to EN 10834**

The equipment can be used **"only"** with the flexure Servo-Plus Evolution testing machine mod:

- **C090-07N** Flexure **"high stiffness"** frame 200kN capacity

connected to the automatic servocontrolled system of load and displacement **Servo-Strain** mod C109-15N (see pag. 164)

The equipment consists of:

C109-15N Test result

C109-15N Set up of deflection

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.

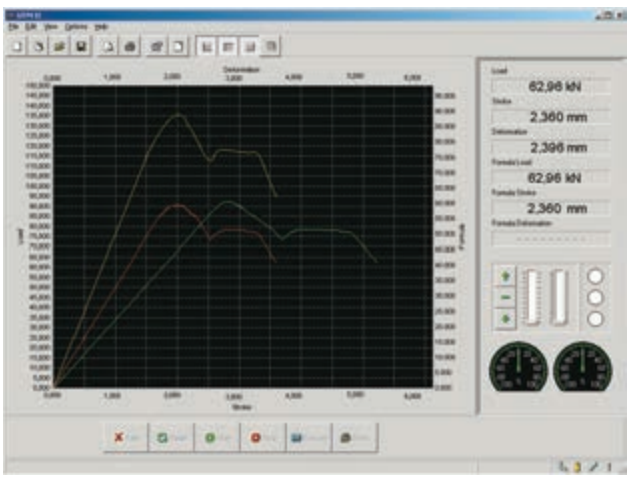
(see pag. 14)

C090-07N + C109-15N + C090-14 + S336-14 + C090-19

C090-14
SQUARE BASE FRAME, dimensions 700 x 700 mm, complete with upper loading element, for energy absorption tests on sprayed concrete specimens.

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

C090-19
HOLDER for transducer, to be fixed to the high stiffness frame with square base



C109-15N Test graph

UNIVERSAL FLEXURAL AND TRANSVERSE MACHINE 150 kN CAPACITY

To perform 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 / NF P18-407, P98-302 UNE 83305 / UNI 6133 / DIN 51227

TECHNICAL SPECIFICATIONS:

- Vertical daylight between upper/lower rollers: max. 825 - min. 65 mm adjustable each 76 mm by hand winch with counterweights
- Rollers dimensions: dia. 40x613 mm
- Complete with 4 adjustable and articulated rollers for two point loading
- Distance between lower rollers adjustable from 75 to 1325 mm
- Distance between upper rollers adjustable from 75 to 575 mm
- Possibility to easily place in the centre one upper roller for centre point loading
- Graduated scales are foreseen to get easy roller's adjustment
- Ram travel 110 mm approx.
- Simple action piston with counterweights to optimize frictions
- Power supply: 230 V 1 ph 50 Hz 750 W
- Dimensions: 970x1400x2000 mm
- Weight: 800÷850 kg

C093-02N + C127N

C093-03N + C127N + H009-01

UNIVERSAL FLEXURAL 150 kN capacity

Model	Motorized	LOAD MEASURING SYSTEM: Cyber-Plus Evolution mod. C109N (pag. 158)	Servo-Plus Evolution mod. C104N (pag. 158)	Digitec mod. C108N (pag. 155)	Autotec mod. C098N (pag. 155)
C093-02 N	•	•			
C093-03 N	•		•		
C093-02 D	•			•	
C093-03 A	•				•

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, 1339

C091-13

C093-11
DEVICE for flexural tests on clay blocks for flooring.
STANDARD: UNI 9730-3

C109-16
SOFTWARE for flexural tests on clay blocks (see pag. 14)

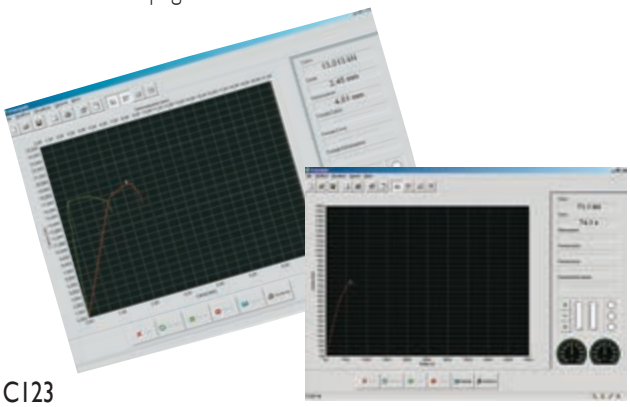
C127N
GRAPHIC PRINTER
on thermo-paper on board

C127-11
THERMO-PAPER roll for printer
(pack of 10 rolls)

C093-11

C109-11 SOFTWARE for flexure tests with Digitec and Cyber-Plus Evolution machines. See pag. 14

C123 SOFTWARE "servonet" for remote control through PC of Autotec and Servo-Plus Evolution machines. See pag. 14


C123
Software "servonet"

C109-11 Software Flexure

C115-01
TWO WAY HYDRAULIC VALVE, connected to the motorized pumping unit of the machine to activate a second frame.
Technical details: see pag. 245

C115-01

C097-01
DUAL LOW CAPACITY DIGITAL RANGE, complete with "appropriate pressure transducer".
Range selectable from 10kN to 100kN
Technical details: see pag. 240

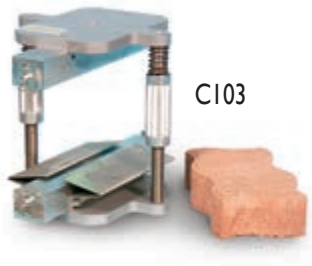
C097-01

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.

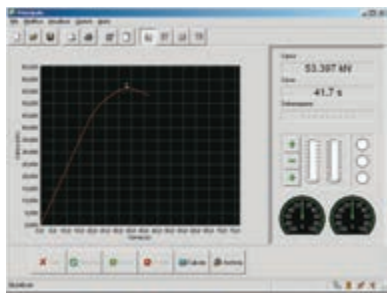
C100

C100
SPLITTING TENSILE test device for cylinders. EN 12390-6 / ASTM C496
Technical details and other models: see pag. 241

C103
SPLITTING TENSILE test device for self blocking pavers and cubes.
EN 1338, 12390-6
Technical details: see pag. 241


C103

C109-12
SOFTWARE for splitting tensile tests.
Technical details:
see pag. 14


C109-12 Graphic of splitting tensile test

E170
COMPRESSION DEVICE to test cement specimens 40,1 x 40 mm.
EN 196 / ASTM C349
Technical details and other models: see pag. 242

E170

E172-01

E172-01
FLEXURE DEVICE for cement 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 pag. 352

CONCRETE PIPE TESTING MACHINE

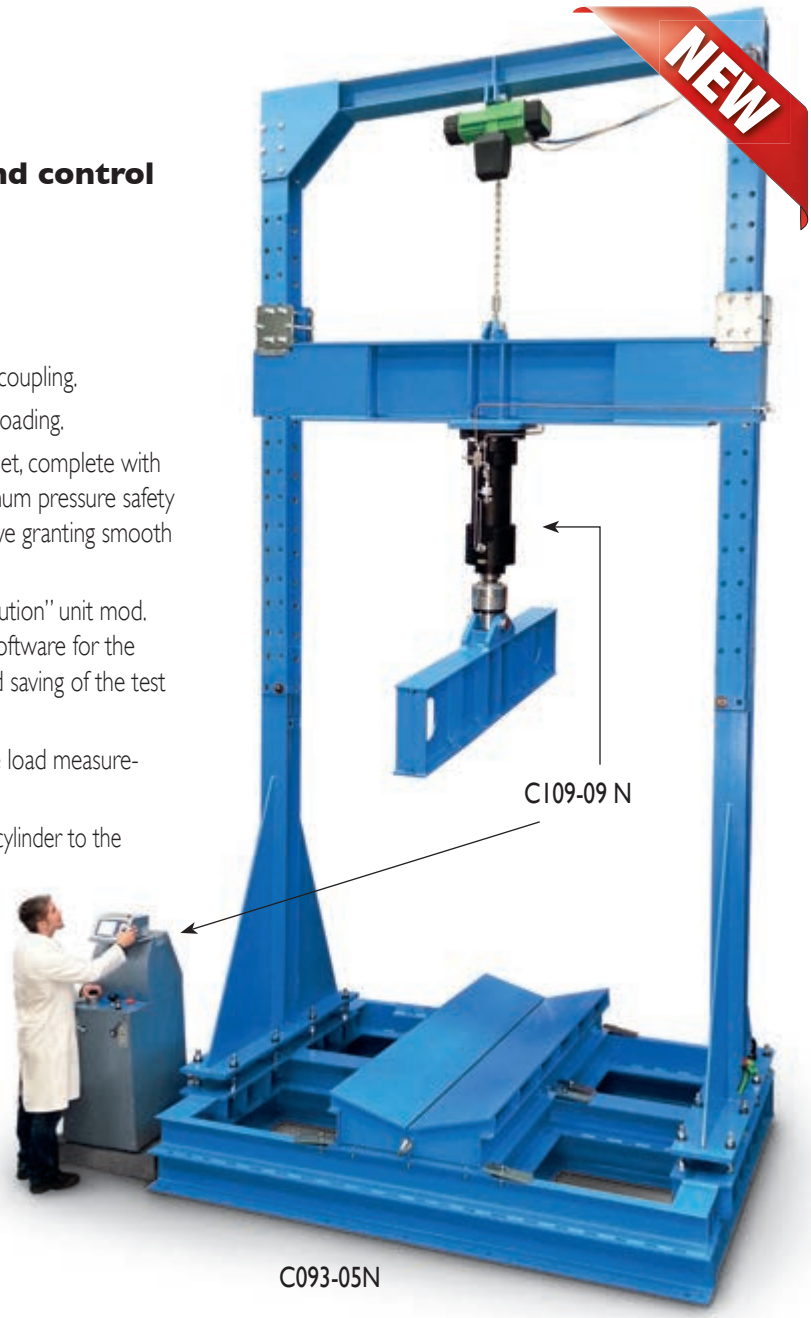
Designed and manufactured to test concrete sewer and drain pipes used in drainage works, water and irrigation supply systems etc.
STANDARD: **EN 1916** comparable to ASTM C301, C497 / BS 5911 / DIN 4035

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 page 158) 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: 70 kg



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: 3700 x 2500 xh 6900 mm approx.
Weight: 7000 kg approx.

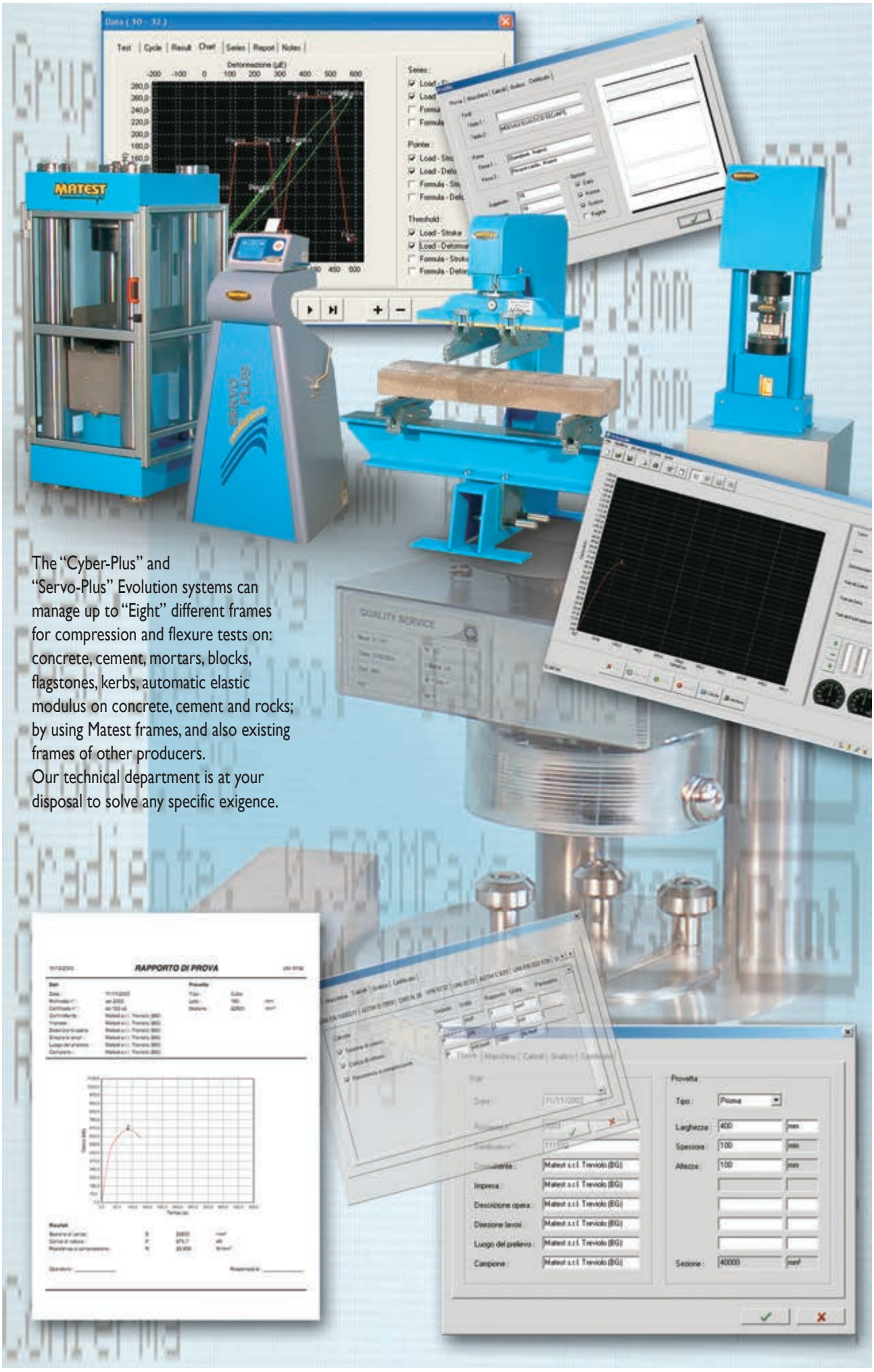
Note:

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



The "Cyber-Plus" and "Servo-Plus" Evolution systems can manage up to "Eight" different frames for compression and flexure tests on: concrete, cement, mortars, blocks, flagstones, kerbs, automatic elastic modulus on concrete, cement and rocks; by using Matest frames, and also existing frames of other producers.
Our technical department is at your disposal to solve any specific exigence.

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 block 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 utilizing only one hydraulic pressure source.

The load of the second combined frame is measured:
- For the gauges group with an additional specific gauge fixed on the second frame.
- For the digital group by utilizing 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 (or specific gauge), 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
- FLEXURAL TESTS ON CONCRETE BEAMS, FLAT BLOCKS, FLAGSTONES, KERBS, SLABS, TILES etc.
- COMPRESSION AND FLEXURE TESTS ON MORTAR SPECIMENS
- SPLITTING TENSILE TESTS ON CYLINDERS, BLOCK PAVERS, CONCRETE CUBES etc.

The composition of the combined group is obtained by:

C053 C092

C092

Flexural frame 150 kN capacity, (technical details and specific accessories at pag. 226) complete with dial gauge, used in conjunction with compression testing machine dial gauge reading.

C055N C092-01

C092-11

Flexural open sided frame 150 kN capacity (technical details and specific accessories at pag. 228) complete with pressure transducer, used in conjunction with a digital compression machine (Digitec, Autotec, Cyber-Plus / Servo-Plus Evolution).

C092-11 + C091-12

C055N + C126

C092-01

Flexural frame 150 kN capacity, (technical details and specific accessories at pag. 226) complete with pressure transducer, used in conjunction with a digital compression machine (Digitec, Autotec, Cyber-Plus / Servo-Plus Evolution).

C092-15

Flexural high stiffness frame 200 kN capacity (technical details and specific accessories at pag. 230) complete with pressure transducer, used in conjunction with a a digital compression machine (Digitec, Autotec, Cyber-Plus / Servo-Plus Evolution).

C055N C092-15 + C090-12

This two frames Group offers the considerable advantage to perform compression tests on concrete cube, cylinder and block specimens; flexural tests on concrete beams, and by using suitable accessories, to perform also the following tests:

- Compression on portions of 40.1x40x160 mm mortar broken in flexure conforming to EN 196, DIN 1164 Specifications (Devices mod. E170, E170-01 - see pag. 242)
- Compression on 50 mm mortar cubes, conforming to ASTM C109 (Device mod. E171- see pag. 242)
- Compression on 70 mm mortar cubes, conforming to BS 4550 (Device mod. E171-01 - see pag. 242)
- Splitting tensile on cylindrical specimens dia. 100, 150, 160 mm conforming to EN 12390-6 - NF P18:408 - ASTM C496 - UNI 6135 BS 1881:117 (Device mod. C101-01 - see pag. 241)
- Splitting tensile on concrete cubes and concrete block pavers, conforming to EN 12390-6 , 1338 (Device mod. C103 - see pag. 241)

COMBINED TWO FRAMES GROUP
Upgrading option:

- 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
- COMPRESSION AND FLEXURAL TEST ON MORTAR SPECIMENS

The composition of the combined group is obtained by:

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 pag. 342÷345) complete with pressure transducer used in conjunction with a digital concrete compression machine (Digitec, Autotec, Cyber-Plus / Servo-Plus Evolution).

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 pag. 346÷349) complete with two pressure transducers used in conjunction with a digital concrete compression machine (only Cyber-Plus / Servo-Plus Evolution).

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:

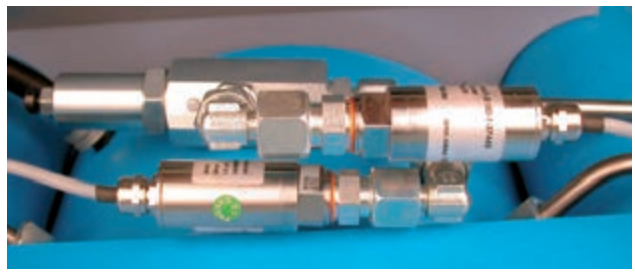
- Group formed by two concrete compression frames.
- Group formed by one concrete flexural frame and one mortar compression frame.

GROUP EXAMPLE

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 (solenoid valve with Cyber-Plus and Servo-Plus), 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

H009-01

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 pag. 14)

***** NOTE:
The machines with Cyber-Plus Evolution (C109N) or Servo-Plus Evolution (C104N) system can be equipped of a third measuring scale at the same cost of the second range.

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.

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

C097-08

OFFICIAL ACCREDIA HARDNESS CERTIFICATE
(Equivalent UKAS, ENAC, DAKKS, SAS, COFRAC etc.) of upper and lower compression platens. Minimum hardness: 55 HRC.

C097-08

C105

C105

Device with central screw

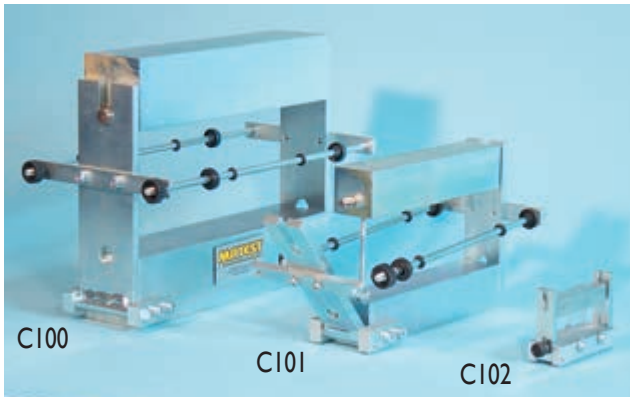
Very practical to adjust the light between the compression platens of a machine, according to the height of the specimen to be tested. Recommended solution for machines equipped with big sized platens.
This device can be foreseen on all models of concrete compression machines, except "High Stability" models.

ACCESSORIES TO COMPRESSION AND FLEXURAL TESTING MACHINES

Splitting tensile test devices

For cylindrical specimens.
STANDARDS: **EN 12390-6** / ASTM C496 / NF P18-408
UNI 6135 / BS 1881:117

Model	Cylinders dia. 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



C101-01*

Splitting tensile test device, for cylindrical specimens from dia. 100x200 mm (4"x8") to dia. 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

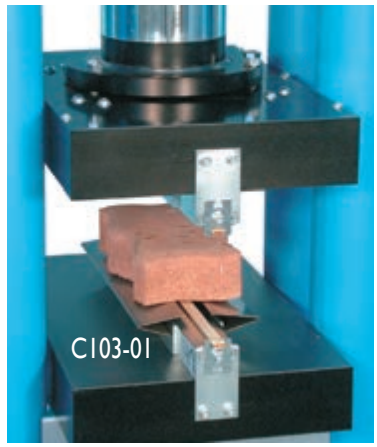
C103*

Splitting tensile test device to perform tests on concrete cube specimens 100 and 150 mm and on concrete block pavers.
STANDARDS: **EN 12390-6, EN 1338**
Dimensions: 350x250xh264 mm. Weight: 17 kg

***** 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, pag. 240), or with a flexural frame.

C103-01*

Splitting tensile test device, same to 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



C103-02

Splitting tensile device, same to mod. C103-01, but to be fixed to the flexural frames serie C091-01 (pag. 228) and C090-06 (pag. 230)

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** / BS 1881
PACKING STRIPS, dimensions 4x15x350 mm to be used for splitting tensile tests with mod. C103. Pack of 100 pieces.

C100-03 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 12390-6, EN 1338** / UNI 6135

General description and technical details: see UTM2 pag. 14

ACCESSORIES TO COMPRESSION AND FLEXURAL TESTING MACHINES

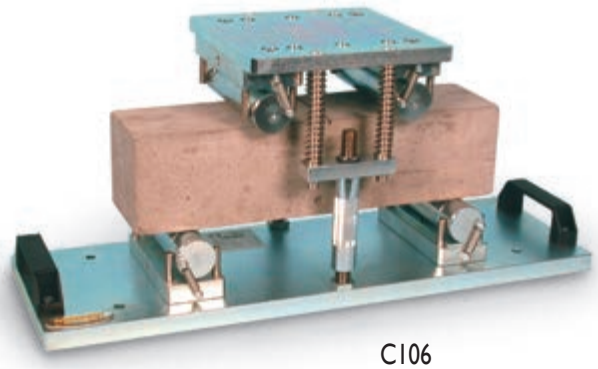
C106

Flexural device for two point and centre point tests on concrete beams100x100x400/500 and 150x150x600/750 mm

STANDARDS: **EN 12390-5** / UNI 6133 / NF P18-407 / UNE 83305
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 pag. 240)
Dimension: 610x200xh320 mm. Weight 27 kg



C106

E170

Compression device to test mortar prisms 40,1x40x160 mm broken in flexure

STANDARDS: **EN 196-1** / ASTM C349 / NF P15-451
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: dia. 153xh182 mm.
Weight: 12 kg

E170

E171

Compression device to test mortar cube specimens 50 mm (2")

STANDARD: ASTM C109
It is possible to test also cylindrical specimens dia. 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

E171

E171-01

Compression device to test mortar cube specimens 70,7 mm

STANDARD: BS 4550
It is possible to test also cylindrical specimens dia. 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

E171-01

C091-13

Concrete kerbs and slabs device

FLEXURAL STRENGTH MEASUREMENTS

STANDARD: **EN 1340:2004, EN 1339**

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 and C093) to apply a flexural strength on three points on the concrete kerb, without any torsional stress.

C091-13

ACCESSORIES TO COMPRESSION TESTING MACHINES

Unbonded capping pads and retainers

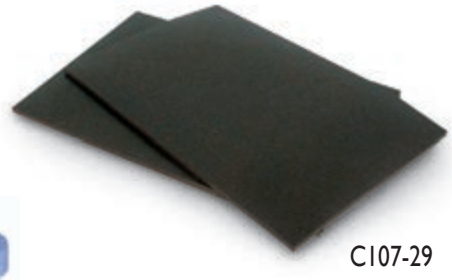
STANDARD: ASTM C1231

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

Models:

C107-09 Capping retainers (couple) for dia. 100x200mm cylinders.

C107-10 Capping retainers (couple) for dia. 150x300mm and 6x12" cylinders.

C107-12 Capping retainers (couple) for dia. 160x320 mm cylinders.

C107-18 Neoprene pads (couple) 60 shore A for dia. 100x200mm cylinders.

C107-19 Neoprene pads (couple) 70 shore A for dia. 100x200mm cylinders.

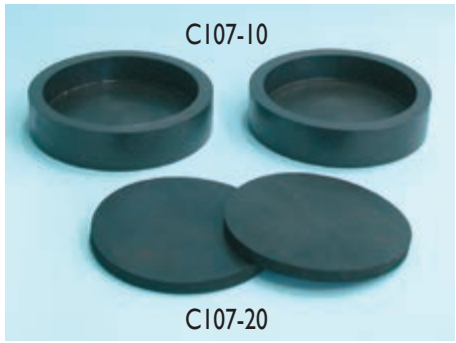
C107-20 Neoprene pads (couple) 60 shore A for dia. 150x300mm and 6"x12" cylinders

C107-21 Neoprene pads (couple) 70 shore A for dia. 150x300mm and 6"x12" cylinders

C107-25 Neoprene pads (couple) 60 shore A for dia. 160x320mm cylinders

C107-26 Neoprene pads (couple) 70 shore A for dia. 160x320mm cylinders

C107-29 Neoprene sheet (couple) 60 shore A.
Dimension: 600x400x12mm
For tests on blocks.



C107-10

C107-20

EXAMPLE OF UTILIZATION

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 dia. 150x300mm or 6"x 12"; and minimum 376 mm for the cylinders dia. 160x320 mm.

C110-30

UPPER COMPRESSION PLATEN + SPHERICAL SEAT, for tests on cylinder specimens dia. 100x200, 150x300, 160x320 mm and 4"x 8", 6"x 12"(to fix on the testing machine, in replacement of the standard one where requested), to meet the ASTM C39, AASHTO T22 Specifications.
Platen dimensions : dia. 165x30 mm
Weight: 10 kg approx.

C110-30

Auto-centering device

For cubes 100 and 150 mm side and cylinders dia. 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 dia. 216 mm (1300, 1500 and 2000 kN)

C107-01

Auto-Centering Device, to be used with compression machine having platen dia. 287 mm (3000 kN and high stability machines)

C107

ACCESSORIES TO COMPRESSION TESTING MACHINES

Safety guards to CE Safety Directive, manufactured from highly resistant transparent polycarbonate material, complete with hinges and lock.
The guards are both on front and back sides.

C121

MODELS:

C121
Machines 1200kN, 1300kN and 1500kN

C121-05
Machines 2000kN (mod C051 to C058-05N)

C121-01
Machines with block platens 2000kN (mod C073 to C078N)

C121-06
Machines high stability 2000kN (mod C089 to C089-04N)

C121-10
Machines high stability with block platens 2000kN capacity (mod C089B to C089-22N)

C121-07
Machines 3000kN (mod C066 to C071N) and high stability 3000kN (mod C089-06 to C089-10N)

C121-08
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
Machines 5000kN (mod C086-02 to C086-03N)

C126

Fragment guards to CE Safety Directive, manufactured from highly resistant transparent polycarbonate material. The guards are both on front, back and lateral side and are easily/quickly fixed to the machine with hooks.

MODELS:

C119
Machines 1200kN, 1300kN and 1500kN

C119-03
Machines 2000kN
(mod C051 to C058-05N)

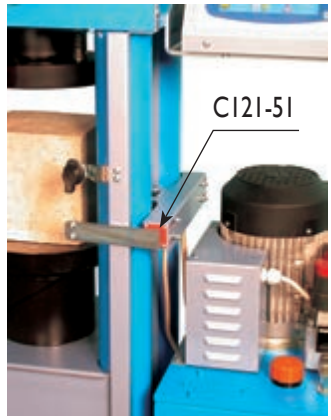
C119-04
Machines, high stability, 2000kN
(mod C089 to C089-04N)

C119-05
Machines 3000kN (mod C066 to C071N) and high stability 3000kN (mod C089-06 to C089-10N)

C121-51

Door stop safety switch

This door locking electric switch if fixed on the front and rear doors of the compression machine as safety device. It cuts off mains and stops the machine when one of the two doors is open. This locking switch can be installed only on digital compression machines equipped with safety guards with hinges and lock to CE Directive, serie C121



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.

ACCESSORIES AND SPARES TO TESTING MACHINES

C109-03N

Hydro-Plus Evolution

Stand alone control console. Connected to a load frame, it provides tests throughout all phases: data acquisition, display, processing, saving of the test dates, software for the print out of results and certificate.

To upgrade or complete your concrete or mortar compression and flexure testing machine (even not manufactured by Matest).

The "Hydro-Plus Evolution" control console consists of:

C109N Cyber-Plus Evolution, digital Touch-Screen with 8 analogic inputs (technical data: see pag. 158)

C114 Hydraulic motorized pumping unit with speed selector (technical data: see pag. 153)

Holding frame, complete with hydraulic flexible hose, connector, accessories.
Supplied **"without"** hydraulic oil to be ordered separately (see mod. C114-10).

C109-03N

C109-04N

Hydro-Plus Evolution for Two Frames

Similar to mod. C109-03N, but provided with an hydraulic valve, to control alternatively TWO FRAMES.

C113

Pumping unit, hand operated, complete with tank, accessories and connectors. Spare part for compression and flexure machines.
Weight: 20 kg

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. C114-10).
Power supply: 230V 1ph 50 Hz 750 W
Weight: 40 kg

C114-01

Pumping unit, motorized, identical to mod. C114, but equipped also of a two way hydraulic valve to activate, alternatively, two testing frames.
Supplied complete.

C114-10

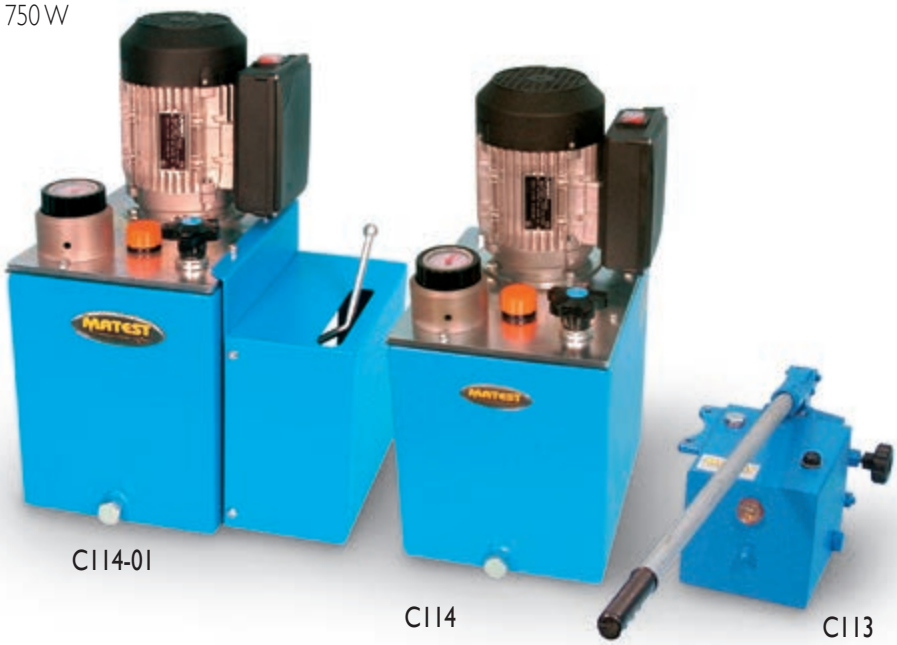
SPARE HYDRAULIC OIL for compression/flexural testing machines.
Can of 8,8 kg
(2 cans needed).

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.

C115-01
with case

C115-01



C114-01

C114

C113

SPARE PARTS TO TESTING MACHINES

Gauge, dia. 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

Packing set, at 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

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%

AVAILABLE MODELS:

C116-01N Pressure Transducer range: 0 - 10 bar

C116-02N Pressure Transducer range: 0 - 20 bar

C116-03N Pressure Transducer range: 0 - 35 bar

C116-04N Pressure Transducer range: 0 - 50 bar

C116-05N Pressure Transducer range: 0 - 100 bar

C116-06N Pressure Transducer range: 0 - 200 bar

C116-07N Pressure Transducer range: 0 - 350 bar

C116-08N Pressure Transducer range: 0 - 500 bar

C116-09N Pressure Transducer range: 0 - 700 bar

C116-10N Pressure Transducer range: 0 - 400 bar

C116-11N Pressure Transducer range: 0 - 600 bar

C116-12N Pressure Transducer range: 0 - 160 bar

C116-13N Pressure Transducer range: 0 - 60 bar

C116-01N÷C116-13N

C122 ÷ E183-12

Compression platens

Surface hardened over 55 HRC and finish-grinding.

UPPER PLATEN:

Model	Dia. 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	Dia. 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 510 x 320 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 dia. 216 or 287 mm foreseen by the specific machine.
This distance piece is finish-grinded (suitable also for high stability testers), has dia. 210 mm, height 20 mm.
Weight: 3 kg approx.

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 dia. 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 dia. 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

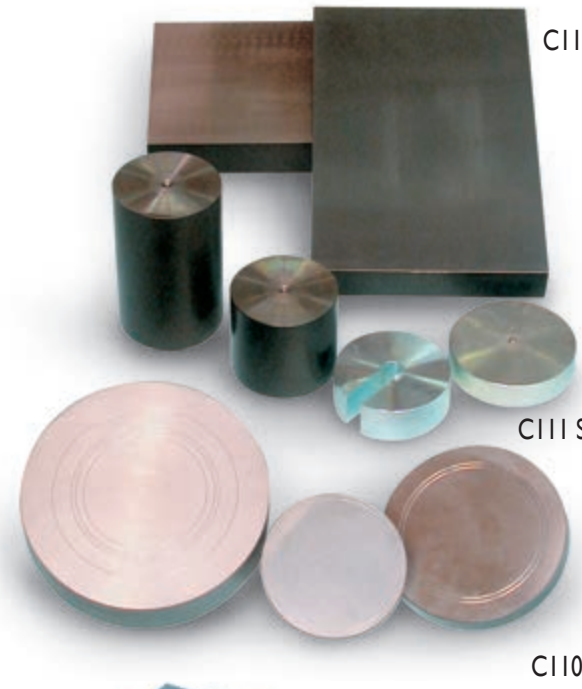
"Slotted" distance pieces dia. 150 mm for central screw machines: 2000kN (C073 to C078N), 3000kN (C079-01 to C079-06N)

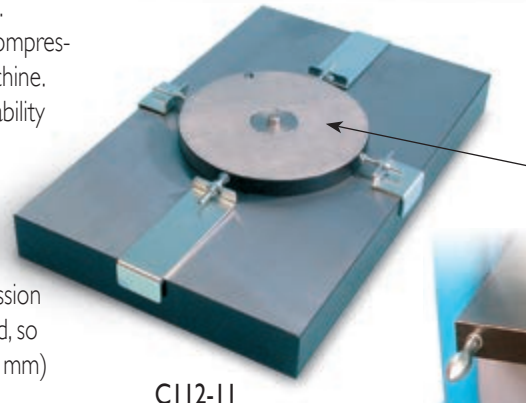
C111-27 High 20 mm
C111-23 High 50 mm
C111-28 High 76 mm
C111-08 High 126 mm

Distance pieces dia. 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





C112-05

S205

UNITRONIC 50 kN, UNIVERSAL MULTIPURPOSE COMPRESSION/FLEXURAL AND TENSILE FRAME FOR:
- COMPRESSION / FLEXURAL TESTS, 50 kN MAX. CAPACITY LOAD
WITH AUTOMATIC LOAD OR DISPLACEMENT/DEFORMATION CONTROL, for testing:

Concrete:
- FLEXURE ON BEAMS
- FLEXURE ON TILES

Clay Blocks, Tiles:
- PUNCHING
- TRANSVERSE/DEFORMATION on adhesives for tiles - **EN 12002** (see page 416)

Cement, Asphalt, Metal, Wires, Ropes, Plastic, Papers, Textiles, etc.,

Rock and stones, Soil

Unitronic technical details and aditional specific tests are described at pag. 414

SPECIFIC APPLICATIONS:

S205
with load cell

Flexural test with centre point on concrete beams and clay tiles

Standards: **EN 12390-5, 491, 538** / ASTM C78, C293
BS 1881:118 / NF P18-407 / UNE 83305 / UNI 6133

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 315mm, and upper central articulated bearer fixed to the load cell.
Bearer dimensions: 38 mm dia. by 300mm long. Weight : 20 kg approx.

C109-11 Software for flexure tests on concrete beams

Punching test on clay blocks

Standard: 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

S206N

UNITRONIC 200kN "Matest Made"

Universal multipurpose compression, flexural, tensile frame with automatic load or displacement/deformation control. Technical features: similar to Unitronic 50kN, but with max. capacity: 200kN.
Technical details: see pag, 420

S206N

C095-05

Flexure test on clay block portion

STANDARD: UNI 8942-3, 9730-3

The apparatus consists of:
- digital loading balance 16kg 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

C094N

Portable digital press 56 kN capacity

Used for compression tests on small cylinder specimens and core samples up to dia. 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 dia. 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

C094N

ACCESSORY FOR C094:

A125-01

Set of two hardened conical points, to modify the press mod. C094 into the "Point load tester" (see section aggregates mod. A125 pag. 60), for the rock strength index test.

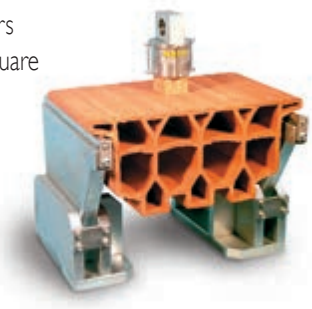
A125-01

ACCESSORY FOR C095:

C093-11

DEVICE for flexural tests on clay blocks for flooring
STANDARD: UNI 9730-3

It consists of two lower bearers dia. 20x300 mm and upper square wooden pressure punch.



C093-11

C095

Flexural testing machine, 50 kN capacity

DESIGNED TO TEST:

- CONCRETE TILES: EN 491
- CLAY TILES: EN 538
- FLAT BLOCKS: BS 6073:1 app. C.
- HOLLOW TILES: UNI 2107
- CLAY FLOORING BLOCKS: UNI 9730-3
- PAVING SLABS, ROOF TILES, FLOOR TILES, TERRAZZO TILES, CERAMICS, BRICKS, etc.

The machine consists of: steel frame, one upper bearer and two lower adjustable bearers, mechanical hand-operated screw jack and a 10 kN capacity proving ring to measure the applied load.

C095

TECHNICAL DETAILS:

- Proving ring 10 kN capacity, complete with calibration certificate (proving rings with larger capacities up to 50 kN on request - pag. 464)
- Vertical clearance between the bearers, adjustable from 50 to 300 mm.
- Distance between lower bearers, adjustable from 50 to 500 mm.
- Bearers dimensions: dia. 25x500 mm
- Accuracy: 1% of the applied load
- Dimensions: 710x610x1520 mm
- Weight: 120 kg

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

C096

ABRASION MEASURING BASED ON BÖHME

C129
Abrasion Tester Böhme

STANDARDS: **EN 1338 :2004 / EN 1339, 1340, 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

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 800 W
Dimension: 1500 x 1000 xh 850 mm
Weight: 320 kg

ACCESSORIES:

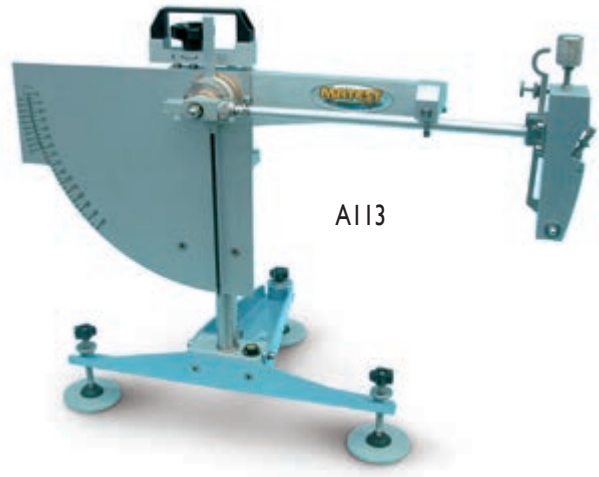
C129-01
ABRASIVE MATERIAL composed of fused alumina (artificial corundum) Pack of 25kg.

C129-02
MEASURER THICKER REDUCTION, composed of dial gauge with anular contact face with a diameter of 8-5 mm and measuring board.

C129-02

A113
Skid resistance and friction tester

STANDARDS: **EN 1338, EN 1341, 1342, EN 1339**
Used for tests on concrete block pavers, natural stones, and skidding tests on wooden floor.
Technical details: see pag. 53



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 by:

C155N
Digital measuring tester Cyber Plus Evolution "Touch-Screen"

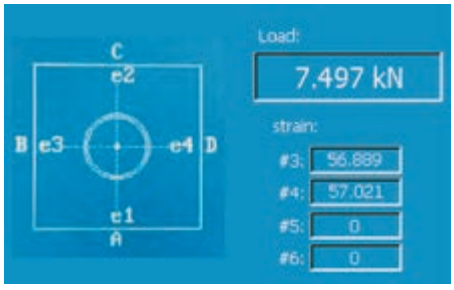
This unit reads simultaneously the four values supplied by the electric strain load cell. The values are memorized, automatically elaborated and visualized, to directly supply the various coefficients resulting by the calculations, and printed on laser printer (accessory C128) directly connected via 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: 230 V 1ph 50 Hz
Dimensions: 450x350x160 mm
Weight: 8 kg

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.

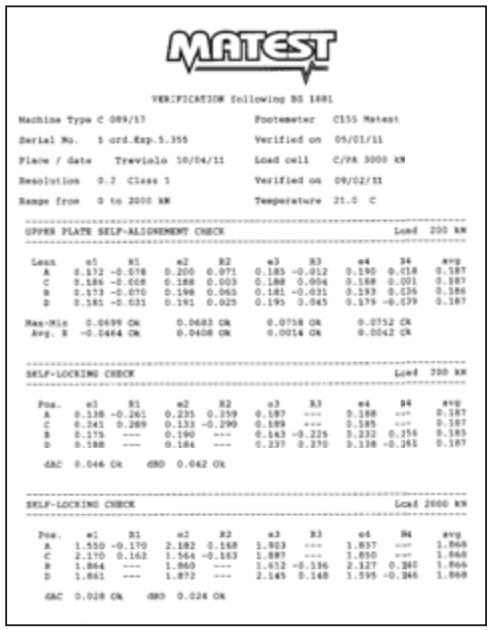


C154
Electric strain load cell 3000 kN capacity

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: dia. 130 by 200 mm high. Weight: 18 kg

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


MATEST

VERIFICATION following BS 1881

Machine Type C 089/17		Footemeter	C155 Matest
Serial No. 1 ord.Exp.5.355		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 0 to 2000 kN		Temperature	21.0 C

UPPER PLATE SELF-ALIGNEMENT CHECK — Load 200 kN

Lean	e1	R1	e2	R2	e3	R3	e4	R4	avg
A	0.172	-0.078	0.200	0.071	0.185	-0.012	0.190	0.018	0.187
C	0.186	-0.008	0.188	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	0.036	0.186
D	0.181	-0.031	0.191	0.025	0.195	0.045	0.179	-0.039	0.187

Max-Min	0.0699 Ok	0.0683 Ok	0.0758 Ok	0.0752 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	0.187	---	0.188	---	0.187
C	0.341	0.289	0.133	-0.290	0.189	---	0.185	---	0.187
B	0.175	---	0.190	---	0.143	-0.225	0.232	0.255	0.183
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

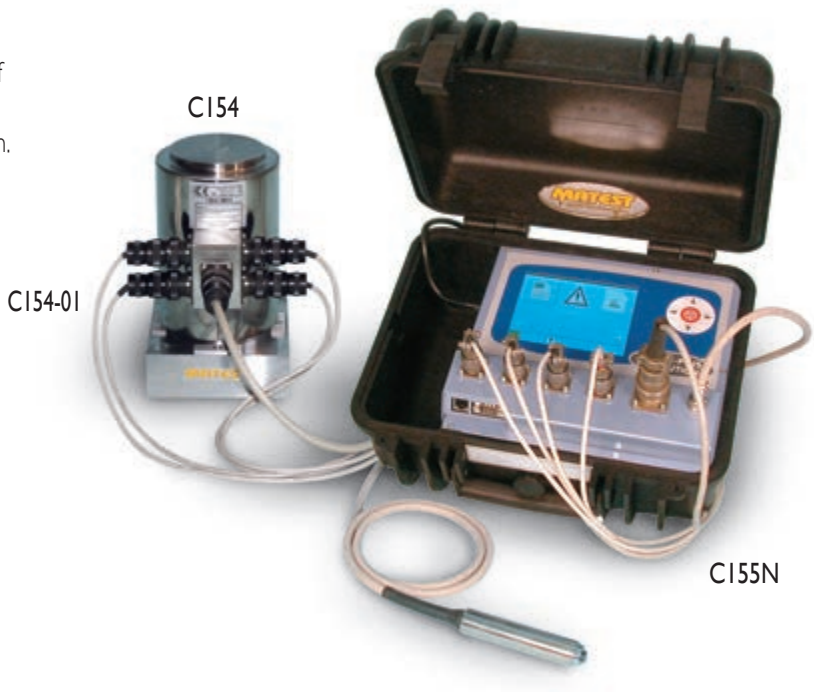
Pos.	e1	R1	e2	R2	e3	R3	e4	R4	avg
A	1.550	-0.170	2.182	0.168	1.903	---	1.837	---	1.868
C	2.170	0.162	1.564	-0.163	1.887	---	1.850	---	1.868
B	1.864	---	1.860	---	1.652	-0.336	2.327	0.340	1.866
D	1.861	---	1.872	---	2.145	0.148	1.595	-0.346	1.868

dAC 0.028 Ok dBD 0.024 Ok

CERTIFICATE EXAMPLE

C154

C154-01



C155N

C138N

Universal digital tester with microprocessor for load cells

Cyber Plus 8 Evolution "Touch-Screen"

STANDARDS: **EN ISO 376:2002 / EN 10002-3**
UNI 6326 / DIN 51220 / NF P18-411
ASTM E74 / BS 1610

C138N

C140-01

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 accuracy's verification of the loads measured from machines under control and it allows to produce the relative certificate.
The instrument foresees three memorized cycle verification program composed of ten measurement 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 calibra ion 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
- Visualization up to 5 decimal points
- 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).

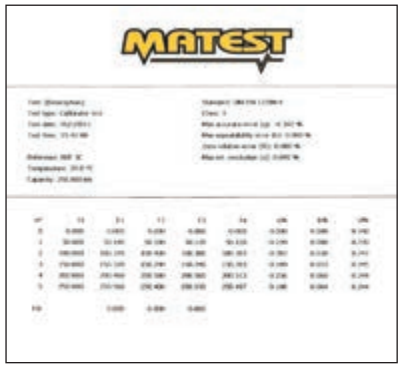
Hardware technical details: see pag. 24

The apparatus, and all the accessories, is contained in a strong and practical suitcase, immersion resistant with a depressurisation valve.
Power supply: 230 V 1ph 50/60 Hz
Dimensions: 360x300x200 mm
Weight: 5 kg

C138-05

Calibration process of one load cell to the digital tester, complete with Matest calibration certificate.

EN ISO 376
EN 10002-3 Class 2



CERTIFICATE EXAMPLE WITH C155-10N SOFTWARE

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 / EN 10002-3 Class 2 /** 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. Supplied complete with Matest calibration certificate. (accessory C138-05).

Model	Capacity kN	Dimensions dia. 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

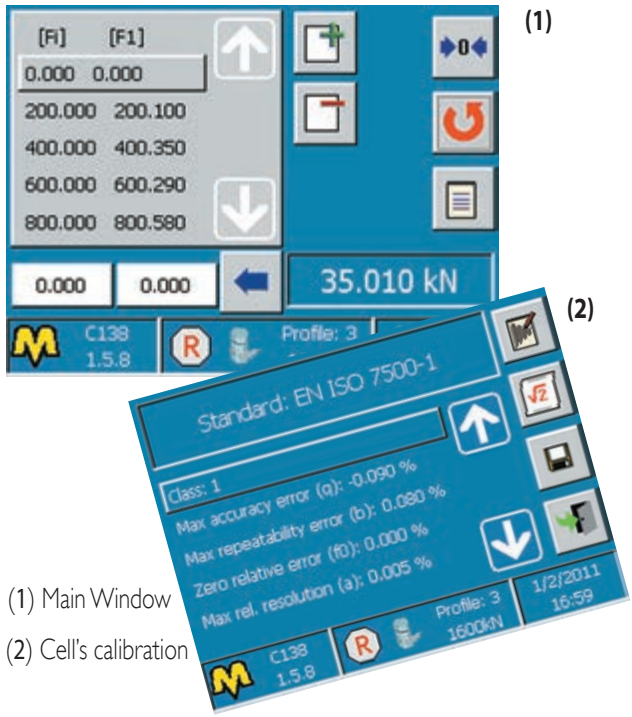
TECHNICAL SPECIFICATIONS

- 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

C140-12 Device for the tensile load cell C140-10

SCREEN EXAMPLES:



(1) Main Window

(2) 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 / EN 10002-3, Class 1 /** 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.
Each cell is supplied complete with Matest calibration certificate (accessory C138-05).

Model	Capacity kN	Dimensions dia. 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 (SIT Centre) 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, C165)
- Oil bath epicycloidal gearbox (mod. C164, C164-01)
- Wear-resistent steel pan (mod. C163, C165)
- Pan and main parts in wearproof steel (mod. C164, C164-01)
- Safety grid with bag breaker
- Adjustable mixing blades
- Manual discharge mouth on the bottom
- Wheels + tow bar (mod. C163, C165)
- Axele with tire wheels and drive drawbar (mod. C164, 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

Models		C165	C163/C163SP	C164	C164-01
Pan capacity (volume)	Litres	100	150	200	300
Yeld per mixture	Litres	65	80	130	220
Pan dimensions (dia x h)	cm	70x30	70x43	80x40	110x40
Motor power	KW	1,1	1,8	4	5,5
Dimensions (dia x h)	cm	71x115	71x150	110x115	130x135
Weight	kg	115	130	250	420

C163

C165

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: 640 mm. dia. x 330 mm deep
Not sellable in CE markets without security cabinet (see mod. C162-02)
Power supply: 230 V 1ph 50 Hz 2 Hp
Weight: 250 kg

C162

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.

C162-01

C161

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 - 0,3 HP
Dimensions: 720x1320x1280 mm
Weight: 60 kg

Testing fresh SELF COMPACTING CONCRETE (S C C)

ERMCO/EFNARC European Guidelines.

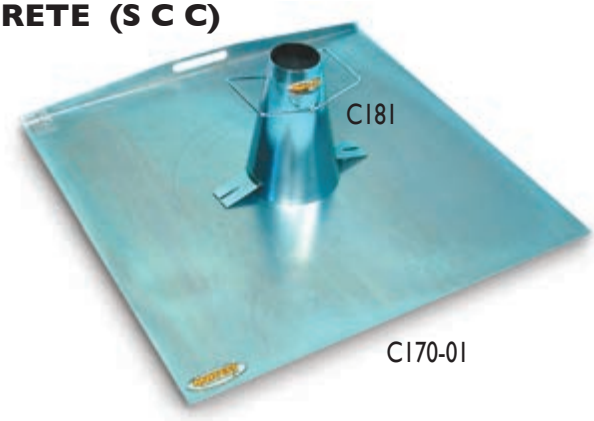
Free Flow and Time Flow determination. "Spray-Test"

STANDARDS: **EN 12350-8** / SCC / ERMCO-EFNARC
UNI 11041 / RILEM report N. 23

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 905 x 905 mm, with engraved two circles having 210 and 500 mm diameter and central X cross.



Flow time determination. " V-funnel test "

STANDARDS: **EN 12350-9** / SCC / ERMCO-EFNARC
RILEM report N. 23 / comparable to UNI 11042

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: 640 x 340 x 1050 mm. Weight : 20 kg approx.

V127 BOX, polythene made, to collect the concrete.

C171-11 Filling hopper stainless steel made, to pour the concrete into the funnel in one operation, as specified by the Standard.

C262 Straight edge, 460 mm, to level the concrete.

Confined flowability determination. "L-Shape box"

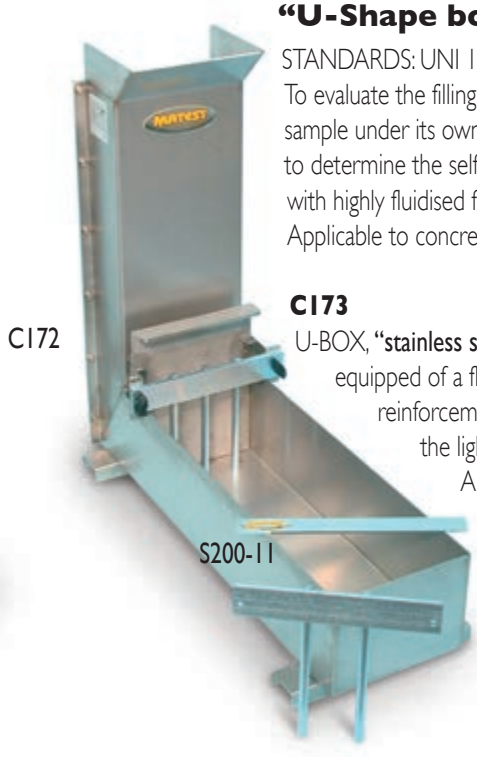
STANDARDS: **EN 12350-10** / SCC / ERMCO-EFNARC
RILEM report N. 23 / comparable to UNI 11043

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 dia. 12 mm and free light of 41 mm
- one set of 2 vertical bars having dia. 12 mm and free light of 59 mm
- gate in guillotine form

Dimensions: 712 x 280 x 682 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 dia. 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: 480 x 250 x 680 mm
Weight : 20 kg approx.

S200-11
STRAIGHT EDGE, 300 mm long, galvanized steel, to level the concrete.

Confined flowability determination. "J-Ring apparatus"

STANDARDS: **EN 12350-12** / comparable to: UNI 11045 / ASTM C1621

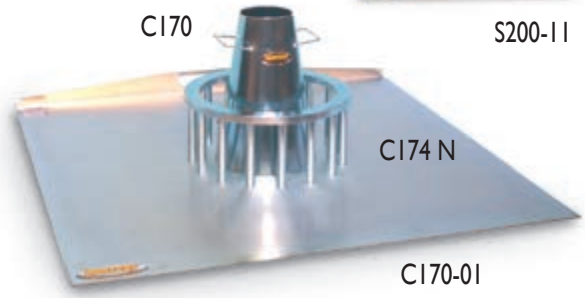
To determine the flowability, i.e. the flow time and the capability of the self compacting concrete to pass through obstacles.

C174 N
J-RING APPARATUS, galvanized steel made, having rectangular section 30 x 15 mm and median diameter of 300 mm.
The median circumference of the ring is drilled, and n. 16 cylindrical bars dia. 18 x 140 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. NEW

C170
SLUMP CONE, galvanized steel, conforming to EN 12350-2 Spec.

C170-01
PLATE, galvanized steel made, dimensions 905 x 905 mm, with engraved two circles having 210 and 500 mm diameter and central X cross.



C183 Vebé consistometer

STANDARDS: **EN 12350-3** / BS 1881:104 / UNI 9419
The Vebé consistometer method is based on the same principle of the simple slump cone test method, for the determination of the workability of concrete, but it has the advantage of a mechanized action. After removing the slump cone, the concrete undergoes a vibration to determine its slump.
Supplied complete.
Power supply:
230 V 1ph 50 Hz 250 W
Dimensions:
260x380x700 mm.
Weight: 90 kg

C184 Vibrating table

(Vebé consistometer)
STANDARD: ASTM C1170-92
For determining the consistency and density of roller-compacted concrete.
Similar to mod. C183, but conforming to ASTM C1170-92 Spec. with sliding weight of 50 lbs
* Power Supply:
230 V 1F 50 Hz 180 W
Dimensions: 280x400x900mm
Weight: 110 kg

* NOTE: The vibrating table is available also at:
230V 60Hz and 110V 60Hz

ACCESSORY for the C184 table:
C184-10
SLIDING WEIGHT 20 LBS (that replaces the standard 50 lbs one) + base to fix a cylinder mould dia. 6"x12" (optional mod. C258-03) to conform the Vibrating Table to the ASTM C1176-92 Specifications.

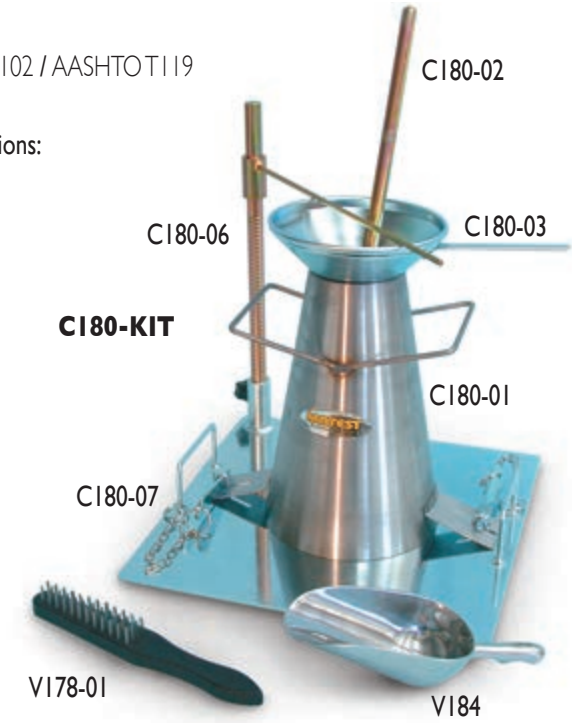
SLUMP CONE TEST SETS

STANDARDS: **EN 12350-2 / EN 12350-8:2011** / ASTM C143 / BS 1881:102 / AASHTO T119
NF P18-305 / UNE 7103 / UNI 9418

SLUMP CONE COMPLETE TEST SETS. 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, dia. 16 x 600 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.

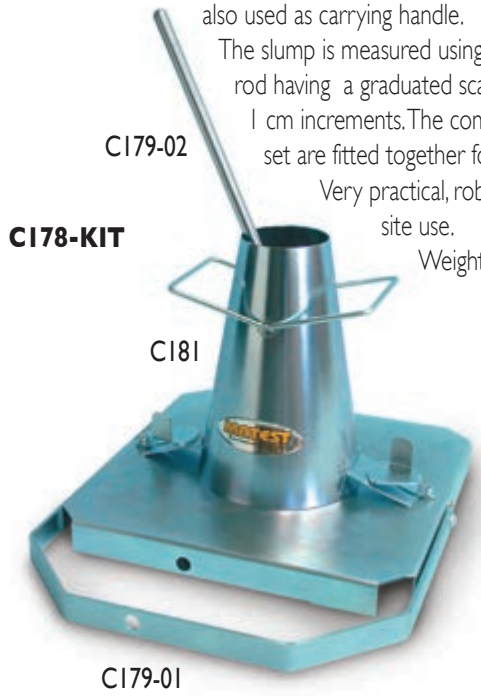


C182-KIT SLUMP CONE, COMPLETE SET, including:

C181 Slump Cone, **"galvanized steel"**
C180-02 Tamping rod, galvanized steel, dia. 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.

C178-KIT PORTABLE SLUMP CONE TEST SET, including:

C181 Slump Cone, **"galvanized steel"**
C179-02 **"Graduated"** steel tamping rod, galvanized, Ø16 x 600 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.



C179-KIT PORTABLE SLUMP CONE TEST SET, including:

C180-01 Slump Cone, **"stainless steel"** made
C179-02 **"Graduated"** steel tamping rod, galvanized, Ø16 x 600 mm
C179-01 Base, galvanized steel, complete with clamps and measuring bridge, as described above.
Weight: 8 kg approx.

C179-02 DETAIL

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"**. Weight: 750 g
C180-02 Tamping rod, galvanized steel, dia. 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.

ACCESSORY:
C180-03P Cone Filling Funnel, **"plastic"**. Weight: 250 g

Note: Each component of this kit can be ordered separately.

C182P KIT

C180-01

Slump Cone only, manufactured from **"stainless steel"**, diameter 100/200mm, height 300mm, thickness 1,5 mm.
Weight: 2 kg approx.

C181

Slump Cone only, galvanized steel, diameter 100/200mm, height 300mm, thickness 1,5 mm.
Weight: 2 kg approx.

C180-01
C181
C180-03P
C181P

V185-03

Scoop, stainless steel

STANDARDS: **EN 12350-1** / UNI 9416
BS 1881:101

Used to sample fresh concrete
Capacity: 5 kg of concrete
Dimensions: dia. 125x250 mm

V185-03

C185

Compacting factor apparatus

STANDARDS: BS 1881:103
BS 5075

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 dia. mm 16x600 long.
Dimensions: mm 500x400x1510.
Weight: 55 kg

C185

C192 KIT

Flow table

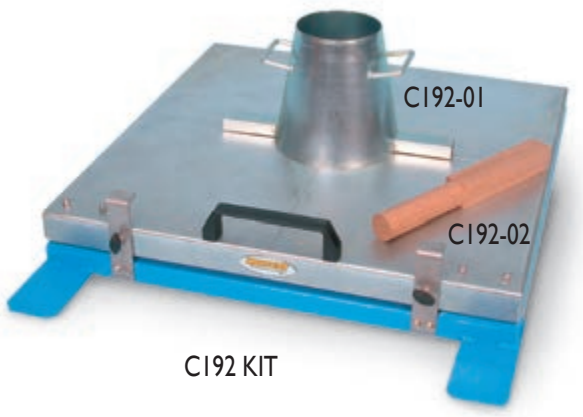
STANDARDS: **EN 12350-5** / BS 1881:105 / DIN 1048 / UNI 8020

The apparatus comprises a galvanized steel conical mould, dia. 130/200 xh 200 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

SPARES:

C192-01 Conical mould, galvanized steel made, dia. 130/200 xh 200 mm

C192-02 Wooden tamper


C192-01
C192-02
C192 KIT

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

C188

Walz consistometer

STANDARDS: **EN 12350/4** / DIN 1048 / UNI 9420

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

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: 230 V 1ph 50 Hz 300 W
Dimensions: 820x420x410 mm
Weight: 80 kg

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

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: dia. 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

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: dia. 25x210 mm
Weight 400 g

C194

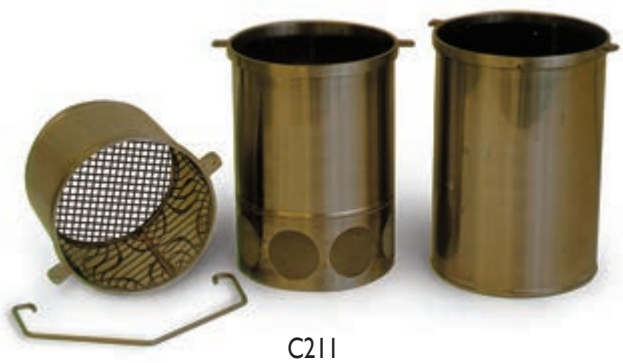
C194-01
Concrete pocket dial penetrometer

To evaluate the initial set of concrete, and the effect of the retarders in the setting time. The plunger has dia. 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: French LCPC 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.
Contained in carryng cases.
Weight: 2 kg

C220

C195

Air entrainment meter 5 litres capacity, water column type

STANDARDS: **EN 12350-7** / BS 1881:106 / UNI 6395
ASTM C231 type A / NF P18-353 / UNE 7141

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: dia. 250x700 mm. Weight: 13 kg

ACCESSORY:
C195-01 Calibration cylinder to check and calibrate the air meter mod. C195

C198

Air entrainment meter, 7 litres capacity, pressure gauge type

STANDARDS: **EN 12350-7** / ASTM C231 type B / 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: dia. 250 by 500 mm approx. Weight: 10 kg

C196

Air entrainment meter 8 litres capacity, pressure gauge type

STANDARDS: **EN 12350-7** / DIN 1048
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: dia. 250x450 mm
Weight: 12 kg

C197

Air entrainment meter 8 litres, electric, pressure gauge type

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: 230 V 1ph 50/60 Hz
Dimensions: dia. mm. 250x450
Weight: 14 kg

ACCESSORY:
C197-01
Filling hopper for the air entrainment meters C196 and C197

DENSITY OF FRESH CONCRETE

C199
Unit weight measure, 10 litres capacity

C199

STANDARDS: **EN 12350-6**
EN 1097-3 / BS 1881:107
ASTM C29, C138

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

Admixtures for concrete, mortar and grout. Determination of bleeding of concrete

STANDARD: **EN 480-4**

C199-10

CONTANIER, having 250 mm dia. 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 aprox.

ACCESSORY:

C199-11

Tamper, **"stainless steel"** made, dia. 100 mm

Unit weight measures

STANDARDS: ASTM C29, C138 / AASHTO T19 / UNI 6394
UNE 7286 / BS 812, 1881, comparable to **EN 1097-3**

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

C199-10

C199-11

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 / comparable to UNI 8020-A / AASHTO T120 / UNE 7102

Used to determine the flow of concrete. The apparatus consists of a flow table, stainless steel flow mould, tamping bar.

C208

C208 + C208-01

MODELS:

C208 FLOW TABLE
Hand-operated by crack handle.
Table diameter 762 mm.
Weight: 100 kg

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: 230 V 1ph 50 Hz 750 W
Weight: 15 kg

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

Density of hardened concrete

STANDARDS: **EN 12390-7** / BS 812, 1881 :114 / UNI 6394

V085
Specific gravity frame. Technical details: see pag. 472

V085-01
Cradle for holding specimens

V041
Density basket dia. 200 by 200 mm, stainless steel, 3,35 mm mesh size.

Note:
Balances for specific gravity tests: see pag. 470

V041

V072-06

V085

C214

C303N

Two channels thermometer K-type thermocouple, with Windows software for data download to PC

NEW

This model is used to automatically measure and store the temperature of concrete casting during the curing phase.
This watertight thermometer is provided with two inputs to connect separately two K-type thermocouple probes.
The data read by the probes can be transferred every 2 seconds to a PC by means of the RS232 port and the appropriate cable and software supplied with the equipment.
This advanced thermometer displays the current measure along with the minimum and maximum temperatures recorded by the two probes during the working cycle. These data are displayed on a two-levels backlit display.
The thermometer can also display:
- the difference between the temperature values read by the two probes compared with a reference value;
- the minimum and maximum temperature levels detected by the probes.

The "hold" button allows the operator to fix the measure on the display and write it down easily.
Measuring range: from -149.9 C to 999.9°C
Resolution: 0,1°C Reading: °C e °F
Power: 3 x 1.5V AA / about 500 hours of continuous use (without backlit display); automatic turning off device, that can be selected after 8 or 60 seconds (this function can be disabled).
Using conditions: from -10 to 60°C; U.R. max. 100%
Supplied complete with: 50 meters of K-type thermocouple coil, set of 4 male connectors, RS232 connecting cable, software for data management through PC, carrying case.
Dimensions: about 300x200x80mm
Weight: 800 g

SPARE PARTS:

C303-01 K-type thermocouple coil (50 meters)
C303-11 Set of 4 male connectors
C303SW Software for PC connection
C303-06N Cable for PC connection

C303N

C303N Detail of the 2 probes

C215

RAM - rapid analysis machine

STANDARD: BS 1881:128

Used for the determination of cement content in fresh concrete, coarse and fine aggregate, fly ash and GGBF slag content can also be determined. Fully automatic procedure with quick and accurate test results (max. errors within 5 kg./cubicmetre).
The complete test takes approx. 10 minutes. The connection to water net for approx. 80 litres each test is required.
The weight of the test sample is 8 kg.
Supplied complete.
Power supply: 230 V 1ph 50 Hz
Dimensions: 780x660x1500 mm
Weight: 150 kg

C215

PLASTIC CUBE, CYLINDER AND BEAM MOULDS

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.

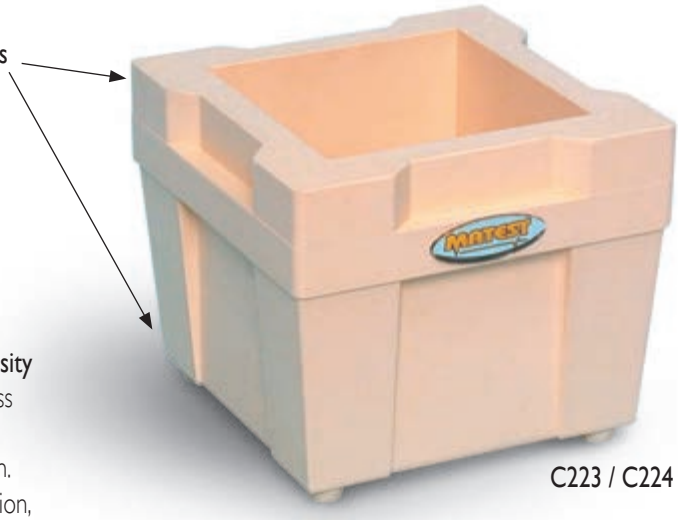
The moulds: C223, C224, C230N, C232N, C228, C229 are produced by Matest and have competitive manufacturer prices.

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 3 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:

Reinforced corners



C223 / C224

C223 "Matest production"
CUBE MOULD, 150 mm side, with "X" reinforced band on the base, and reinforced corners.
Weight: 1300 g approx.

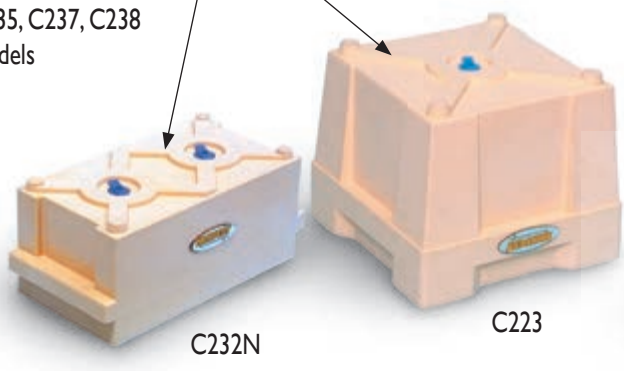
C224 "Matest production"
CUBE MOULD, 150 mm side, "HIGH DENSITY", with "X" reinforced band on the base and reinforced corners.
The mould same to mod. C223 is manufactured from **"high density mixture"** with total weight 1600 g, by obtaining a higher hardness and strength of the plastic material.
- It 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.

C232N "Matest production"
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 "Matest production"
CUBE MOULD, standard, reinforced band, 150 mm side
Weight: 1250 g approx

C230-03 C230N

C230-01 C230

C230
CUBE MOULD, standard, reinforced band, 150 mm side
Weight: 1260 g approx

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

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 "Matest production"
CYLINDER MOULD, dia. 150 x 300 mm with upper and lower reinforced bands.
Weight: 2150 g approx.

C229 "Matest production"
CYLINDER MOULD, dia. 160 x 320 mm with upper and lower reinforced bands.
Weight: 2200 g approx.

ACCESSORIES:

C223-01 COVER, plastic, for C223, C224 moulds. Useful for transportations. Pack of 10 pcs.

C234-02 COVER, plastic, for C230N and C230 moulds. Useful for transportations. Pack of 10 pcs.

C234-03 STOPPER, plastic, to plug the hole of the moulds C223, C224, C228, C230N, C229. Pack of 10 pcs.

C230-04 STOPPER, plastic, to plug the hole of the mould C230. 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 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.

C223-05

C223-05
IDENTIFICATION LABEL
Pack of 250 labels

C238

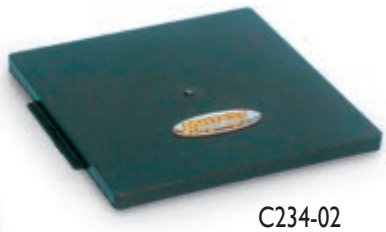
C237

C230-05
GUN, to connect to a water or air pressure, to eject the specimen from the mould.

C229

C228

C230-05


C234-02

C234-03

C231N
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 48 pieces.

C231N

STEEL CUBE, CYLINDER AND BEAM MOULDS

Nominal moulds dimensions meet to requirements of
STANDARDS: **EN 12390-1** / BS 1881:108 / ASTM C192, C39 / AASHTO T23, T126 / NF P18-400 / UNI 6130 / UNE 7240

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

MODELS:

C247 Cube mould, 100 mm. side, **1** gang. Weight: 6 kg
C247-01 Cube mould, 150 mm. side, **1** gang. Weight: 13 kg
C247-02 Cube mould, 200 mm. side, **1** gang. Weight: 25 kg
C247-03 Cube mould, 300 mm. side, **1** gang. Weight: 90 kg

C248 Cube mould, 100 mm. side, **2** gangs. Weight: 11 kg
C248-01 Cube mould, 150 mm. side, **2** gangs. Weight: 30 kg
C248-02 Cube mould, 200 mm. side, **2** gangs. Weight: 45 kg

C248-03 Cube mould, 100 mm. side, **3** gangs. Weight: 17 kg
C248-04 Cube mould, 140 mm. side, **3** gangs. Weight: 30 kg
C248-05 Cube mould, 150 mm. side, **3** gangs. Weight: 38 kg

C249 Cube mould, 100 mm. side, **4** gangs. Weight: 20 kg
C249-01 Cube mould, 150 mm. side, **4** gangs. Weight: 45 kg

C247 ÷ C249-01

C254 Beam mould 100x100x400 mm. Weight: 20 kg
C254-01 Beam mould 100x100x500 mm. Weight: 23 kg
C254-02 Beam mould 150x150x600 mm. Weight: 44 kg
C254-03 Beam mould 150x150x750 mm. Weight: 47 kg
C254-04 Beam mould 200x200x800 mm. Weight: 86 kg
C254-05 Beam mould 140x140x560 mm. Weight: 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** / ASTM C39, C192
AASHTO T23, T126 / NF P18-400 / UNE 7240
Internal surface, base, top and bottom ring are accurately machined.

Models	Dimensions Ø x height	Weight kg
C258	100x200 mm	8
C258-01	112,8x220 mm	8
C258-02	150x300 mm	15
C258-03	6" x 12"	15
C258-04	159,6x320 mm	17
C258-05	250x500 mm	80
C258-06	150x150 mm	10
C258-04 CO	159,6x320 mm fast clamping	18

C258 ÷ C258-06

C258-04CO

Split cylinder moulds

Steel made, galvanized finishing against corrosion.
Foreseen of lateral hinges for total opening and fast clamping system with inbuilt revolving screw. Complete with base
They are easy to use with practical and fast demoulding; recommended for field use.

Model	Dimensions Ø x h. (mm)	Weight kg
C259	150x300 mm	8,5
C259-01	160x320 mm	11

C259 C259-01

Cast iron cube moulds, one gang

STANDARDS: **EN 12390-1** / BS 1881:108 / UNI 6127
DIN 51229

These cube moulds meet the requirements of EN 12390-1 Specifications.
They are checked in the shape, dimensions and tolerance with instruments certified by an Official SIT Institute (or equivalent), and have a Serial Number marked on each side.
The produced cube specimens meet the Standards, by avoiding to the enduser any expensive dimensional verification.
Complete with base plate, clamp type.

Two models are available:
- four part wall equal design
- two part wall "V" shaped, offering more practical and fast use.

C253-01 C253

C253-03 DISASSEMBLED C253 DISASSEMBLED

MODELS:

C253 CUBE MOULD 100 mm cast iron, **"four part design"** Weight: 8,3 kg

C253-01 CUBE MOULD 150 mm cast iron, **"four part design"** Weight: 15,5 kg

C253-02 CUBE MOULD 100 mm cast iron, **"two V shaped part design"** Weight: 8,3 kg

C253-03 CUBE MOULD 150 mm cast iron, **"two V shaped part design"** Weight: 15,5 kg

ACCESSORIES FOR MOULDS:

C180-02 TAMPING ROD, 16 mm dia. 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.
C265 DEMOULDING OIL. Can of 25 litres
V184-01 ROUND ALUMINIUM SCOOP 1000 ml capacity
V187 TROWEL STAINLESS STEEL 120x260 mm
V195 RUBBER MALLET, head dia. 55 mm
V182 MIXING TRAY, galvanized 600x600x80 mm

C180-02 ÷ V195

Verification of flatness, perpendicularity, straightness and dimensions of moulds and specimens. STANDARDS: EN 12390-1 / ISO 1101

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, 153 x 0,01 mm, for dimensional measurements.

V175-03CER
VERNIER CALIPER, digital, 153 x 0,01 mm, for dimensional measurements, complete with Calibration Certificate issued by an Accredited Laboratory (SIT).

in alternative:

V175-02
VERNIER CALIPER, digital, 200 x 0,01 mm, for dimensional measurements.

V175-02CER
VERNIER CALIPER, digital, 200 x 0,01 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

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 11307:2008 / 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 TO UNI 11307:2008 Specification:

C254-01
Beam mould, steel made, to prepare a concrete specimen 100x100x500 mm. Weight: 23 kg

C366-12
Reference pin, to be sticked in the intersection of the longitudinal axis of the specimen with its bases. Pack of 10

EQUIPMENT 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

C366-11
INSERTS, stainless steel, spares to C365 mould. Pack of 10

"needed" ACCESSORIES, conforming to: UNI 11307:2008 and UNI 6555

C364
Measuring apparatus, for 100x100x500 specimens, complete with reference bar, but **"without"** dial gauge to be ordered separately. Weight: 23 kg

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:

S382-02 DIGITAL GAUGE indicator travel: 15,3 mm, division: 0,001 mm
Including battery but **"without"** RS232 port.

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 SOFWARE for S382-01 gauge, complete with USB adaptor and connection cable to PC.

Determination of restrained expansion of a concrete or mortar specimen containing the expansive agent, and the effect of the aggregates on the drying shrinkage of concrete.

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.
STANDARD: UNI 8148 . Weight: 15 kg

E114-02 Restrained end plate 80x80 mm; spare to E114 mould.

E115
THREE GANG PRISM MOULD, to produce 50x50x250 mm specimens.
STANDARD: UNI 8147. Weight: 10 kg

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:

E077 KIT LENGTH COMPARATOR, with analogic dial to measure linear variations. Technical details: see pag. 321

AS AN ALTERNATIVE:

E078 KIT - E077-01 KIT
LENGTH COMPARATOR, with digital dial to measure linear variations. Technical details: see pag. 321

E078-05 REFERENCE ROD, 280 mm long

VIBRATING TABLES

STANDARDS: **EN 12390-2** / BS 1881:108 / UNI 6127

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 50 Hz

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

C278-02

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. 160x320mm, both plastic and metal made.
Supplied complete with elastic bands to fix the mould to the table.
Table dimensions: 400x300mm, height 200mm
Weight: 16 kg

MODELS:

C281N

Vibrating table, portable, 12V dc

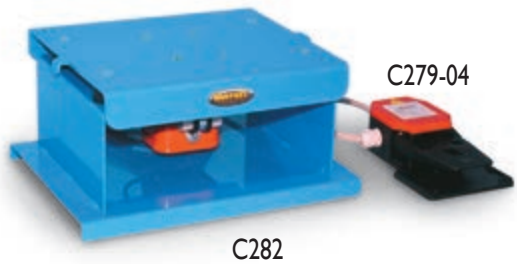
Suitable for site use, where no electric supply is available.
Lightweight and small sized, it can be handled by one person and easily stored in the car trunk.
Supplied complete with On/Off switch and connector for the vehicle cigar lighter

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 / BS 1881:108 / UNI 6137

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

C270N
POKER VIBRATOR, HEAVY DUTY, portable, electric.
Tip dimensions: 25 mm dia. by 290 mm long.
Flexible shaft 2 metres long.
Frequency: 18000 vibr./minute.
Amplitude: 0,65 mm
Centrifugal force: 0,8 kN (80 kg)
Power supply: 230V 1ph 50/60Hz 2300W
Dimensions: 200 x 300 x 350 mm approx.
Weight : 10 kg approx.

SPARES:

C270-10N
TIP, 25 mm dia. by 290 mm long, complete with flexible shaft 2 metres long, for the vibrator mod. C270N.

C271-10
TIP, 22 mm dia. by 250 mm long, complete with flexible shaft 2 metres long, for the vibrators mod. C271 and C274.

C271-10N
TIP, 25 mm dia. by 250 mm long, complete with flexible shaft 2 metres long, for the vibrator C271N

C271N POKER VIBRATOR, portable, petrol operated.
Honda motor, 4-stroke, 1,6HP, 35,8cc
Tip dimensions: 25 mm dia. by 250 mm long.
Flexible shaft: 2 metres long.
Frequency: 10000 vibrations/min.
Supplied complete with knapsack.
Weight: 7 kg approx.

C271N

C274 POKER VIBRATOR, portable, to be connected to a 12 V DC battery car.
Complete with connector for car lighter.
Tip dimensions: 22 mm dia. by 250 mm long
Flexible shaft 2 metres long
Frequency: 12000 vibrations/min.
Weight: 10 kg approx.

C274

C270N

C270-10N

CURING TANKS FOR CONCRETE SPECIMENS

STANDARDS: **EN 12390-2** / ASTM C31, C192, C511
AASHTO T23 / NF P18-404 / UNI 6127, 6128, 6129
BS 1881:111 / UNE 7240

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

C302-10 KIT

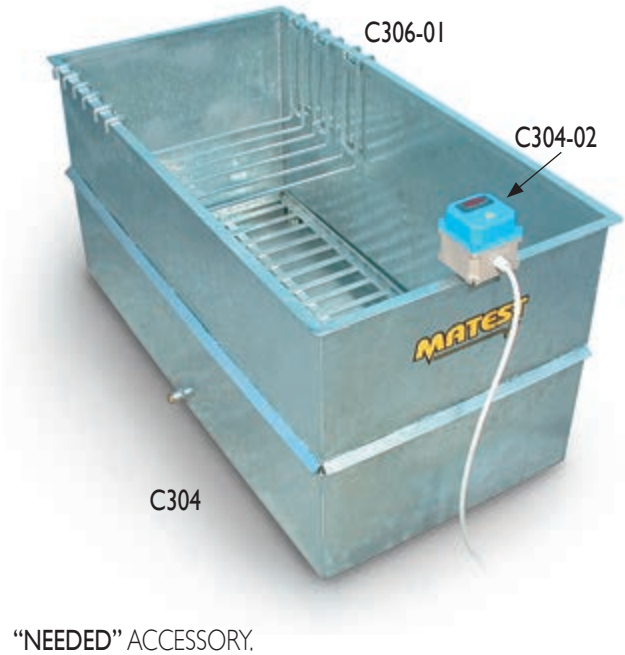
Curing tank, 550 litres capacity, heavy plastic

Same to mod C302 but having:
"Water discharge cock incorporated into the tank"
Inside dimensions: 1100 x 710 xh 690 mm
Overall dimensions: 1200 x 800 xh 850 mm
Weight: 55 kg

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

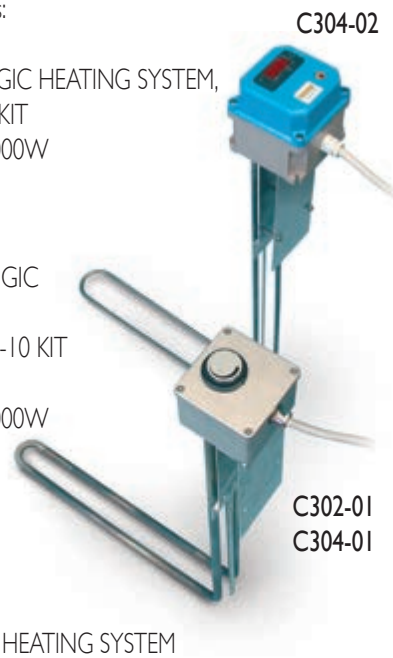


"NEEDED" ACCESSORY.
Available in two versions:

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. C302 KIT, C302-10 KIT and C304,
"ensuring better temperature accuracy"
230V 1ph 50/60Hz 2000W

ACCESSORIES FOR TANKS MOD. C302 KIT, C302-10 KIT, C304:

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, pag. 335

C307

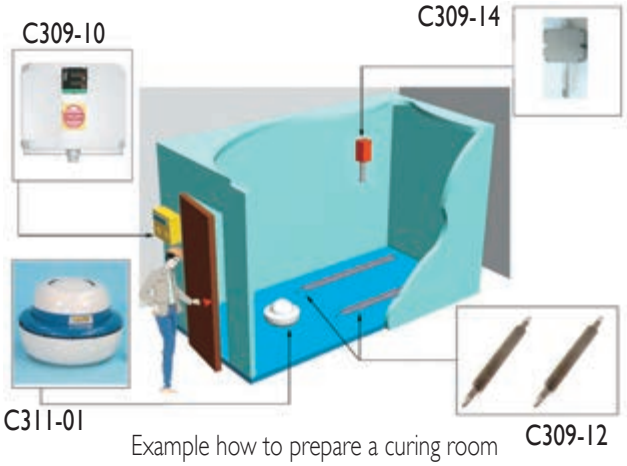
Accelerated concrete curing tank

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 dia. 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

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 approx. 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: dia. 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.

C311-01

VAPORISER
Used to humidify curing rooms up to 150 cubic/metre.
Technical data: see pag. 277

C313

Climatic controlled cabinet 700 litres cap.

- Temperature: -25 to +70°C, stability 0,1°C
- Humidity: 10 to 90%, accuracy ± 1%
- Dew point: +2°C

STANDARDS: **EN 196-1, EN 1367-1, EN 12390-2, EN 12390-9**

Designed for all the research and control laboratories to perform: cold and/or hot temperature measurement at controlled humidity conditions, any kind of freezing/thawing tests, accelerated curing tests.
Used to cure concrete (EN 12390-2) and cement specimens (EN 196-1), to analyze the behaviour to freezing and thawing of aggregates (EN 1367-1) and concrete (EN 12390-9).
Internal capacity: 700 litres.
Internal and external frame made of stainless steel AISI 304.
Polyurethane insulation, 75 mm thick.
Internal ventilation.
Reversible doors with autoclosing hinges and opening lock beyond 90°, rechangeable magnetic gaskets, rounded corners, inside doors in lexan.
Shelves can be taken off and adjustable in height; adjustable feet.
Temperature sensor can be placed at every point of the climatic cabinet; it can also be placed within the specimen.
The cabinet is supplied with a **"decalcification filter"**; it works with demineralized or softened waters, or aqueduct waters with $CaCO^3$ hardness from 0 to 400 ppm, assuring an excellent functioning along the time.
Complete with microprocessor one cycle programmer and 20 temperature segments.
Real-time visualization of the internal temperature and of the set temperature on the digital display.
Audiovisual alarm of minimum and maximum temperature (audio signal can be switched off).
Password to access the cabinet commands.
Security device Class 3.1 (DIN 12880) with automatic activation of two further security thermoregulators.
Supplied complete with 3 adjustable shelves.
Inside dimensions:
600x670x1350 mm
Overall dimensions:
720x800x2070 mm
Power supply:
230V 1ph 50/60 Hz 1800W
Weight approx.: 180 kg

Detail of the control panel

- Temperature control (%)
- Humidity inside the chamber (%)
- Humidity control (%)
- Internal temperature of the chamber
- Set Point temperature
- Humidity Set Point

C313

C313-01

Climatic cabinet 1500 litres cap.

Same as C313 model, but with an internal capacity of 1500 litres.
Supplied complete with 6 adjustable shelves.
Inside dimensions: 1320x670x1350 mm
Overall dimensions: 1440x800x2070 mm
Weight: about 360 kg

ACCESSORIES:

C313-11 PROGRAMMER, 10 cycles (programs) and 50 different linear temperature segments (as alternative to the programmer supplied with the cabinet).

C313-12 PROGRAMMER, 25 cycles and 100 different linear temperature segments.

C313-13 PROGRAMMER, 50 cycles and 200 different linear temperature segments.

C313-15 DATA LOGGER for temperature and humidity recording and monitoring, complete with software and connecting cable for data transfer to PC.

UNBONDED CAPPING PADS AND RETAINERS

STANDARD: ASTM C1231

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.

Pads + Retainers + Specimen configuration

MODELS:

C107-09 CAPPING RETAINERS (couple) for dia. 100x200mm cylinders.

C107-10 CAPPING RETAINERS (couple) for dia. 150x300mm and 6x12" cylinders.

C107-12 CAPPING RETAINERS (couple) for dia. 160x320 mm cylinders

C107-18 NEOPRENE PADS (couple) 60 shore A for dia. 100x200mm cylinders

C107-19 NEOPRENE PADS (couple) 70 shore A for dia. 100x200mm cylinders

C107-20 NEOPRENE PADS (couple) 60 shore for dia. 150x300mm and 6"x12" cylinders

C107-21 NEOPRENE PADS (couple) 70 shore for dia. 150x300mm and 6"x12" cylinders

C107-25 NEOPRENE PADS (couple) 60 shore for dia. 160x320mm cylinders

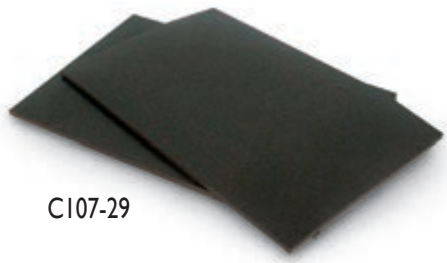
C107-26 NEOPRENE PADS (couple) 70 shore for dia. 160x320mm cylinders

C107-29 NEOPRENE SHEET (couple) 60 shore A dimensions: 600x400x12mm for test on blocks.

C107-12

C107-10

C107-20



C107-29

C311-01
Curing room vaporiser up to 150 m³

Used to humidify curing rooms for concrete and mortar specimens.
Max. room capacity: 150 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: dia. 360x230 mm. Weight: 3,5 kg

C311-01

C312-10

C312-02
Curing room vaporiser up to 500 m³

Same to mod. C311-01, but more powerful for rooms up to 500 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:
dia. 420x350 mm
Weight: 8 kg

C312-02

ACCESSORY FOR MOD. C311-01, C312-02:

C312-10
HUMIDISTAT to automatically control the room humidity, range 30 ÷ 100 %

SPARE:

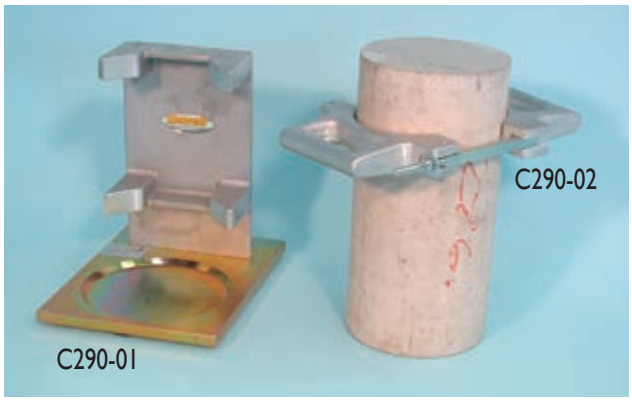
C312-11
LEVEL REGULATOR, complete of antioverflow.

CYLINDER CAPPING EQUIPMENT

Sulphur method

STANDARDS: **EN 12390-3** / ASTM C617, C31, C192 / AASHTO T23, T126 / NF P18-416 / UNI 6132 / UNE 7240, 83303

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.



Cylinder cappers

To obtain plane end surfaces perpendicular to the axis of the cylinder.

Model	Cylinder dia. x h	Weight kg
C290-01	150x300mm, 6"x12"	6,3
C291-01	160x320 mm	6,2
C292-01	100x200 mm	4,4

C290-02
CYLINDER CARRIER, for dia. 150x300mm, 160x320mm and 6"x 12". For an easier handling of the specimens.
Weight: 1,4 kg

MELTING POT for capping compound.
Used to melt the sulphur capping compound. Complete with thermoregulator. Suitable also for general laborataory purposes.

AVAILABLE MODELS:

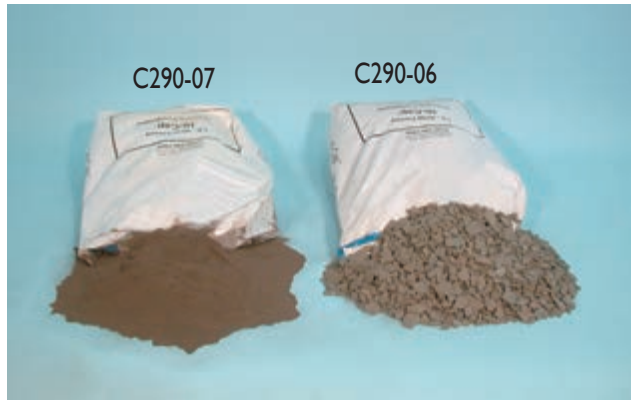
C290-03 KIT MELTING POT, capacity : 4 litres. Inexpensive model. 230V 1ph 50/60Hz 1500W

A106
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: dia. 200 mm x 160 mm
230V 1ph 50/60Hz 800W. Weight: 3 kg

C290-06
CAPPING COMPOUND, ultra strong flake type.
This compound is a mixture of sulphur and mineral filler; the compressive strength of 8000 - 9000 Psi is granted (at two hours) on a 2" cube specimen, as requested by ASTM C617 Standard.
On a 150 mm dia. cylinder the compressive strength is 16000 Psi.
Melting point is 115 to 143°C. (ideal: 130°C.)
Bag of 22,5 kg (50 lbs)

C290-07
CAPPING COMPOUND, of sulphur and mineral powder mixture, with minimum strength of 55 Mpa.
Bag of 20 kg

V186-01 LADLE, stainless steel made.



OTHER MODELS:

C294-01 Vertical cylinder capper for dia. 250x500 mm

C294-02 Cylinder carrier for dia. 250x500 mm

C294-05 Vertical cylinder capper for dia. 60x120 mm

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

C298

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.
The specimens are easily fixed to the table by proper locking stirrups (see accessories) allowing to grind at a time:
- n° 3 cube specimens 100mm side, or
- n° 3 cube specimens 150mm side, or
- n° 2 cube specimens 200mm side, or
- n° 2 cylinder specimens dia. 100x200, 110x220, 150x300, 160x320mm, or
- n° 1 block with max. dimensions 390x250mm

The revolving abrasive head is radially and alternatively moved in both directions through an electric motor actuated by a pushbutton.
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 0,05mm 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,
- the diamond sectors (8 pieces)

that must be ordered separately (see accessories)

Technical specifications:
Table dimensions: 775x280mm (usefull: 750x250mm)
Grinding wheel dia.: 330mm
Vertical span width: min. 125mm, max. 330mm
Grinding head stroke: 205mm
Grinding wheel speed: 1400 rpm.
Power supply: 400V 3ph 50Hz 4500W
Dimensions: 1220x1080x (h) 1730mm
Weight: 410 kg approx.

C298 / C299 with C300-06N

C299

AUTOMATIC GRINDING MACHINE

Same to mod. C298, but the radial mouvement of the head is equipped with end of stroke system, granting the fully automatic displacament in both directions without activating the electric pushbutton.

"NEEDED" ACCESSORIES:

C300-06N
LOCKING STIRRUPS for cube specimens side 100, 150, 200mm complete with distance piece 60mm high.

AS AN ALTERNATIVE:

C299-10
FAST LOCKING DEVICE, for:
cubes 150 and 200mm;
cylinders dia. 100 to 160mm
Each device accepts only one specimen.
It is possible to grind at a time:
1 cube 200mm; 2 cubes 150mm;
2 cylinders.

C299-10

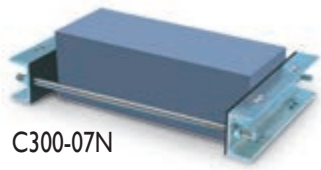
C300-02
DIAMOND GRINDING SECTOR (8 pieces required) **"particularly recommended"** because of their long duration and good grinding action.

C300-02

ACCESSORIES:

C300-03
LOCKING STIRRUPS for cylinder specimens dia. 100, 110, 150, 160mm. They can be used only in conjunction with the C300-06N stirrups.

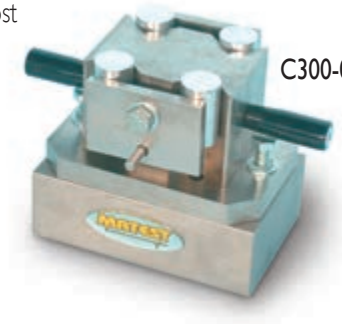
C300-07N
LOCKING STIRRUPS to grind blocks of different sizes, but with max. dimensions of 390x250mm


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 20 to 55mm dia. and can be mounted on most grinding machines.
Weight: 7 kg approx



C300-08

C300-01
ABRASIVE DRINDING SECTORS,
spare, set of 8 pieces.

CORE DRILLING MACHINES "LIGHTWEIGHT, PORTABLE"

General description:
These drilling machines are extremely practical, lightweight, easy to use.
The base if 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"**: diamond bit, spanner, core extractor (see accessories next page) to be ordered separately.

C318N
Core drilling machine, electric motor

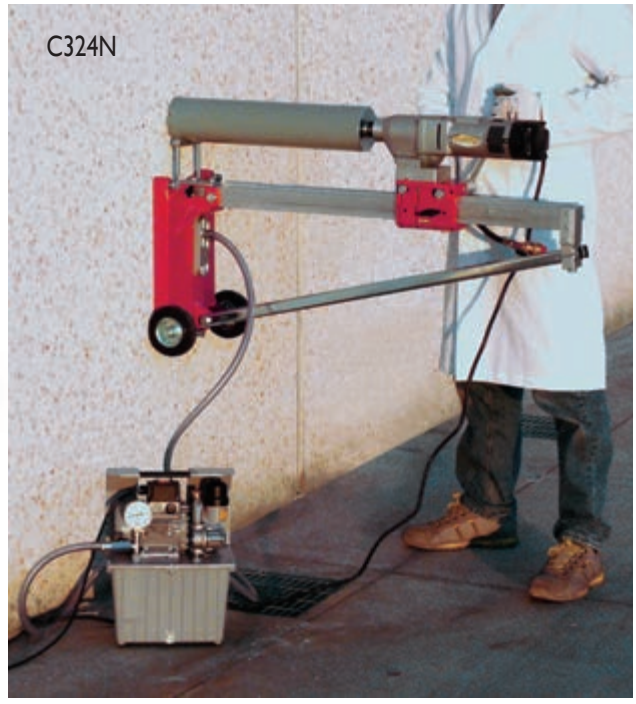
Electric motor at three speeds: 530, 1280, 1780 rpm, with speed reducer, provided of multifunction electronic friction device and switch to CE Safety Directive.
The machine accepts bits dia. 50 to 150 mm
Power supply: 230 V 1 ph 50/60Hz 2200 W
Dimensions: 600x320x1020 mm
Weight: 24 kg

C318N tilted

C318N

C324N
Electric core drilling machine with vacuum facility

The frame and the electric motor are the same of 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



C324N

ACCESSORY:

C318-10

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.

C332

C332

PORTABLE ELECTRIC GENERATOR
To use with electrically driven machines where electrical power is not available. The generator is rated at 4000 Watt and it supplies: 230 V 1ph 50 Hz.
Complete with tank, accessories.
Weight: 60 kg

CORE DRILLING MACHINES "HIGH PERFORMANCE"

General description:
These drilling machines are extremely robust, heavy duty, compact and reliable.
The sliding group is rectified so as 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 dia.
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"**: diamond bit, core extractor and spanner (see accessories at pag. 282) 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

- Original Briggs & Stratton motor
- It can drill cores up to 200 mm dia.
- Vertical rectified screw feed
- Built in water swivel to cool the bit
- Rugged, compact, wheels mounted

C319

C319-02

C319-02

Pavement core drilling machine 12,5HP 4-stroke petrol engine

Same to mod. C319, but activated by a petrol engine 12,5 HP power 4-stroke Briggs & Stratton model.
Weight: 150 kg

SPARE PARTS:

C331 PETROL ENGINE, for C319 machine 5 HP power, 4-stroke Briggs & Stratton model.
Supplied complete with tank, accessories
Weight: 20 kg

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

...follows...

C322 KIT

Universal electric core drilling machine

Comprising:

C321-10 UNIVERSAL DRILLING FRAME COMPLETE, but without electric motor

C330 ELECTRIC MOTOR COMPLETE

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 it is pre-built for extension column connection (accessory mod. C322-01).

Power supply: 230 V 1ph 50/60 Hz 2200 W

Dimensions: 440x750x1300 mm

Weight: 85 kg

C322 KIT

ACCESSORY:

C322-01

EXTENSION COLUMN, 1000 mm long, to connect to mod. C322 KIT for drillings over 1 metre from the ground.

Supplied complete with clamping devices.

Cadmium plated for rust protection.

SPARE PART:

C330

ELECTRIC MOTOR, for C318N, C322 KIT and C324N

Power 2200 Watt, three speeds 670 - 1140 - 1580 rpm complete with friction device, and connection to coolant water supply.

Double extremely safe isolation and switch to CE Safety Directive.

Connection to hub 1 1/4".

Power supply: 230 V 1ph 50/60 Hz 2200 W. Weight: 9 kg

C346 ÷ C346-04

C345

C344

C344-01

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).

Diamond core drill bits "with" backend screwed connector

NEW

Designed for making holes and to get 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 9mm high segment is important for the bit life, because the diamond is about the 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.

C339-01 ÷ C339-05

Model	Outside Dia. mm	Inside Dia. mm	Bit length mm	Expander Coupling	Core Extractor
C339-01	57	50	450	no	**C346**
C339-02	82	75	450	no	**C346-01**
C339-03	108	100	450	no	**C346-02**
C339-04	160	152	450	no	**C346-03**
C339-05	210	200	500	no	**C346-04**

The core extractor allows an easy removal of the core sample from the hole.

C348N

Specimen cutting machine with sliding supports

The machine accepts blades up to dia. 400 mm
Useful cutting height: 115 mm
Dimensions of the sliding table: 550x410 mm
Blade rotation speed: 2800 rpm
Supplied **"without"** blade (see accessories)
Power supply:
230 V 1ph 50 Hz 3 Hp
Dimensions:
700x1100x680 mm
Weight: 80 kg

C350N

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 dia. 450 mm
Supplied **"without"** blade (see accessories)
Power supply:
400 V 3ph 50 Hz 4 Hp
Dimensions: 1220x700x1360 mm
Weight: 125 kg

C350-01N

Specimen cutting machine

Identical to mod. C350N, but with:
Power supply: 230 V 1ph 50 Hz 4 Hp

C349N

Specimen cutting machine

Basically similar to mod. C350N, but it can accept blade having max. dia. 550 mm. Power supply: 400 V 3ph 50 Hz 5 Hp

C351

Specimen cutting machine, bench type

The machine accepts blades up to dia. 350 mm
Shear capacity: 120 mm
Blade rotation speed: 3900 rpm
Supplied complete with abrasive blade dia. 350 mm
Power supply: 230 V 1ph 50 Hz 2000 W
Dimensions: 560x460x390 mm. Weight: 20 kg

ACCESSORIES:

C350-12 DIAMOND BLADE dia. 450 mm., having long life for a faster and more precise cutting operation. Suitable for models C350N and C350-01N.
C350-13 DIAMOND BLADE, dia. 350 mm for mod. C351
C350-14 DIAMOND BLADE, dia. 400 mm for mod. C348N
C350-15 DIAMOND BLADE, dia. 510 mm for mod. C349N
C350-16 DIAMOND BLADE, dia. 550 mm for mod. C349N
C350-10 ABRASIVE BLADE dia. 350 mm for mod. C351

NOTE:
It is recommended to use the blade having the max. diameter accepted by the cutting machine.

C352
DEVICE FOR CYLINDERS AND CORES
To clamp and cut cylinders and cores dia 100 to 160 mm.
The device is fixed to the table of the cutting machines mod. C348N, C350N, C350-01N, C349N. Weight 10 kg

C352 SP
DEVICE FOR CORES, as above, but dia. 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. C348N, C350N, C350-01N, C349N.
Weight: 5 kg

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 ulteriorly 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 28 x 100 mm
- Impregnated diamond bit for cores with Ø 28 x 200 mm
- 2 Self-blocking pincers to fit the flanged guide assembly to the surface

Set of accessories comprising: anchors, bits, wrenches, 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 liters capacity

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 dia. 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.

Note:

The maximum values foreseen for compression tests on micro-cores are usually lower than 60 kN. Portable compression machine mod. C094 (see pag. 249), or a cement compression tester (see pag. 342) may be conveniently used.

Trimming of cores may be even obtained with the grinding machine mod. C298 + device mod. C300-08 (see pag. 279)

SPARE PARTS:

C377-10 ELECTRIC DRILL, suitable for the microcoring purposes.

C377-15 DIAMOND BIT, dia. 28 x 100 mm

C377-16 DIAMOND BIT, dia. 28 x 200 mm

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 standard equipment 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, complete.

C360-01 KIT STRAIN GAUGE, 200 mm measuring length, complete.

C361 KIT STRAIN GAUGE, 300 mm measuring length, complete.

MODELS WITH **"digital gauge"**, battery feeded, with reading values in mm (sens. 0,001 mm) and inch.
Complete with battery, but **"without"** RS232 port.

C359 KIT STRAIN GAUGE, 300 mm measuring length, complete

C359-01 KIT STRAIN GAUGE, 100 mm measuring length, complete

C359-02 KIT STRAIN GAUGE, 200 mm measuring length, complete

C359-01 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, complete.

C363-01 KIT STRAIN GAUGE, 100 mm measuring length, complete.

C363-02 KIT STRAIN GAUGE, 200 mm measuring length, complete.

ACCESSORY for C363 serie models:

S382-13

Software, complete with USB adaptor and connection cable to PC

SPARE PARTS:

C362-01 DATUM DISC (pack of 50)

C362-02 ADHESIVE compound.

C363 KIT

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

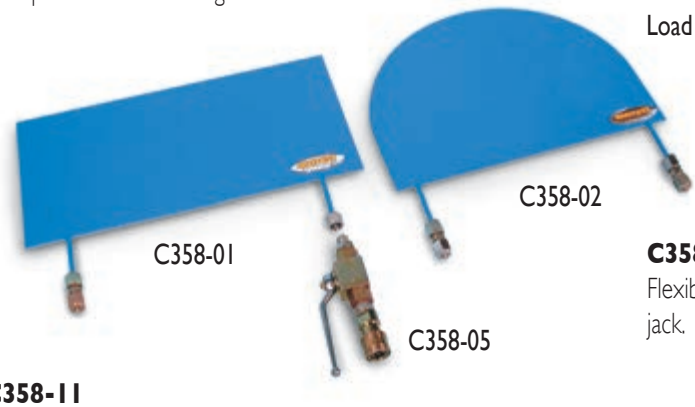
Determination of the resistance and deformation under load
Evaluation of the tensile stress
Measurement of the elastic modulus and breaking load

The complete test is developed in two steps:

DETERMINATION OF THE 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 THE 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 ÷ C359 KIT
STRAIN GAUGE-EXTENSOMETER with digital strain gauge, 300 mm length

Other strain gauge models with accessories described in detail at pag. 285

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: approx. 300 g

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.

C405-15N
CYBER-PLUS 8 EVOLUTION "TOUCH SCREEN"
8 Channels acquisition and processing data system,
24 bit resolution.
Electronic advanced technology, "colour touch screen" 1/4VGA, high graphic performances, the unit automatically performs test and data processing. A certificate can be printed through a printer (optional) directly connected to the unit through the USB port.
The Cyber-Plus is equipped with slots for external pendrive or SD card infinite memory supports, it can be directly connected to a PC.
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 pag 24

S337-51
CALIBRATION process between the electronic extensometer or the pressure transducer to the data acquisition unit C405-15N

C405-15N

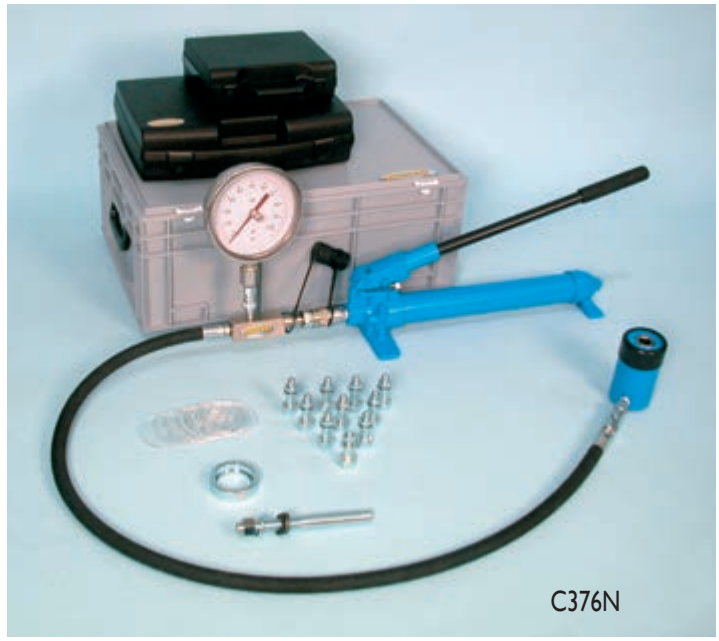
C358-21

C376N

Pullout test apparatus

STANDARDS: **EN 12504-3** / BS 1881 part 207 / UNI 9536, comparable to ASTM C900

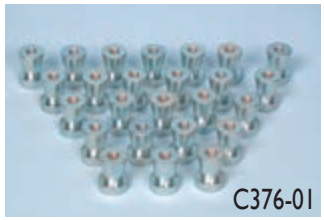
Used to evaluate the concrete resistance as per the strength applied to extract a disc embedded into concrete.
The standard equipment conforms to EN 12504-3 Specification and comprises hydraulic extraction unit 100 kN capacity with pump, precision manometer 0-100kN, bearing ring, 10 steel discs 25 mm dia. (EN 12504-3), carrying cases.
Weight: 18 kg approx.


C376N

ACCESSORY:

C376-01

INSERTS, 30 mm dia. (UNI 9536) to embed.
Pack of 25 pieces.


C376-01

SPARE PART:

C376-03

DISCS, 25 mm dia. (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**
NF P18-858 / BS 1881:207 / ISO 4624
EN 13963, 14496

This dynamometer measures the adhesive force and the tensile strength of two layers of materials (concrete, facing plasters, mortars, building plasters, lime etc.) and is particularly suitable for applications concerning testing repairs of any structure where the bond strength between two layers is an essential factor.
Thecnical details, more accurate description and accessories: see pag. 330

E142

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 and Benefits:

- 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 cm3
- 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 the 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.

SPARE-PART:

A028-11
Carbide Ampoules (pack of 100)

A028

C375-02

Carbonation test

STANDARD: **EN 13295**
The test allows the measurement of the depth of carbonation through the surface of concrete.
The set consists of :
- two washing bottles capacity 500 cc. containing phenolphthalein solution and distilled water,
- depth measuring gauge.

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: 1,5 kg

C375-02

C375-01

Chloride field test system

STANDARD: ASTM C114 (conforms to AASHTO T260)

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.

Features and Benefits:

- 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.

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.
An 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.

C375-10 KIT

C375-01

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-PART:
C375-11
Silicone rubber plugs.
Pack of 25 pcs.

RAPID CHLORIDE PERMEABILITY OF CONCRETE

NEW

C378

Chloride Ion penetration meter

STANDARDS: ASTM C1202, ASTM C1760 / 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.

C378

Applications

The device can be used for testing the durability of concrete exposed to chloride-contaminated environment including:

- Concrete's 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.

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.

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.

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	280 x 240 x 104 mm
Weight	2 kg

ACCESSORY:

C378-01

VACUUM PUMP + DESSICATOR and accessories to saturate the specimen with water (required by ASTM C1202).

REBOUND CONCRETE TEST HAMMERS

STANDARDS: **EN 12504: Part 2** / ASTM C805 / UNI 9189 / DIN 1048
BS 1881:202 / NF P18-417 / UNE 83307

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, Matest model

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/mm^2 (Mpa) values, abrasive stone, carrying case.
Dimensions with the case: 330x100x100 mm
Weight: 2 kg

C380

C380 WITH CASE

C380-01

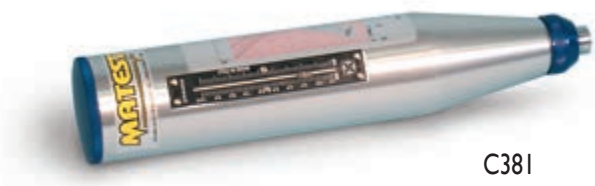
Concrete test hammer, Matest model

Exactly the same to mod. C380, but with calibration curve chart in Psl values as requested by ASTM Specifications.

C381

Concrete test hammer, Matest model

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: dia. 150 by 320 mm.
Weight: 16 kg

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

C383 "NR" model; same as C382 model, but having an automatic incorporated device recording on diagram the impact values

C383-01 Spare roll recording paper for C383 (pack of 5)

C383-10

C383-10

Silver Schmidt

Digital concrete test hammer. Impact energy: 2,207 Nm.

C382

C383

C386 N

Digital Concrete Test Hammer with microprocessor, MATEST model

STANDARDS: **EN 12504:Part 2** / ASTM C805 / BS 1881:202 / NF P18-417 / DIN 1048 / UNI 9189 / UNE 83307

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 MpA or Psi
- Shows numbers of performed rebounds
- Shows date and time
- Identifies tested element
- Identifies automatically and shows rebound angle
- Shows battery life

Main features:
- Possibility to store, display on graphic LCD 64x124 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

Technical specifications:
- Impact energy: 2,207 Joule (Nm)
- Measuring range: 10 – 120 N/mm2
- 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

C386 N WITH CASE

C386 N

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. C372N (see pag. 296) for "combined ultrasonic and rebound tests with automatic data acquisition, processing and store of the results"

C386 N + C372N

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, 25 mm diameter.
- 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

ULTRASONIC PULSE VELOCITY TESTERS

STANDARDS: **EN 12504 part. 4** / ASTM C597 / BS 1881:203 / UNI 9524 / NF P18-418 / UNE 83308

Used to determine the presence of faults, voids, cracks etc., in in-situ or precast concrete and for longterm monitoring of structures subject to environmental conditions.
They give 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 about the modulus of dynamic elasticity, and strength of the concrete.

AVAILABLE MODELS:

C369N

Ultrasonic pulse velocity tester "high technology"

- 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.
- Calibrating cylinder and contact paste.
- Battery rechargeable pack NiMh 4,8V > 2000m/A with low battery condition alarm.
- Anti shock case holding the unit and the accessories.
- 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 mt. long) to connect the probes to the tester. Used to test voluminous/large structures.

SPARE-PARTS:

C370-02 TRANSMITTING/RECEIVING PROBES (couple), 55 kHz

C370-06 COUPLE OF CABLES (each 3,5 mt. long) to connect the probes to the tester.

C370-07 Tube of grease to better coupling the probes to the material under test.

C372N

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 / UNE 83308 / UNI 7997, 9189, 9524

This is an instrument using the most modern technologies; it has a ¼ VGA colour touch screen, 64 MB, Compact Flash interface, SD card, USB, RS232, RS485, working system Windows CE with the possibility to manage, EXCEL, WORD, PPT files etc.

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 is also measured (by knowing the distance between the probes and the density of the tested material).
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.
Advance function for research purposes:
- Selection of the transmission frequency of the impulse.
- Selection of the impulse amplitude.

Infinite filing capacity of the test dates and the graph tracing of the tests on SD card or Compact Flash extractable and expandable.
RS232 or RS485 or USB interface for PC or printer connection.
Time measuring from 0 to 9999,9 µS
Resolution: 0,1 µS
Possibility to use the instrument with two exponential probes, or with one standard probe and one exponential probe.
The use of the appliance is made easy because it is based on the Palmer PC and Windows CE way of working, it allows using the user knowledge of the classic personal computer and its softwares.
Possibility to connect the instrument to internet for consultations or extractions, like a common PC.
Possibility to visualise the shape of the transmitting wave while it goes through the material checked, by transforming the instrument into a real oscilloscope with the option "Scope" mode.

Combined ultrasonic and rebound hammer determination (sonreb method):

The C372N 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.

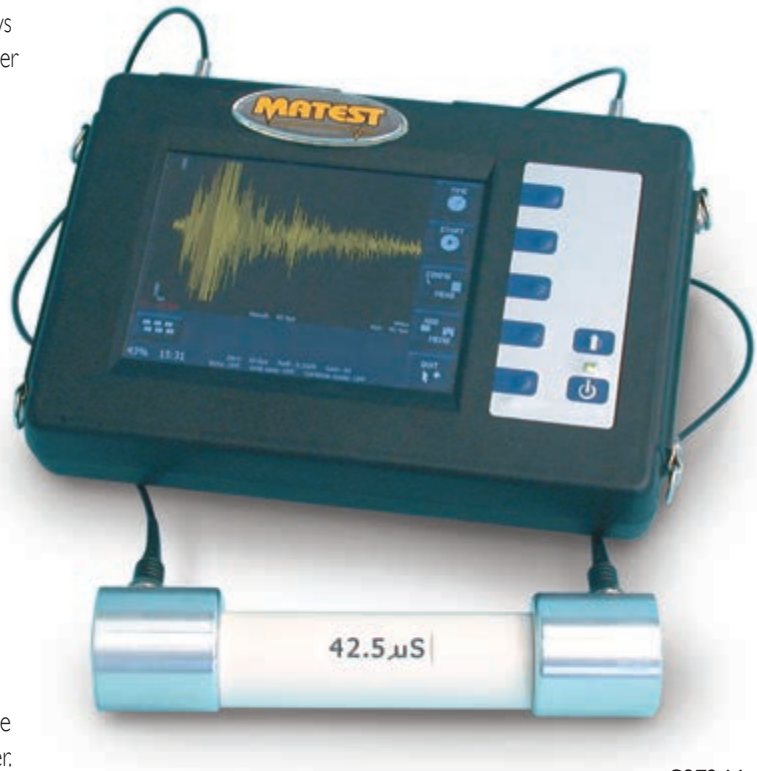
a) Manual mode:
Rebound values measured with a standard concrete hammer are manually input into the ultrasonic Tester.

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 C372N tester.

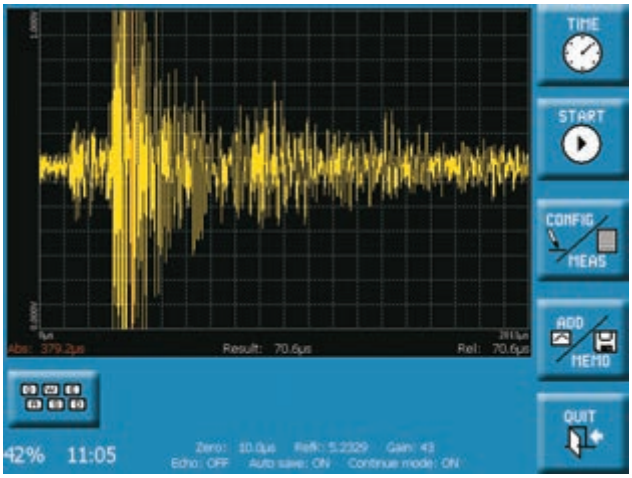
The measures of the velocity of ultrasonic pulses and the rebound values are automatically stored and processed, giving estimates of dynamic modulus of elasticity and Poisson's Ratio, and providing informations on possible voids, cracks and strength of the structure.
Through mathematical formulas it 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 (x-scale 400MHz, 64MB Flash Memory, 64 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.

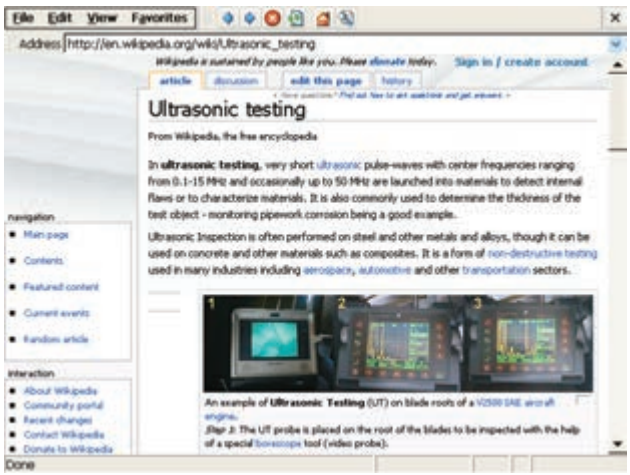


C372 N



Display of graphic function

C386 N + C372 N



Display of internet function

Electronic card: detail

C372 N 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.

C370-09 COUPLE OF CABLES (each 10 mt. long) to connect the probes to the tester. Used to test voluminous/large structures.

C372-10

SPARE PARTS:

C370-02 TRANSMITTING/RECEIVING PROBES (couple), 55 kHz

C370-04 COUPLE OF CABLES (each 3,5 mt. 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

C393

Resonance frequency meter

FOR THE DETERMINATION OF THE RESONANT FREQUENCY OF CONCRETE

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.

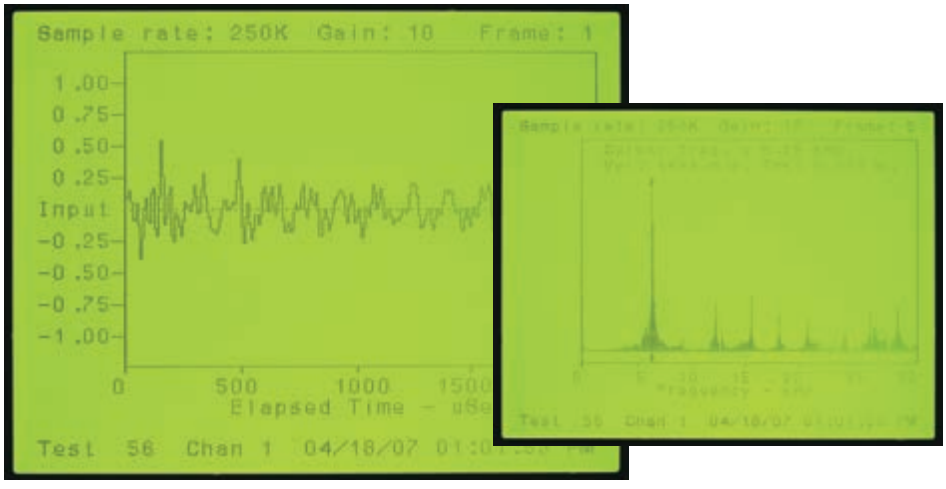
From these, the following material characteristics, non destructively, can be calculated:
- young's modulus of elasticity,
- modulus of rigidity, and
- poisson's ratio.

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/ms2)
- 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.

C393



The standard supply includes:
- electronic main unit.
- standard bench with its accessories.
- accelerometer with cable.
- hardened steel balls set.

Weight: 30 kg approx.

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 visualization 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.

In addition the unit convinces through its intuitive user interface making rebar detection easy.

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.

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.
Dia. accuracy measurement: ± 1 mm
Dia. measuring range: up to 63 mm
Weight: 1600 g

C397N

Profometer PM-630

Sophisticated advanced meter extending the application range of the Profometer PM-600 with the Line and Scan Modes and an extensive choice of statistical views.
Specially suitable to measuring large areas, long lines, inspecting tunnels, retaining walls, bridge slabs etc.
The link software allows the download of the saved data to a PC for analysis.

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.

C411

Canin

CORROSION ANALYSING INSTRUMENT

STANDARDS: UNI 9535 / ASTM C876 / BS 1881:201

For the non-destructive detection of corrosion in the reinforcement bars of concrete building elements.
The large display, just 9 keys for simple operation using menu technique and intelligent memory render Canin a unique instrument worldwide.
120.000 measurements can be stored in the intelligent memory and called up with the cursor keys. A measuring surface of more than 4000 sq.mt. can be managed with the large memory. Standard supply includes one bar electrode, RS 232, integrated software for printer, cables, copper sulphate, carrying case.
Dimensions: 300x330x100 mm
Weight: 5 kg

C411

EXTENSIONS:

C411-05
ONE-WHEEL ELECTRODE, for fast scanning of large areas.

C411-06
FOUR-WHEEL ELECTRODE, for maximum measurement speed on large areas.

C411-05

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 embedded in it.
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: 400x270x130mm
Total weight: 4 kg

SPARE PART:
C412-11
Tube of conductive gel.

C412-01

C414 NEW

Cor Map

A SIMPLE METHOD FOR IDENTIFYING AREAS OF PROBABLE REBAR CORROSION IN CONCRETE STRUCTURES

STANDARDS: ASTM C876 / BS 1881:201 / SIA 2006
UNICO 174 / DGZfP B3

Features and Benefits:
- Detachable electrode extension pieces (41 cm long), facilitate measurements in hard to reach locations.
- High impedance digital meter is designed for tough field conditions.
- Easy to use, supplied complete.

C414 detail

ACCESSORY:
C414-01
REFERENCE ELECTRODE, including copper sulphate reservoir.

C414 complete set
NEW

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

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.

C403-10

C410-10

Windsor pin penetrometer

PENETRATION RESISTANCE
STANDARD: ASTM C803
This portable instrument is suitable to evaluate the concrete strength and mortar joints of existing structures up to 37 Mpa.
The unit can test also polymer concrete and patching compound.
The test is performed by penetrating a steel pin into the concrete.
The pin can be reused.
Safe to use: no explosive charge is required.
Ideal for quality control on precast elements, pipes, brick slabs etc.
The test is based on the depth penetration principle which is inversely proportional to the compression strength.
The spring system of the unit penetrates the steel pin into the concrete, and the micrometer (supplied with) measures the reached depth penetration.
This value is compared with previously prepared chart, or with provided charts for typical concrete and mortar.
The penetrometer is supplied complete with accessories, portable carrying case.
Dimensions: 420x310x150mm
Weight: 8 kg approx

C410-10

C403-10

Deep scanning metal detector up to 150mm

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: 250x110x62mm
Weight: 300g approx.

C405-10

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. C405-15N.
One telescopic deflectometer consists of:

- Aluminium telescopic tubular anodized frame having 1080 mm mimimum height and 3120 mm maximum extension.
- Linear potentiometric displacement transducer with spring system, fixed on the base of the telescopic tubular frame, with measurements either in compression or tension, +/- 50 mm stroke and 0,01 mm resolution.
- Stainless steel chain, 10 m long for measurements over 3 m.
- Stainless steel base for anchoring the tubular with ballast, hook, accessories.
- Carrying case.

Weight: 2 kg

NOTE: **Three deflectometers are recomended to correctly perform a test.**

C405-15N

Cyber-plus 8 Evolution "Touch Screen"

8 Channels acquisition and processing data system, 24 bit resolution. Electronic advanced technology, **"colour touch screen"** 1/4 VGA, high graphic performances, the unit automatically performs test and data processing. A certificate can be printed through a printer (optional) directly connected to the unit through the USB port
The Cyber-Plus is equipped with slots for external pendrive or SD card infinite memory supports, it can be directly connected to a PC.
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 pag 24

S337-51

CALIBRATION process of one deflectometer with the data acquisition unit C405-15N.

ACCESSORIES:

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-PART:

C405-20 CHAIN, 10 m long, steinless 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:

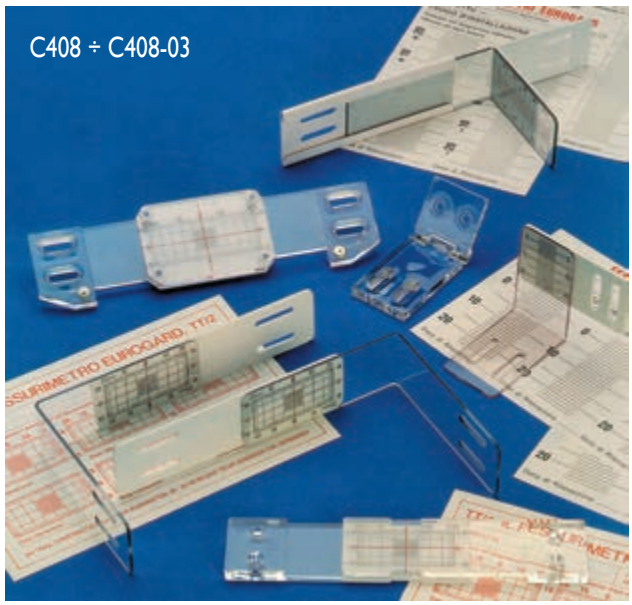
S376 Dial gauge 10 mm stroke x 0,01 mm sens.
S377 Dial gauge 25 mm stroke x 0,01 mm sens.
S378 Dial gauge 30 mm stroke x 0,01 mm sens.
S379 Dial gauge 50 mm stroke x 0,01 mm sens.

SPARE:

C407-02 Inextensible wire coil, 20 metres long

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.



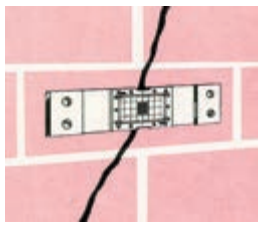
MODELS:

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.

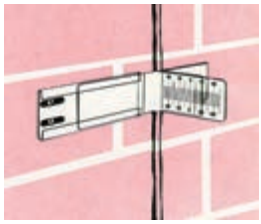
C408-02 CRACK WIDTH GAUGE FOR FLOORS, to monitor floor settlements to a wall, column etc.
Pack of 5 pieces.

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

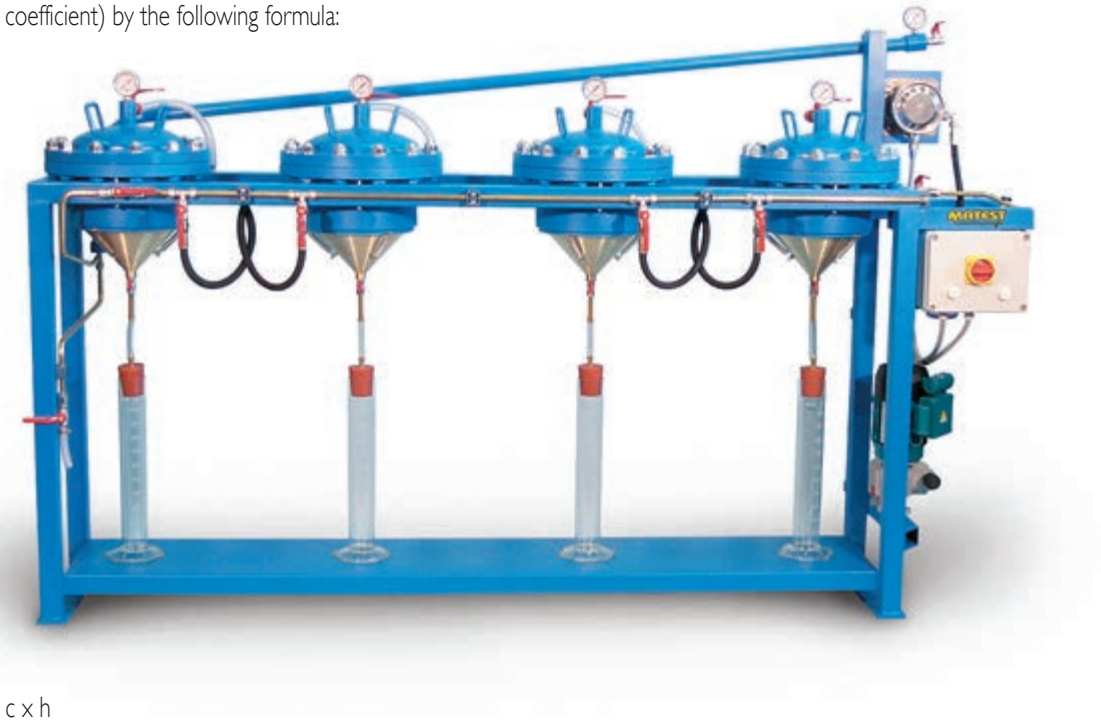
C408-02


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:



C430

$$K = \frac{c\,c \times h}{A \times t \times P}$$

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

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.

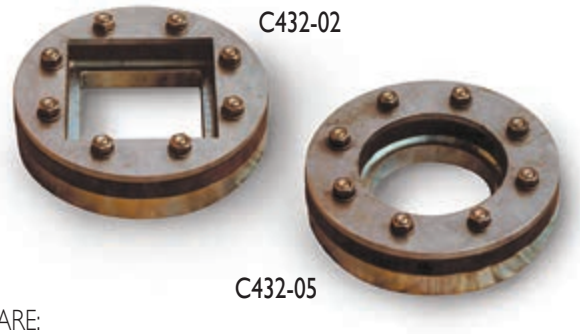
Supplied complete with four cells, four graduated cylinders, epoxy resin and accessories. The **"sealing devices are not included"** in the standard package and must be ordered separately.
Power supply: 230 V 1 ph 50 Hz
Dimensions: 2500x500x1300 mm
Weight: 240 kg

"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 dia. 100 mm
C432-05 Sealing device for cylinders dia. 150 mm
C432-06 Sealing device for cylinders dia. 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 / ISO 7031 / UNI 9533

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 to 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.

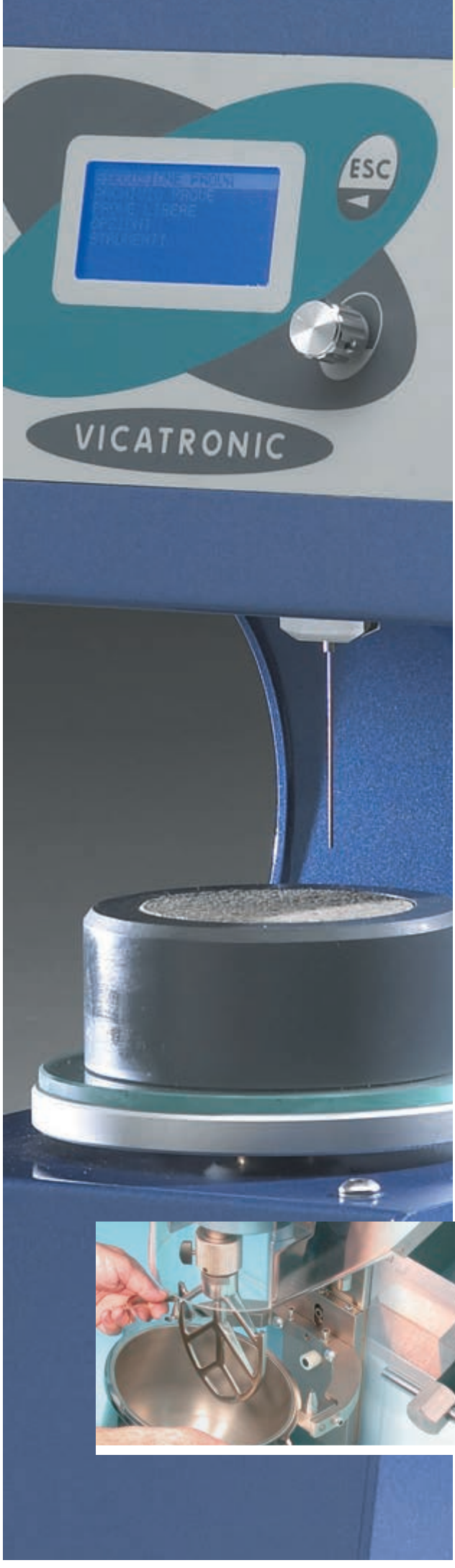
E138-11 TUBING and accessories to connect the impermeability apparatus to the air compressor.

MATEST manufactures a complete range of Mobile Laboratories as:

- Trailer-type mobile laboratory.
- Van-mounted mobile laboratory.
- Container mounted laboratory.

Both of small or large dimensions, by supplying also the mobile structure, benching, furniture, generators, air conditioning, electronic and plumbing installation etc; or by simply fixing the Testing Equipment on the mobile structure supplied by the customer.

Matest's technical staff is at complete disposal of the customer to study any specific requirement and to submit detailed proposals to satisfy the end-user's necessities.

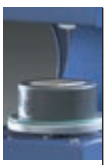


Section E
CEMENT - MORTAR

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.



BLAINE AIR PERMEABILITY APPARATUS
TO DETERMINE THE FINENESS OF CEMENT

STANDARDS: **EN 196-6**, comparable to:
ASTM C204 / AASHTO T153 / BS 4359:2
UNI 7374 / NF P15:442 / UNE 80106 / DIN 1164

Available models

E009 KIT

Blaine air permeability (fineness) apparatus

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

ACCESSORIES:

E010-02 Standard reference cement 114q. to ASTM/SRM/EN to calibrate the Blaine

E055-08 Glass Thermometer -10 to +50° C.

SPARES:

E010-01 U-tube glass manometer complete

E010-03 Manometric liquid 250 ml bottle

E010-04 Filter paper 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

E011N

Digital Blaine Air Permeability Apparatus, with display of time measured

Digital Blaine air permeability apparatus with automated test cycle, electric suction pump, photoelectric cells for detection of levels, chronometer start-up and stop.
After the test, automatic display of the time measured.
Precision of time displayed: 0.01 second.
The apparatus is delivered complete with:
Stainless steel cell with grid and plunger, bottle of manometric liquid, bag of 1000 filter paper disks, funnel.
Power supply:
230V 1ph 50Hz 20W
Dimensions:
300x250x510 mm
Weight: 8 kg

E011N

E011-01

Automatic Blaine Air Permeability Apparatus

This automatic electronic apparatus with microprocessor is equipped with an automatic airproof device.
The apparatus consists of a flat enclosure with a manometer column and with 4 components stainless steel measuring cell.
Depending to the cement porosity and its density, the equipment calculates automatically the masse that you have to test, determines the constant K according to standard cement, records the test results with possibility to elaborate an average value of different tests. RS 232 port
The defining of final Blaine value is automatically given by the apparatus.
Supplied complete with accessories
Power supply:
230V 1ph 50Hz
Dimensions:
280x325x410mm
Weight: 10 kg

E011-01

E014

Le Chatelier flask

STANDARDS: **EN 196-6** / ASTM C188
AASHTO T133 / UNE 83453

Used to determine the relative density (specific gravity) of hydraulic cement and lime. Capacity 250 ml. The neck is graduated from 0 to 1 ml and from 18 to 24 ml with divisions of 0,1 ml.
Weight: 500 g

ACCESSORY:
V192-08
CHATTAWAY SPATULA, 120 mm long.

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 dia. and 95 mm high with two stainless steel cloth disks having opening 0,18 and 0,09 mm. A cement sample of 25 g. is placed inside the sieve and washed for two minutes by means of the 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

SPARES: **E016-01** Stainless steel cloth disk, opening 0,18 mm
E016-02 Stainless steel cloth disk, opening 0,09 mm

E017

Fineness of fly ash by wet sieving

STANDARDS: **EN 451-2** / ASTM D430

The set, brass made, consists of: sieve dia. 50 mm. with stainless steel mesh opening 0,045 mm, spray nozzle 17,5 mm ID with 17 holes dia. 0,5 mm, pressure gauge dia. 80 mm range 0-160 kPa, div. 5 kPa, fittings and connectors. Weight: 3 kg

E029

Measurer 400 ml capacity

STANDARDS: ASTM C185-85 / 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: dia. 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: dia. 32x1050 mm. Weight: 3 kg

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 dia.
Dimensions: dia. 350x520 mm
Weight: 6 kg

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: dia. 200 by 320 mm
Weight: 3,5 kg

E027-01

Air content meter 0,75 litre capacity

STANDARD: **EN 413-2**

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

E028

Air content meter 1 litre, electric

STANDARD: **EN 459-2**

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

Apparatus for lime testing reactivity

STANDARDS: **EN 459-2** / NF P98-102

This apparatus is used for determining the reactivity on slaking of ground quicklime.
The equipment consists of a Dewar vessel 1000 ml capacity complete with cover, electric stirrer 300 rpm. complete with stirring paddle (propeller), base with stand, digital thermometer range -50 +200°C. subd. 0,1°C., accessories.
Power Supply: 230V 1ph 50Hz
Dimensions: 400 x 250 x 750 mm
Weight: 10 kg approx.

ACCESSORY:

E034-05
Weighting and filling container

SPARE PARTS:

E034-11
Dewar vessel

E034-12
Stirring paddle (propeller)

E034

E034-12

E034-05

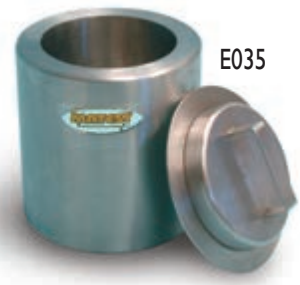
E035

Slaking vessel

BUILDING LIME – YIELD OF 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 dia. 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

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 dia. 100x25 mm. The base of the stand is machined. Chromed finishing.
Weight: 8 kg

ACCESSORY:

E031-01
BALL PENETRATION MEASURING DEVICE, formed by a tripod on which a dial gauge 25x0,01 mm is mounted. A device to adjust the height of the dial in relation to the tripod is also included. Chromed finishing.
Weight: 1 kg

E031

E031-01

E039N

Cement water retention apparatus

STANDARDS: ASTM C91, C110

Used to determine the water retention value of cement and lime putty.
The unit comprises: water aspirator, mercury column manometer, three-way stopcock, metal perforated dish, glass funnel, mercury valve, pack of filter paper, accessories; the whole assembled on stand.
The vacuum pump with accessories are not included in the supply and have to be ordered separately, while the mercury (1 kg needed) cannot be supplied for shipping safety problems.
Dimensions: 400x300x600 mm
Weight: 8 kg approx.

E039N

ACCESSORIES:

V205 + V205-10 + V230-03
Vacuum pump with accessories.
Power supply: 230V 1ph 50Hz
See pag. 487

E036 KIT

Settling and swelling ratio apparatus of grouts. Container Method.

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

The equipment consists of:

E036-10 Container, stainless steel (3 pieces).
E036-11 Cover, airtight, ballast, stainless steel (3 pieces).
E036-12 Plexiglass disc (3 pieces).
E036-13 Measuring bridge.
V175 Vernier caliper.
V102-02 Filling graduated measurer.
Total weight: 4 kg approx.

E036 KIT

E038

Flow cone apparatus

STANDARDS: **EN 445 /** NF P18-358, P18-507

Used for viscosity and fluidity determinations of mortars, muds, grouts, fluid materials, etc. Cone top dia. is 155 mm, total lenght 290 mm, capacity 1700 cc.
Mortar fluidity is considered suitable when the flow time of 1000 cc of mortar is comprised between 17 to 25 seconds.
Entirely brass made, it is supplied complete with four interchangeable nozzles dia. 8 - 9 - 10 - 11 mm, stand adjustable in heigh, plastic graduated cup.
Weight: 10 kg

ACCESSORIES:

E038-01
Interchangeable nozzle dia. 12,5 mm.

E038-02
SIEVE, 150 mm dia., 1,5 mm mesh opening that fits the upper cone

E037

Marsh funnel viscometer

Utilized for viscosity determination on drilling muds and fluid materials.
Orifice opening 4,7 mm
Half part of the funnel mouth is foreseen of sieving cloth 2 mm mesh.
Plastic break-resistant made.
Supplied complete with graduated cup.
Weight: 1 kg

E037-10

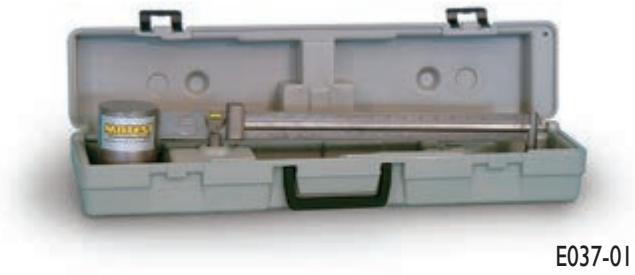
Sand Content of Drilling Muds

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 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: 5 kg



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 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, nitrogen pressurized cartridges.
Dimensions:
210x240x500 mm approx
Weight : 12 kg

E055N

Vicat apparatus

DETERMINATION OF SETTING TIME AND CONSISTENCY OF CEMENT

STANDARDS: **EN 196-3:2005 / EN 13279-2 (gypsum)**
EN 480-2 / ASTM C187, C191
AASHTO T131 / DIN 1196, 1168 / BS 4550
NF P15-414, P15-431 / UNE 80102

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

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

Dimensions: 160x200x300 mm. Weight: 5 kg

E055N
WITH ACCESSORIES

"NEEDED" ACCESSORIES:

E046N Needle, hardened dia. 1,13 mm EN 196-3:2005
E046-01N Needle, hardened dia. 1 mm ASTM - AASHTO

E055-10 Conical plastic mould dia. 70/80 h 40 mm (EN - NF)
E055-05 Conical plastic mould dia. 60/70 h 40 mm (ASTM - AASHTO)

CONICAL MOULDS TO BS, DIN, UNI SPECIFICATIONS:

E055-04 Conical plastic mould dia. 80/90 h 40 mm (UNI)
E055-13 Conical plastic mould dia. 65/75 h 40 mm (DIN)
E055-11 Conical brass mould dia. 80/90 h 40 mm (BS)

ACCESSORIES:

E055-06 Additional weight 700 g to the sliding probe (EN - NF)
E042N Final needle dia. 1,13 mm (EN - NF - BS - DIN - UNI - UNE)
E042-01N Final needle dia. 1 mm (Standards: ASTM - AASHTO)
E055-08 Glass thermometer -10 to +50° C.
E044-40N Conical penetration needle dia 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

SPARE PARTS:

E055-07 Glass base plate dia. 120 mm
E044-48N Tang to fix the needle to the probe
E042-02N Consistency plunger dia. 10x50 mm

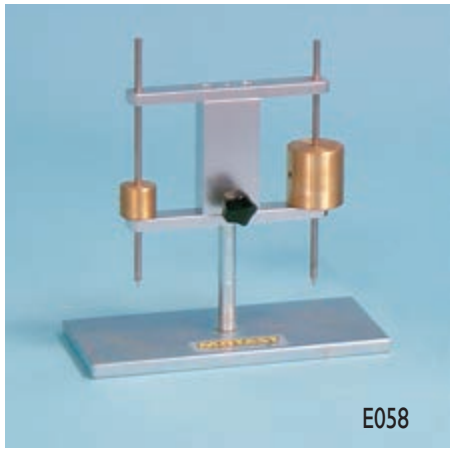
E058

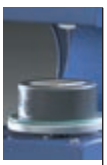
Gillmore apparatus

STANDARDS: ASTM C91, C141, C266 / AASHTO T154

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

Weight: 3 kg





E044N

VICATRONIC
AUTOMATIC COMPUTERISED TROPICALIZED VICAT RECORDING APPARATUS

STANDARDS: **EN 196-3:2005 / EN 13279-2 (gypsum) / EN 480-2** / ASTM C187, C191 / DIN 1168, 1196 / BS 4550 / UNE 80102 NF P15-414, P15-431 / AASHTO T129, 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.

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

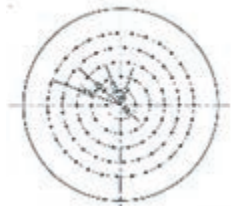
E044-45

E044N

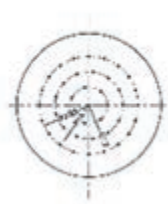
FIRMWARE
The Vicatronic is supplied with the standard programs to make automatically, all the tests according to the following Standards:
EN 196-3:2005 / EN 13279-2 gypsum / EN 480-2 / ASTM C191
DIN 1164 / DIN 1168 gypsum / NF P15/431 / BS 4550 / AASHTO T131

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

90 penetrations program



ASTM



EN

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.

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:

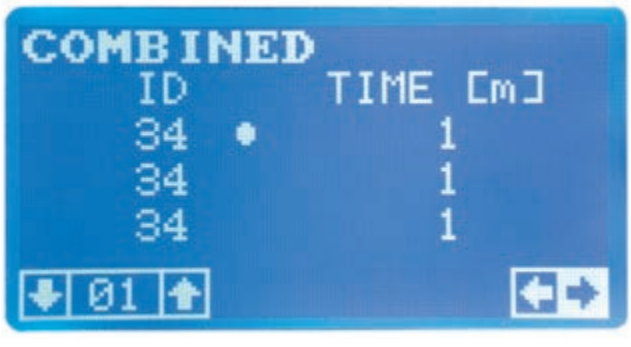
- The time from the moment of the sample preparation (set by the operator).
- The time the test starts.
- The residual time to the next penetration.
- The residual time to the end of the test
- The number of penetrations made and the residual penetrations to be made.

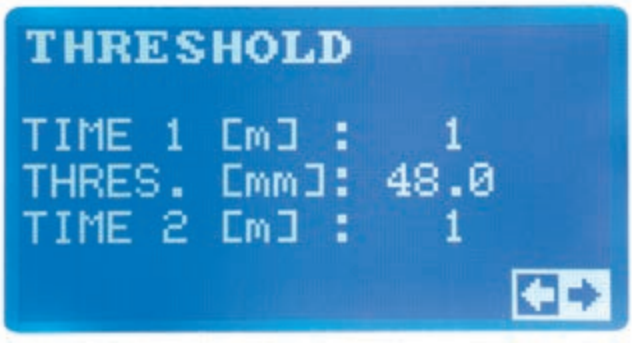
TEST RESULTS

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

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

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

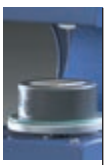




TEST NUMBER : 0996_____
KIND OF TEST : BS4550
POINTS MOVE [mm]
17 0.00
11 10.00
5 10.00
1 10.00
OPERATOR CODE : F_____
CUSTOMER CODE : 23W3_____
DATE OF TEST : 15/02/2011
SPECIMEN TIME : 14:36:16
START DELAY[m]: 1
1ST PEN TIME : --:--:--
SPECIMEN TYPE : X5_____
WATER CONT.[%]: 89.0
TEMPERATURE[°C]: 22.3
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]

ID	PEN.[mm]	
1	0.0	
2	0.0	
3	0.0	
4	0.0	
5	0.0	
6	0.0	
7	0.1	
8	5.4	
9	6.6	
10	7.9	
11	9.3	
12	11.1	
13	12.6	
14	13.6	
15	14.9	
16	15.8	
17	16.5	
18	19.3	
19	20.3	
20	21.6	
21	23.1	
22	24.8	
23	26.7	
24	28.3	
25	29.6	
26	31.1	
27	35.0	
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.

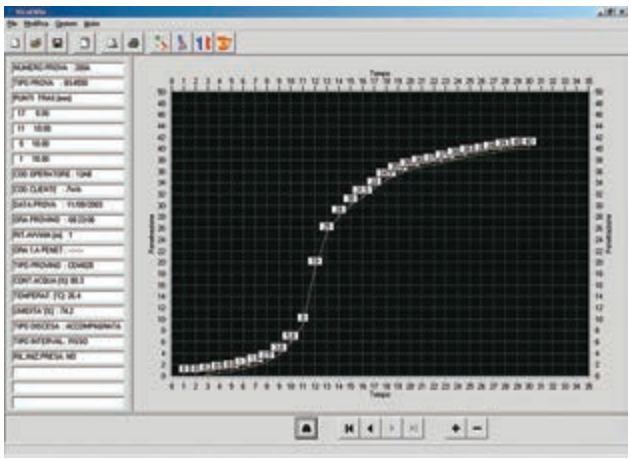
The Vicatronic is supplied complete with the incorporated printer, two hardened needles (one with 1 mm diameter and one with 1,13 mm. diameter), two conical moulds EN and ASTM, a glass plate to hold the conical mould.
Power supply: 230 V 1 Ph 50/60 Hz. 50W
Dimensions: 400 x 200 xh 470 mm. h.
Weight: 13 kg.

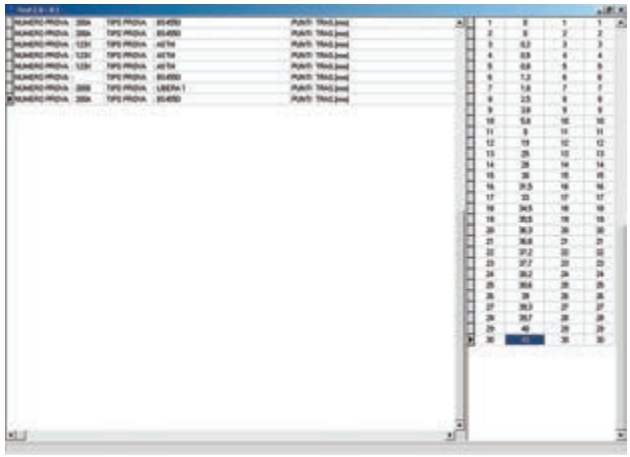
E044-03 N

VICATRONIC, identical to mod. E044 N, but with possibility of continuous penetrations each 15 seconds..

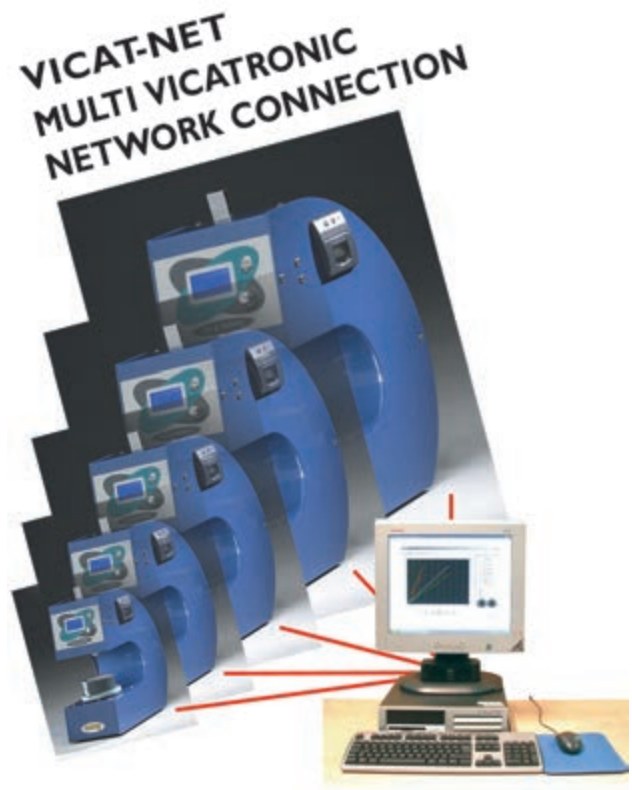
ACCESSORIES:

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

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.

E044-20
THERMOSTATICALLY CONTROLLED HEATING/COOLING SYSTEM
The device produces water at a controlled temperature of 20° C. ± 1° C. that is circulated into the tank E043 to perform the test at controlled temperature and humidity as required by the Standard EN196-3. Can be used only with one single Vicatronic.
Power supply: 230V 1F 50Hz 1300W
Dimensions: 300x440x650 mm. Weight: 31 kg.

E044-21
THERMOSTATICALLY CONTROLLED HEATING/COOLING SYSTEM
Same as the mod. E044-20 but can be used simultaneously for "TWO" Vicatronic.

E044-30
NEEDLE CLEANING DEVICE
It removes the residual cement particles from the needle keeping it constantly lubricated.

E044-25
THERMOSTATICALLY CONTROLLED HEATING SYSTEM WITH COOLING COIL.
The apparatus heats water from room temperature to 20 +/- 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, inlet/outlet system to circulate the water into the E043 tank, cooling coil device current water operated, to maintain a constant temperature of the bath when room temperature is slightly higher.
The E044-25 unit is also a general purpose laboratory water bath with temperature range from room to 35°C. +/- 1°C.
Power supply: 230V 1ph 50Hz 1050W
Dimensions: 375x335x420 mm
Weight: 12 kg

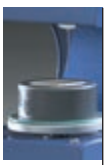
Gypsum test: EN 13279-2 / DIN 1168

E044-40 N
CONICAL PENETRATION NEEDLE, having 8 mm. 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.

E042-02N Consistency plunger dia. 10x50 mm
E042N Needle for final setting 1,13 mm. diameter, BS, EN 196-3:2005
E042-01N Needle for final setting ASTM 1 mm. diameter.
E044-45 Additional 700 g weight (EN, NF)
E055-04 Plastic mould Ø 80/90 x 40 mm. high following UNI
E055-11 Brass mould Ø 80/90 x 40 mm. high following BS
E055-13 Plastic mould Ø 65/75 x 40 mm. high following DIN

SPARE PARTS:
E046N 1,13 mm. Ø hardened needle (EN 196-3:2005)
E046-01N 1 mm. Ø 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 196-3:2005
E044-48N Tang to fix the needle to the probe
C127-11 Thermo-paper roll for printer (pack of 10 rolls)



SETTING TIME AND CONSISTENCY OF CEMENT

E050

Automatic recording penetrometer "Italcementi model" *

Used for determining the initial and final setting time of hydraulic binders.
This instrument automatically measures and records the time needed by a cement paste to reach a pre-established consistency degree.
The setting of the specimen is measured in static conditions; it is continuously and automatically recorded on a diagram allowing an accurate and uniform determination of the initial, intermediate and final hardening process.
The operator obtains a graph with the results of each tested specimen, accurately showing the progressive increasing of the consistency-time ratio (consistogram).
The instrument automatically cut-off at the end of the test.

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

THE PENETROMETER IS SUPPLIED COMPLETE WITH:

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

Power supply: 230V 1ph 50Hz 100W
Dimensions: 450 x 185 x 370 mm
Weight : 22 kg

E050

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. A024, pag. 28
section Aggregates.

A024

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. Supplied complete.
Weight: 20 kg

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 premixed mortars for anchorages, mixed with water.
STANDARDS: UNI 8996, 8998
The equipment consists of:

E060 Bridge of dual measure, formed by a steel square straightedge with two adjustable measure screws

E060-01 Fix caliper at two steps, having heights of 100 and 107 mm

E060-03 Metallic container dia. 99x120 mm with 3 hermetic covers

E061N

CALORIMETER

HEAT OF HYDRATION OF CEMENT

STANDARDS: **EN 196-8** / ASTM C186
Comparable to: BS 4550, 1370 / UNE 80102, 7105
DIN 1164 / UNI 7208

Used to determine the heat of hydration of low heat Portland and hydraulic cement.
The apparatus consists of a Dewar flask contained in an insulated material and housed in a wooden box which is hinged so that the flask can be easily removed or replaced.
A **"second"** hinged wooden box contains the first one, granting a better insulation, as expressly requested by the a.m. Standards.
The Calorimeter is supplied complete with a constant speed electric stirrer, and filler glass funnel.

The standard supply **"does not include"**:
- the thermometer (to be selected from Beckman or digital model; see accessories)
- the propeller (selecting it from the specific Standard; see accessories)

which must be ordered separately.
Power supply: 230V 1ph 50Hz 150W
Dimensions: 350 x 250 xh 680 mm
Weight : 12 kg approx.

E062-02

E061N OPEN

SPARE PARTS:

E062-01 Dewar flask

E062-03 Filler glass funnel

"NEEDED" ACCESSORIES:

E062-02
BECKMAN centesimal glass mercury thermometer, or:

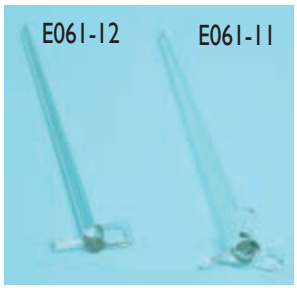
E062-04
DIGITAL THERMOMETER. **Resolution: 0,01°C.**
Complete with probe, or:

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

E062-04N

E061-11
PROPELLER, conforming to ASTM C186 Specifications, or:

E061-12
PROPELLER, conforming to EN 196-8 Specifications.



E061-12 E061-11

ACCESSORY:

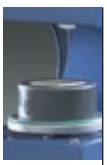
V300-19
Paraffin wax with melting point 55°C to coat the glass parts which are in contact with the hydrofluoric acid.
Pack of 4600 g.

E062-10

Langavant calorimeter

STANDARD: **EN 196-9**
Used to measure the heat of hydration of cements by means of semi-adiabatic method.
The equipment consists of:
Testing calorimeter, calibrated, dia. 160 by 350 mm
Reference calorimeter (same of the testing one), without certificate.
50 mortar box and 20 sand bags.
Measuring system complete with two temperature probes, modem, software to record temperature, analyze and display data with wireless transmission to modem.
To perform the test a PC is required

E062-10



E070

Autoclave

SOUNDNESS (EXPANSION) OF PORTLAND CEMENT

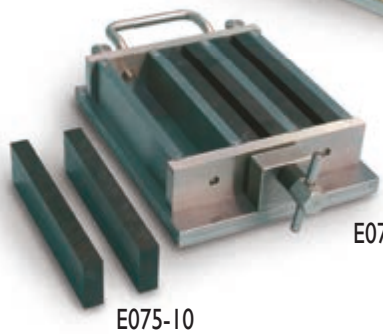
STANDARDS: Comparable to ASTM C151, C490 / AASHTO T107

It consists of a high pressure boiler made from special alloy steel, inside dia. mm. 154x430 high, receiving a holding rack for 10 cement specimens. The heating system is achieved by electric resistances. The 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 sellable on CE market.
Power supply: 230 V 1ph 50 Hz 3500 W 295 psi
Dimensions: 450x475x1080 mm
Weight: 75 kg

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

E073
STANDARD: BS 1881, 6073
TWO GANG PRISM MOULD to produce 75x75x254 mm specimens. Complete with 4 steel inserts. Weight: 9 kg

E072-01 CONTACT POINTS stainless steel, spare for E072 and E073 moulds. Pack of 10 pieces.

E075

Three gang prism mould to produce 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: 8,600 kg

SPARE PART:

E075-01 CONTACT POINTS, stainless steel, complete with fixing screw. Pack of 12

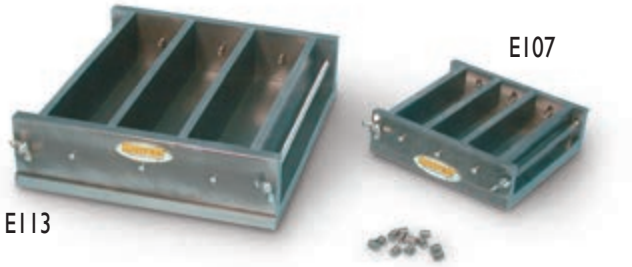
ACCESSORIES:

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



E113
STANDARD: NF P18-427

THREE GANG PRISM MOULD to produce 70x70x280 mm specimens. Made from steel 55 HRB. Complete with 6 inserts. Weight: 17 kg

E107-01

E107-01 CONTACT POINTS, spare for E107 and E113 moulds. Pack of 12 pieces.

Length comparator

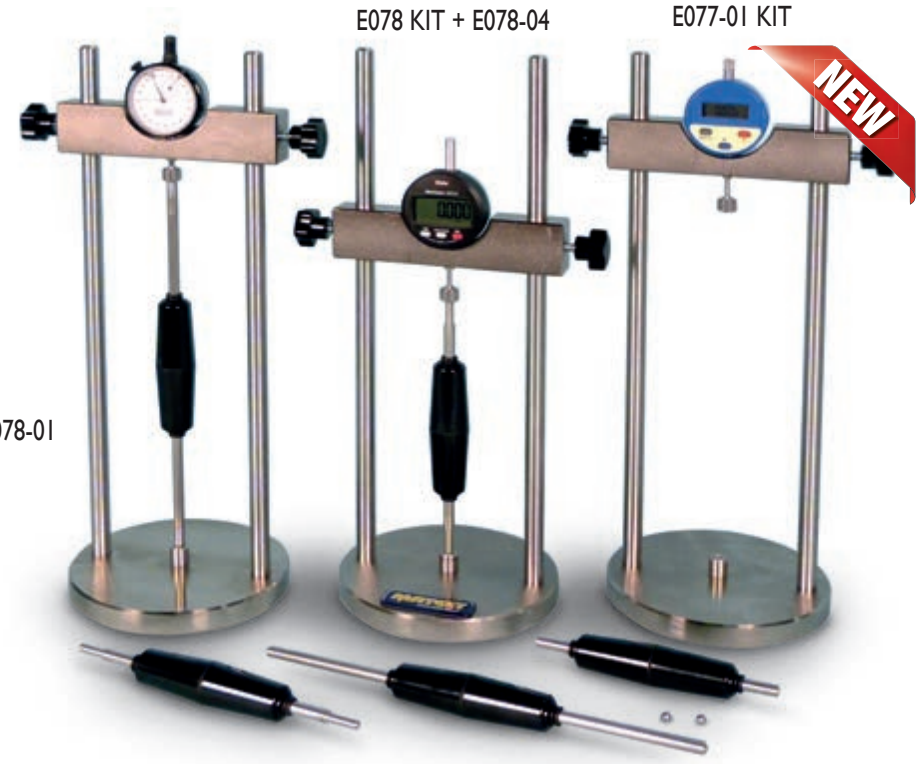
STANDARDS: **EN 12617-4, 1367-4, 12808-4 /** ASTM C151, C490, NF P15-433, P18-427 / BS 1881:5, 6073 / DIN 1164

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: dia. 180 x 450 mm
Weight : 10 kg



AVAILABLE MODELS:

E077 KIT
LENGTH COMPARATOR with Analogic Dial Indicator, 5 mm travel by 0,001 mm divisions, mod. S375

as an alternative:

E077-01KIT NEW
LENGTH COMPARATOR with Digital Gauge 15,3 mm travel by 0,001 mm divisions mod. S382-02, complete with battery, but **"without"** RS232 port

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
Software, complete with USB adaptor and connection cable to PC.

ACCESSORIES for E077 KIT, E077-01 KIT and E078 KIT:

E078-04 Reference rod, Invar, for 40x40x160mm specimens
Standards: EN 12617-4, EN 12808-4, NF P15-433

E078-01 Reference rod, Invar, for 25x25x250mm and 75x75x254mm 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

SOUNDNESS OF CEMENT AND LIMES

STANDARDS: **EN 196-3 / EN ISO 9597** / BS 6463 / NF P15-432 UNE 80102

E064

Le Chatelier water bath

Constructed with stainless steel inside chamber and exterior case in painted steel sheet, it can hold up to 12 Le Chatelier moulds (to be ordered separately) in the removable rack, 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.
Power supply: 230V 1ph 50/60 Hz 1800 W
Dimensions: 405x265x205 mm
Weight: 7 kg

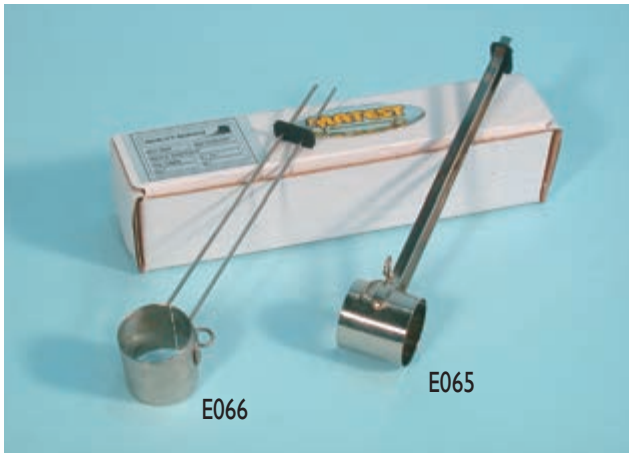
E064
with E065

Rack detail with E065

E066

Le Chatelier mould

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



E065

Le Chatelier mould individually tested

Similar to mod. E066, but with pointers bigger sized, granting a higher number of test utilisations (about 10 times more) within the tolerances requested by EN Specifications.
"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.

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 dia.
Weight: 70 g.

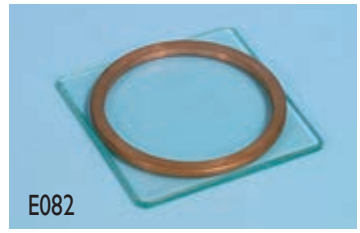
E082

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 carry out one test, three moulds are required.



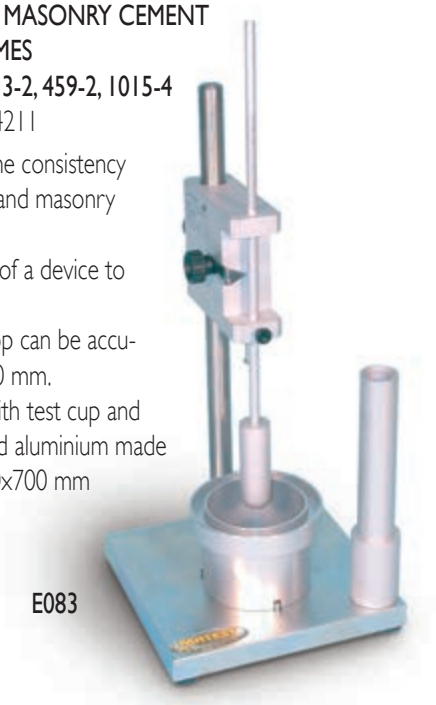
E083

Plunger penetration apparatus

CONSISTENCY OF MASONRY CEMENT AND BUILDING LIMES

STANDARDS: **EN 413-2, 459-2, 1015-4** DIN 4211

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



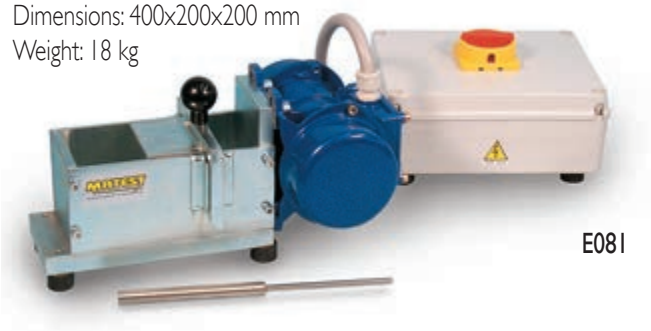
E083

E081

Mortar workability apparatus

STANDARDS: **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 50 Hz 110 W
Dimensions: 400x200x200 mm
Weight: 18 kg



E081

E082-01

Water retention

STANDARDS: **EN 413-2**

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

E082-01

Methods of test for mortar for masonry

E082-11

CIRCULAR TEST CONTAINER

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 sq.mt., on which the test sample is sealed
Dimensions: dia. 240 mm by 60 mm
Weight: kg approx.

E082-11

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: 455x215xh350 mm
Inner dimensions: 300x150xh260 mm
Weight: 9 kg approx.

ACCESSORIES:

E066 LE CHATELIER MOULD Technical details : see pag. 322
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, 17 mm dia x 70 g weight.

E081-10

Products and systems for the protection and repair of concrete structures. Determination of stiffening time

STANDARD: **EN 13294**

Methods of test for mortar for masonry. Determination of workable life and correction time of fresh mortar

STANDARD: **EN 1015-9**

E083-10

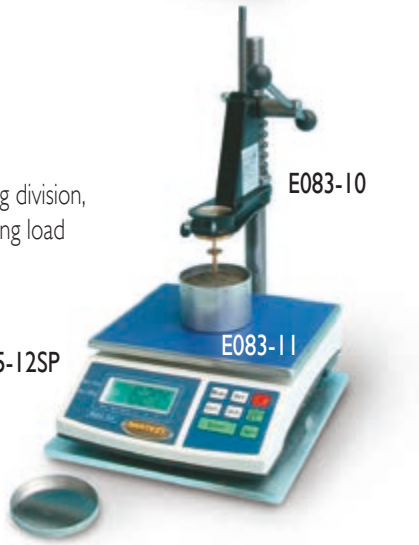
Lever Support (drill-holder type), complete with washer and penetration rod brass made, clamp and locking support.
Used for the determination of stiffening time on products and systems for the protection and repair of concrete structures. Complete with container.
Dimensions: 380 x 300 xh 500 mm
Weight: 12 kg approx.

SPARE PARTS:

E083-11
CONTAINER, rigid aluminium made, dia. 90 by height 60 mm, complete with cover.

ACCESSORY:

V075-12SP
DIGITAL BALANCE,
15 kg capacity and 0,2 g division, with hold of the breaking load and with tare..



E067

Craking test mould

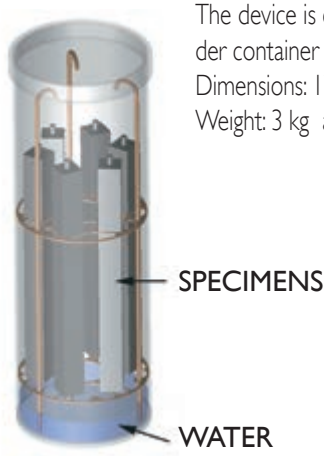
STANDARD: NF P15-434

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

E067-05

Mortar bar container

STANDARD: ASTM C227
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: 170mm dia. x 450mm
Weight: 3 kg approx.



EXAMPLE

E067-05

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, (Gasometer) Dietrich-Frühling

CARBONATE CONTENT $CaCo^3$ IN 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

A105

FLOW TABLES

FOR FLOW AND WORKABILITY TESTS OF MORTAR AND LIME

STANDARDS: **EN 459-2, EN 1015-3** / ASTM C230 / *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 and EN 1015-3 Specifications.
Power supply (motorized models): 230 V 1ph 50 Hz 150 W
Weight: 25÷60 kg

E090 KIT

E090-01 KIT

ACCESSORIES :

E087-01
FLOW CALLIPER to ASTM and BS Standards, for measuring the diameter of the sample. Brass made.
Weight: 450 g.

E086 KIT

E087 KIT

E087-01

E090-08

E090-08
FLOW CALLIPER to EN 459-2 and EN 1015-3 Specifications.

SPARE PART:

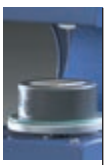
E085-07
FILLING HOPPER to the mould.
Standard: EN 459-2.

Model	Standard	Operated Hand	Operated Motorized	Table dia. 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	•		300	10	**E085-05**	**E085-06**
E090-01 KIT	EN 459-2 EN 1015-3		•	300	10	**E085-05**	**E085-06**

E092N KIT

MIXMATIC *"HIGH PERFORMANCE TOUCH SCREEN"* AUTOMATIC PROGRAMMABLE COMPUTERIZED MORTAR MIXER

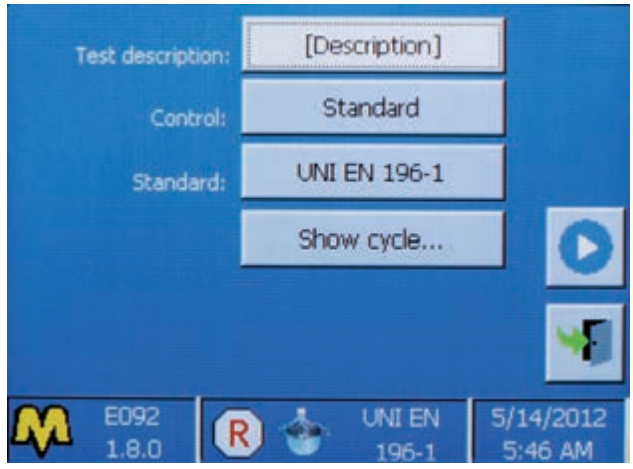
STANDARDS: **EN 196-1**, **EN 196-3:2005**, **EN 413-2**, **EN 459-2**, **EN 480** / NF P15-314 / EN ISO 679 / DIN 1164-5, DIN 1164-7 ASTM C305 / AASHTO T162



E092N KIT

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

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 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. Direct connection to Intranet (connection to a LAN network) and Internet to establish a remote communication and receive an immediate diagnostic analysis of the potential problem from Matest technicians, or for updates of the software.
  Hardware technical details: see pag. 24
  Unlimited memory storage with: 2 USB ports, 1 SD card slot, RS232/485 serial 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.



Selection of the Standard

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

Power supply: 230V 50/60 Hz 1ph
Dimensions: 530 x 620 xh 780 mm
Weight : 85 kg

E092N KIT MIXMATIC ...follows...

Test esecution

Personalized cycle composition

E092-05

E092-06

ACCESSORIES :

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

E092-06
DISPENSER (supplementary) with hopper for the automatic introduction (managed by the software) of water into the bowl, also during the mixing phase.

E097-01N Reference sand, size 0,08÷2 mm to EN 196-1 Standard.
Bag of 1350 g. Pack of 16 bags for total of 21,6 kg.

Main menù

SPARE PARTS:

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

E095-04 BEATER, polished, stainless steel.

USE EXAMPLE

... follows...

MORTAR MIXERS

STANDARDS: **EN 196-1, EN 196-3:2005, EN 413-2, EN 459-2, EN 480-1** / EN-ISO 679 / NF P15-314 / DIN 1164-5 UNE 80801 / ASTM C305M / AASHTO T162

E093 + E095-03

MODELS:

E093

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 196-3:2005, 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: 340x460x700 mm.
Weight: 45 kg

E094

Mortar mixer

Basically similar to mod. E093, but not equipped of automatic program, sand dispenser and safety door.
Two speeds can be selected. Supplied complete with stainless steel bowl, but **"without beater"** which has to be ordered separately.
This mixer can be supplied only to extra CE markets
Dimensions: 340x460x500 mm
Weight: 40 kg

E094

E095

E095

Mortar mixer

Basically similar to mod. E094, 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: 340x460x500 mm
Weight: 44 kg

ACCESSORIES FOR E093, E094, E095 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.

E096-01

E096-01
Dispenser with hopper, to ease the manual introduction of water, additives etc. into the bowl also during the mixing phase. Accessory to mod. E093 and E095 mixers.

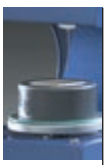
E097-01N Reference sand, size 0,08÷2 mm to EN 196-1 Standard. Bag of 1350 g. Pack of 16 bags for total of 21,6 kg.

SPARE PARTS FOR E093, E094, E095 MIXERS:

E095-01
Stainless steel bowl

E095-05
Bajonet coupling between beater and shaft

MATEST
SERVO PLUS
evolution
CYBER-PLUS EVOLUTION
27,1 kN
35,0 s
Execute
Store



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 / 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.
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 176mm diameter, see drawing "A") with very stable bearing, or in the **"compact"** position (overall dimensions 92,5mm diameter, see drawing "B"), to perform tests in narrow spaces, or for specimens close one to the other.

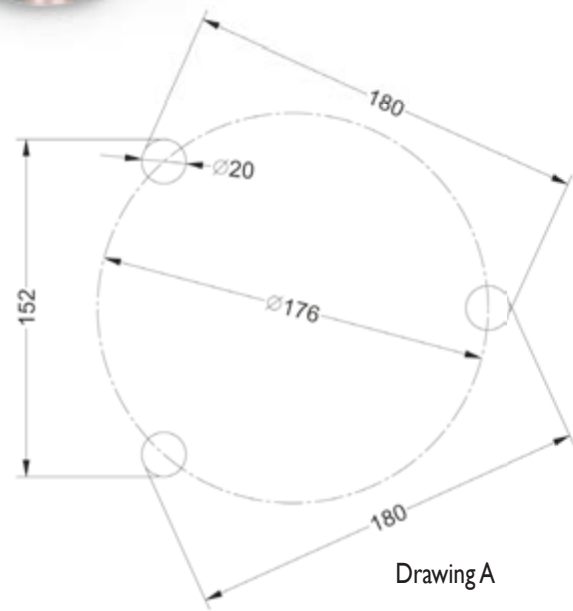
Specifications:
- Load capacity: 16 kN
- Resolution: 10 N
- Working range: 0,25 to 16 kN
- Accuracy and repeatability: better than +/- 1%
- Complete with traceable calibration certificate
- Battery operated
- Serial port for PC connection
- Hand wheel rounds: 60 with mechanical round/counter
- Graphic 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: 410 x 210 xh 270 mm
Weight : 3,5 kg approx.

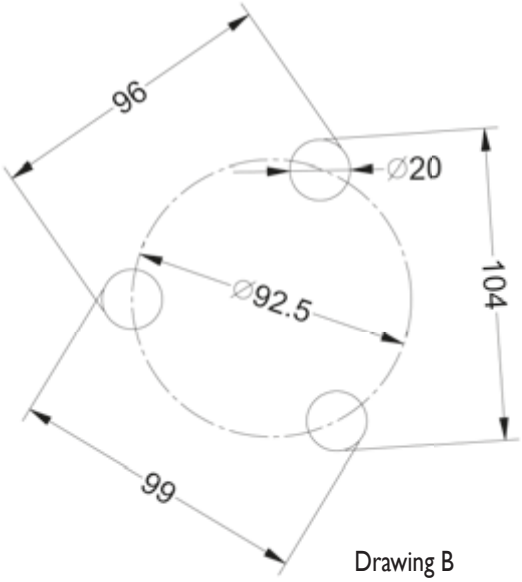
E142
with feet
in large position

E142-01 Pull-Off "Digital" tester 0-5 kN capacity
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 dia. by 20 mm thick (n° 10 pieces)

E143-01 Adhesion test aluminium disc 50 mm dia. by 31 mm thick (n° 10 pieces)

E143-10 Adhesion test stainless steel disc 50 mm dia. by 21 mm thick (n° 10 pieces) It conforms to EN 1015-12 Specification.

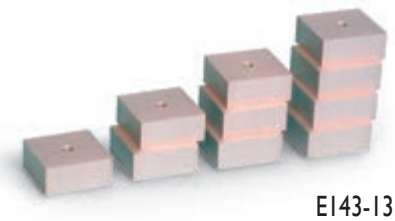
E143-13 Adhesion test aluminium disc, square, 50x50mm, 20mm thick (n° 10 pieces)
Standard: EN 1348

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

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

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

E143-12 Acrylic adhesive glue, 300 ml. cartridge, complete with small pump and nozzles.



E143-13

SPARE PART:

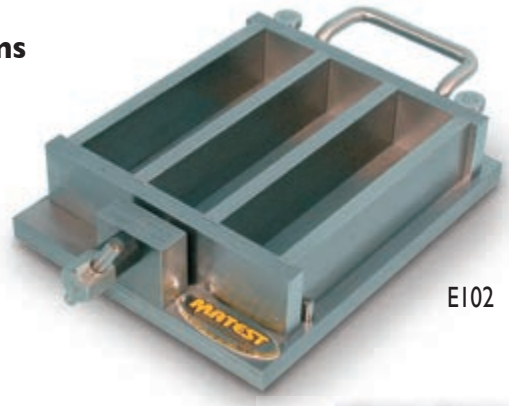
E143-09 Tie rod with spheric head for Disc/Dynamometer coupling.

E102

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

STANDARDS: **EN 196-1** / EN ISO 679

Manufactured from steel 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.



E102

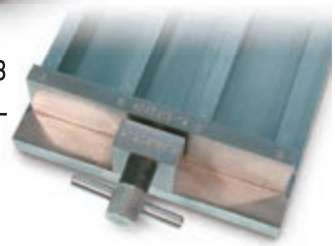
E103

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

STANDARDS: **EN 196-1** / 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.

E103
DETAIL



E104

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

STANDARD: **EN 196-1**

Similar to mod. E103, but with:
- Large base mm 240 x 245
- Weight: 11,850 kg

Manufactured expressly for "Italcementi Group" cement factory.

E105

Three gang mould for prisms 40x40x160 mm

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

Made from steel, hardness 55 HRB, it conforms to the above mentioned Specifications. Weight: 8 kg

ACCESSORIES:

E106 FEED HOPPER, used to fill the mould 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 196-1-2005

S200-11 STRAIGHT EDGE 300 mm. long

E102-03 GLASS PLATE 220x190x6 mm to cover the mould

E102-11

Six gang mould for 40,1 x 40 x 80 mm

DETERMINATION OF WATER ABSORPTION on grouts for floor or wall installation of ceramic tiles.

STANDARD: **EN 12808-5**

Identical to mod. E102, but equipped with three stainless steel partitions, positioned in the middle of the gangs, to obtain six gangs having dimensions 40,1 x 40 x 80 mm approx.

Weight: 8600 g

E105

E102-11

E112

Three gang mould for 70,7x70,7x282,8 mm

STANDARD: NF P18-401

Made from steel. Weight: 17 kg

E111

Briquette mould

STANDARDS: ASTM C190, C307 / AASHTO T132

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

Weight: 3 kg

E110

50 mm three gang cube mould

Made from steel, hardness 55 HRB, ti can be also used for soil and other materials. Weight: 7 kg

E130

Jolting apparatus

STANDARDS: **EN 196-1** / EN ISO 679 / NF P15-412 / BS 3892 / UNE 80101

Used to compact cement mortar prisms 40x40x160 mm in the three gang mould, as requested by the above Specifications.

The apparatus, consists of a table holding the mould, seated on a rotating cam driven at 60 revolutions per minute. The jolting group is connected to the table by bayonet joints for quick checking of the weights.

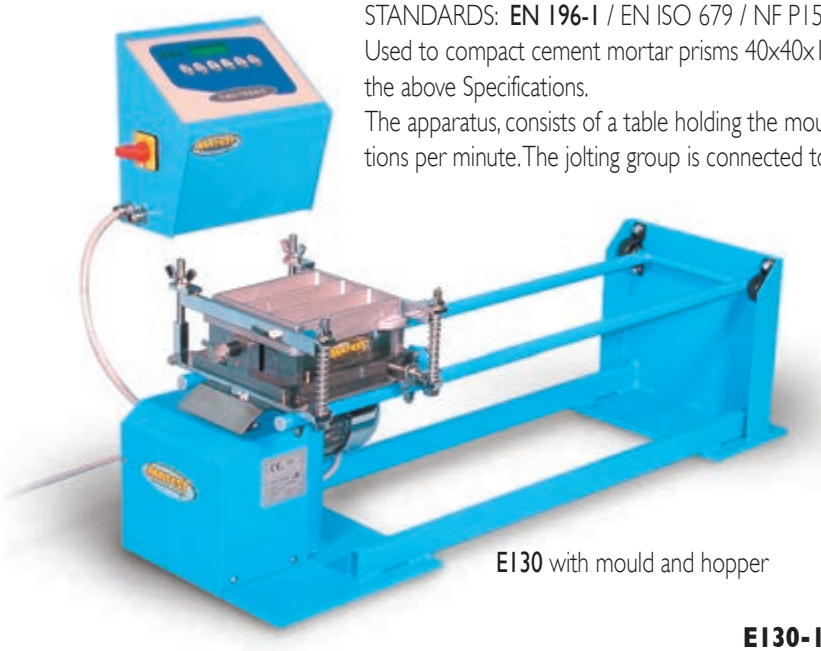
The drop height (15,0 mm) is adjustable to keep it correct also after intensive uses. The apparatus is supplied with separate control panel including main switch, automatic digital drop counter, start/stop push button.

The apparatus accepts moulds Matest made, and also of other manufacturers.

Power supply: 230 V 1ph 50 Hz 500 W

Dimensions: 1000x380x420 mm

Weight: 65 kg



E130 with mould and hopper

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: 1300 x 510 xh 700 mm

Weight: 25 kg

E130-11 + E130

E131N

Jolting apparatus "high performance"

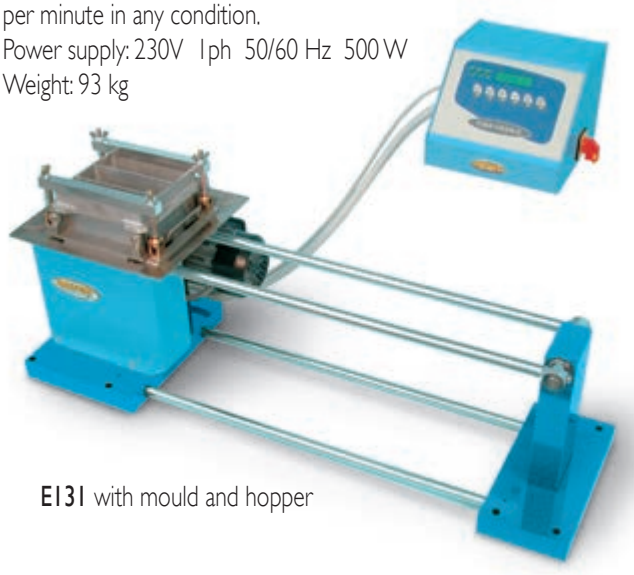
STANDARDS: **EN 196-1** / EN ISO 679

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 50/60 Hz 500 W

Weight: 93 kg



E131 with mould and hopper

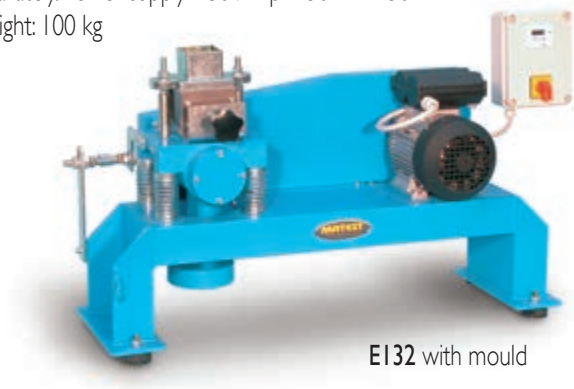
E132

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 50 Hz 250 W

Weight: 100 kg



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

E133

WATER BATHS FOR CEMENT CURING

AND FOR GENERAL LABORATORY PURPOSE

STANDARDS: **EN 196-1, 196-8** / EN 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

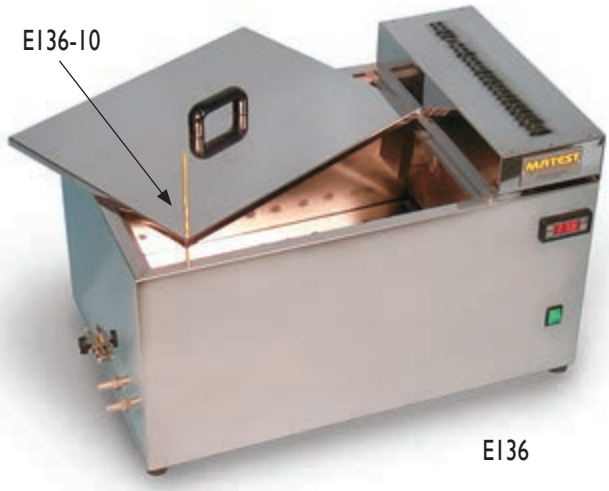
Similar to mod. E136, but with temperature range: +3 to +95° C.
Accuracy of ± 0,4° C at 20° C.
The cooling unit is housed under the water bath.
Outside dimensions: 800x430xx1000 mm
Weight: 60 kg

B052-02

ACCESSORY:

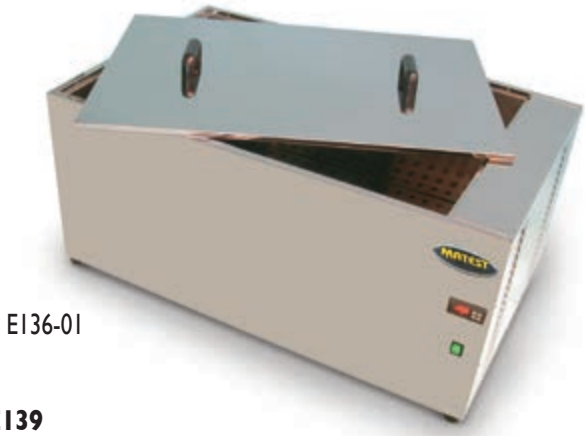
E136-10

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



E136-10

E136



E136-01

E139

Curing cabinet

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

Both exernal and internal walls are stainless steel made, and insulated by a 50 mm. thick glass wool.
The cabinet has an inner inspection glass door.
Temperature range: from ambient to 70 °C, with digital thermostat.
A dual safety/thermostat with higher thermic threshold ensures safe working conditions.
Humidity range: 90% to saturation
Power supply: 230V 1ph 50/60 Hz 1000 W
Inside dimensins:620x440x400 mm
Overall dimensions: 900x700x800 mm
Weight: 60 kg

E139

ACCESSORY:

V165

THERMO-HYGROMETER for humidity and temperature control.
Technical details: see pag. 482

E138

Large capacity curing cabinet

STANDARDS: **EN 196-1** / EN ISO 679
ASTM C87, C109, C190, C191 / UNE 80102

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 230 V 1ph 50 Hz 2000 W
Weight: 100 kg

E138

ACCESSORIES for mod. E138:

V206-01 Air Compressor, air displacement: 250 litres/min.
Tank capacity : 100 litres
Recommended for standard use

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

E138-11 Tubing and accessories to connect the E138 cabinet to the air compressor

E134-11
Pan, 240 x 300 x 70 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:

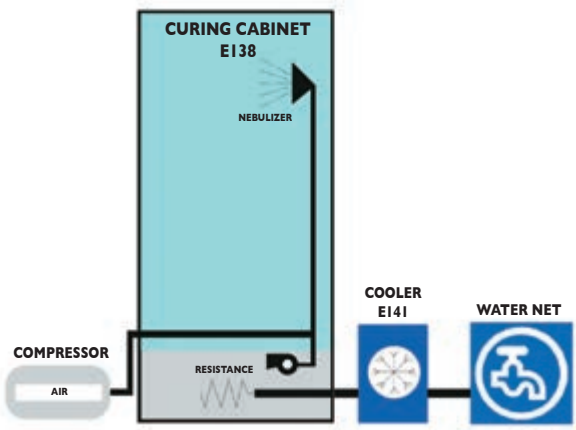
E141

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: 550 x 500 x 880 mm
Weight: 55 kg

E141

WORKING DIAGRAM



V206-01

COMPRESSION AND FLEXURAL TESTING MACHINES FOR CEMENT 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 (pag. 337 ÷ 339)
- Unitronic 50 kN and Unitronic 200 kN universal multipurpose compression/flexural and tensile frames (pag. 340)
- Two columns machines with only one measuring range for **"compression tests only"** and 250kN or 500kN capacity load (pag. 342 ÷ 345)
- 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 (pag. 346 ÷ 349)
- 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 (pag. 350)
- 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 (pag. 353)

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.

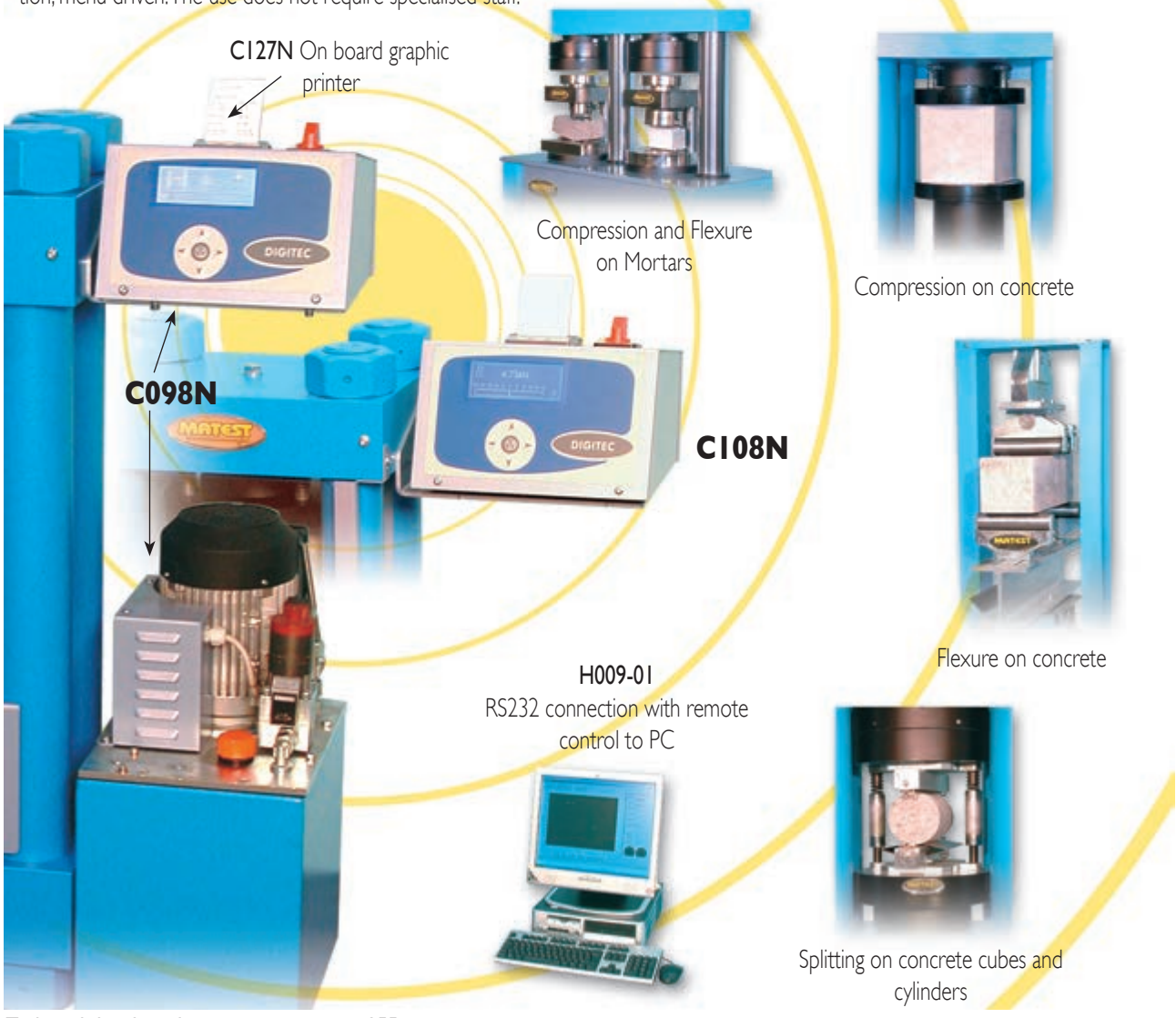
TO UPGRADE OR COMPLETE YOUR CONCRETE OR MORTAR COMPRESSION AND FLEXURE TESTING MACHINE (also from other manufacturers).

The system can manage and process the data in compliance with EN 12390 Specification and the different International Standards, for the following tests:

- Compression on concrete
- Flexure on concrete
- Splitting on concrete cubes and cylinders
- Compression and flexure on mortar
- C127N On board graphic printer
- RS232 connection with remote control to PC

Specifications Digitec / Autotec::

- **2 analogue-digital channels** connectable to two different compression/flexure frames.
- Simple and immediate set up of the parameters and test execution, menu driven. The use does not require specialised staff.
- 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: 0,5%** starting from 10% of maximum value, on request from 1% of maximum value.



Compression and Flexure on Mortars

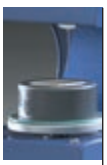
Compression on concrete

Flexure on concrete

Splitting on concrete cubes and cylinders

Technical details and accessories: see pag. 155

C109N CYBER-PLUS
C104NSERVO-PLUS *evolution*



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)

The system can manage and process the following tests:

Compression and flexure on cement

Compression on concrete

Tensile on steel

Flexure on concrete

C127N On board graphic printer

C109N

C104N

(C104-04)

Splitting test on concrete cubes and cylinders

INTERNET support

Connection to the internet for remote online assistance.

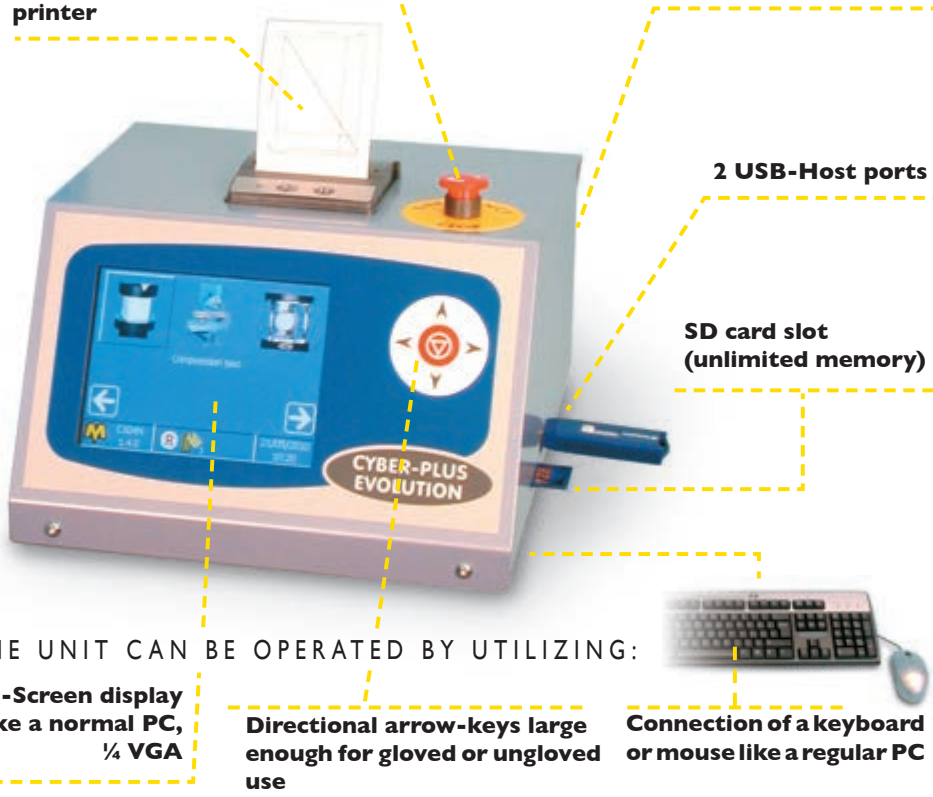
H009-01
PC connection. Remote control from PC.

C128 USB laser printer for graphs and certificates

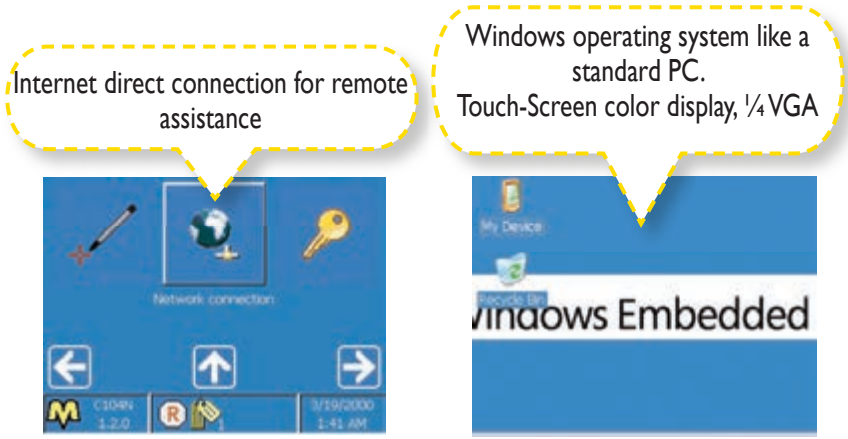
Main Features:

The control unit Cyber/Servo-Plus Evolution runs like a standard PC based on Windows operating system.

The touch-screen graphical icon interface allows easy set up of the parameters and immediate execution of the test.
High resolution color display, ¼ VGA, offers all the functions of a PC for the management and analysis of the data, test results, and graphs.



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 a diagnostic analysis of a potential problem, the ability to execute the test from distance, and to provide updates of the software.
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 visualization (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 update 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:
UNI EN, ASTM, BS, NF, UNE, DIN etc.

Technical details, features and accessories: see pag. 158

S205

UNITRONIC 50 kN, UNIVERSAL MULTIPURPOSE COMPRESSION/FLEXURAL AND TENSILE FRAME FOR:

- COMPRESSION / FLEXURAL TESTS, 50 kN MAX. CAPACITY LOAD
- TENSILE TESTS, 25 kN MAX. CAPACITY LOAD (see mod. S205-05)

WITH AUTOMATIC LOAD OR DISPLACEMENT/DEFORMATION CONTROL, for testing:

Cement / Mortar

Concrete

Rock and stones

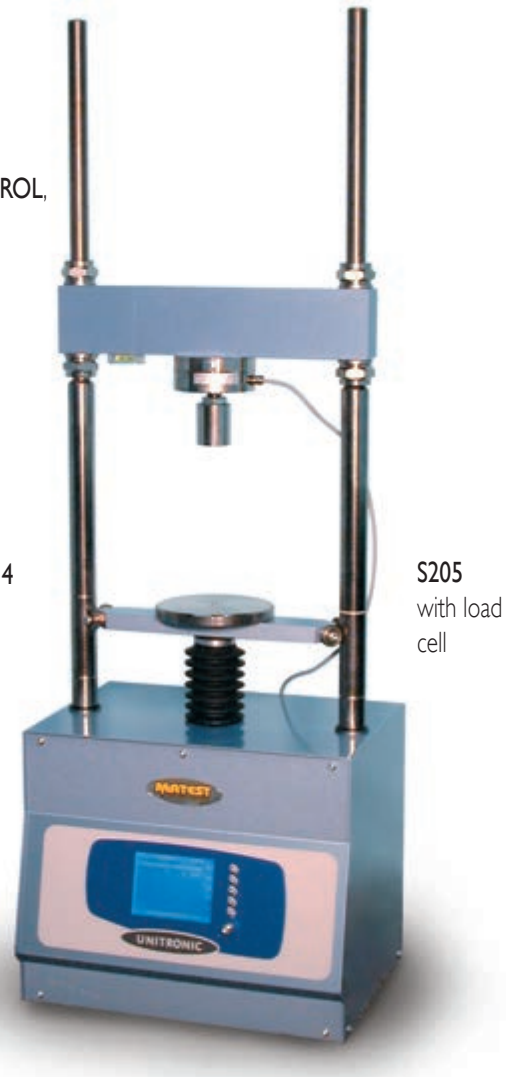
Clay blocks

Metal, plastic, wires, ropes, textiles, papers etc.

Asphalt

Soil

Unitronic technical details and aditional specific tests are described at pag. 414



S205 with load cell

SPECIFIC APPLICATIONS ON CEMENT AN MORTAR:

Flexural test on mortar prisms 40x40x160mm

Standards: **EN 196-1** / ASTM C348 / NF P15-451 / DIN 1164
EN ISO 679

Test development with load control.

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 pag. 352)
E164 Software for flexural tests.

Compression test on mortar specimens

(50kN max. load)

Standards: **EN 196-1** / EN ISO 679 / ASTM C109, C349
NF P18-411 / UNE 80101 / BS 3892 / DIN 1164

Test development with load control.

Needed accessories:

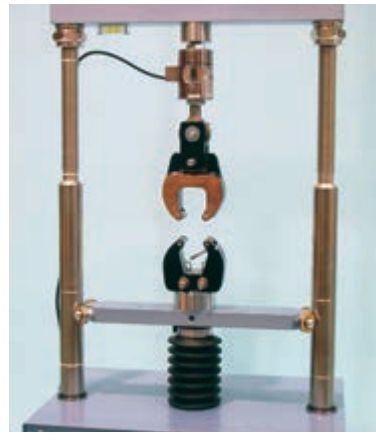
S337-34 Strain gauge load cell 50 kN capacity.
S212-05 Loading piston.
E170 Compression device on portion of 40x40x160mm specimens. (devices for different specimens described at pag. 352)
E163 Software for compression tests.

Tensile test on mortar briquettes "8" shaped

Standards: ASTM C190, C307 / AASHTO T132

Needed accessories:

S205-05 Unitronic Compression / Tensile
S337-32 Tensile/Compression strain load cell 10kN capacity
S205-07 Tensile jaws "8" shaped for mortar briquette
S205-08 Software for tensile test
E111 Briquette mould (see pag. 332)



S205-05

Unitronic Compression 50 kN/Tensile 25 kN

The Unitronic frame S205 is modified and improved to perform also tensile tests with max. capacity of 25 kN.

S206N

UNITRONIC 200kN "Matest made"

UNIVERSAL ELECTROMECHANICAL FRAME, 200KN CAPACITY, "TOUCH-SCREEN" FOR: 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 page 24

Specifications of the Frame: see page 420

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: 950 x 560 x 2400 mm. Weight: 820 kg

S206N

Compression test on mortar specimens

STANDARDS: **EN 196-1** / ASTM C109, C349 / NF P15-451 / EN ISO 679 / DIN 1164 / BS 4550

S206N	Unitronic 200 kN
E170	Compression device on portions of 40x40x160mm specimens (devices for different specimens described at page 352)
E163N	Software for the compression test (page 14)

E170

C163N
Report of the compression test

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 40x40x160mm specimens (available also ASTM, see page 352)
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 (page 14)

E172-01

Tensile test on mortar briquettes "8" shaped

STANDARDS: ASTM C190, C307 AASHTO T132

S206N	Unitronic 200 kN
S205-07	Tensile jaws "8" shaped for mortar briquette
E111	Briquette mould (page 332)
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 pag. 420

MACHINES FOR ONLY COMPRESSION TESTS

FOR CEMENT AND MORTAR SPECIMENS, BRICKS, ROCKS, REFRACTORIES etc.

STANDARDS: **EN 196-1** / EN ISO 679 / ASTM C109, C349 / NF P18-411 / UNE 80101
DIN 1164 / BS 3892

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)

- Two columns high stiffness frame.
- Max. vertical daylight between platens: 185 mm
- Platens diameter: 153 mm
- Ram travel: 45 mm approx.
- Accuracy: Grade 1 starting from 1/10 of the scale
- Gauge dia. 200 mm, range 0-300kN, subdiv. 2,5kN
- 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

E151 + E170

COMPRESSION

Model	Max load kN	Manual	Motorized	LOAD MEASURING SYSTEM Gauge	Digitec mod. C108N (pag. 155)	Autotec mod. C098N (pag. 155)
E151	**300**	•		•		
E155	**300**		•	•		
E159 D	**500**		•		•	
E159-01 D	**250**		•		•	
E161 A	**250**		•			•
E161-02 A	**500**		•			•

ACCESSORIES FOR COMPRESSION MACHINES:

E170
COMPRESSION DEVICE for portions of prism 40,1x 40x160 mm broken in flexure. EN 196, EN/ISO 679, ASTM C349. See pag. 352

E171
COMPRESSION DEVICE for cubes 50 mm and 2" side. ASTM C109.
See pag. 352

E171-01
COMPRESSION DEVICE for cubes 70,7 mm side. BS 4550.
See pag. 352

E170

E171-01

E171

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

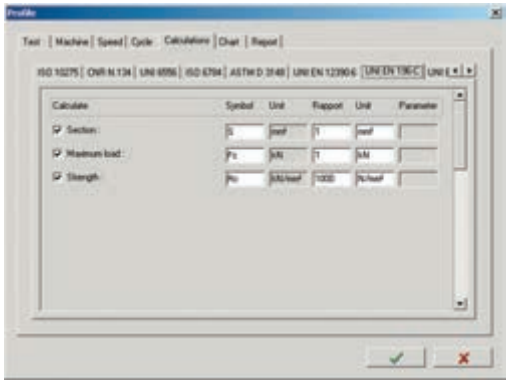
C127-11 THERMO-PAPER roll for printer (pack of 10 rolls)

E161-12 SAFETY GUARDS, polycarbonate made, to CE Safety Directive, complete with hinges and lock

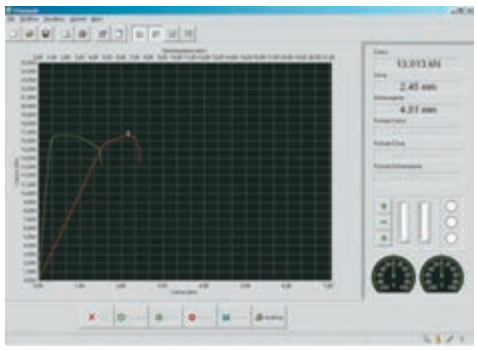
C121-51 STOP SWITCH on safety guards. See pag. 244

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. Applicable only on digital machines.

E163
SOFTWARE for compression tests. Developed for the managing and the remote control from a PC. To be used with Digitec models.
See pag. 14


E163
Software compression

C123
SOFTWARE "Servonet" for the fully automatic managing and remote control from a PC. To be used with Autotec models.
See pag. 14


C123
Software "servonet"

H009-01
PERSONAL COMPUTER, LCD 17" monitor, keyboard, mouse, cables. The supply of the PC includes the installation of the software
.

E161-11 BENCH, to hold the compression frame.

E161-11

C115-01
TWO WAY HYDRAULIC VALVE, connected to the Digital machines, to activate a second frame.
Technical details: see pag. 245

C115-01

C106-10

C106-10
FLEXURAL DEVICE FOR CONCRETE BEAMS 100x100x400 mm and 150x150x600 mm.

MACHINES FOR ONLY COMPRESSION TESTS

To test cement and mortar specimens, bricks, rocks, refractories etc.

Cyber-Plus or Servo-Plus Evolution Touch Screen Digital System

STANDARDS: **EN 196-1** / EN ISO 679 / ASTM C109, C349 / NF P18-411 / UNE 80101
DIN 1164 / BS 3892

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)

- Two columns high stiffness frame.
- Max. vertical daylight between platens: 185 mm
- Platens diameter: 153 mm
- Ram travel: 45 mm approx.
- Accuracy: Grade 1 starting from 1/10 of the scale
- Supplied complete with lower compression platen and coupling piece to easily fix the compression device.
- Power supply: 230V 1ph 50Hz 750W
- Weight: 300 - 330 kg

E159N + C127N + E170

E161N + C127N + E170

E161N + C127N

C104-04

ACCESSORIES:

C104-04
CONSOLE HOUSING THE SERVO-PLUS EVOLUTION
The pump assembly and the digital system are encased to enhance the design and look of the machine.

C104-05
ONLINE REMOTE ASSISTANCE PACKAGE
The machine features a connection to Internet through which Matest Customer Service provides real time support to analyze the problem, to find possible solution, and to carry out a proper test execution.

COMPRESSION

Model	Max load kN	Motorized	LOAD MEASURING SYSTEM Cyber-Plus Evolution mod. C109N (pag. 158)	Servo-Plus Evolution mod. C104N (pag. 158)
E159 N	**500**	•	•	
E159-01 N	**250**	•	•	
E161 N	**250**	•		•
E161-02 N	**500**	•		•

ACCESSORIES FOR COMPRESSION MACHINES:

E170
COMPRESSION DEVICE for portions of prism 40,1x 40x160 mm broken in flexure. EN 196, EN/ISO 679, ASTM C349. See pag. 352

E171
COMPRESSION DEVICE for cubes 50 mm and 2" side. ASTM C109. See pag. 352

E171-01
COMPRESSION DEVICE for cubes 70,7 mm side. BS 4550. See pag. 352

E170

E171-01

E171

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

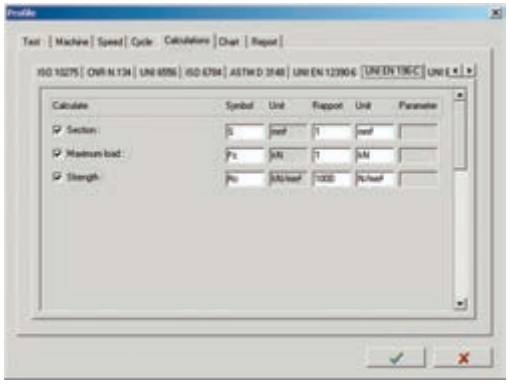
C127-11 THERMO-PAPER roll for printer (pack of 10 rolls)

E161-12 SAFETY GUARDS, polycarbonate made, to CE Safety Directive, complete with hinges and lock

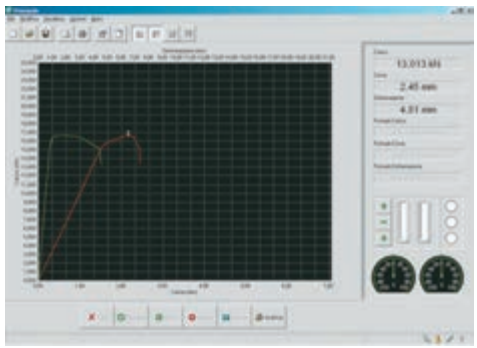
C121-51 STOP SWITCH on safety guards. See pag. 244

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.

E163N
SOFTWARE for compression tests. Developed for the managing and the remote control from a PC. To be used with Cyber-Plus Evolution models. See pag. 14


E163N
Software compression

C123N
SOFTWARE "Servonet" for the fully automatic managing and remote control from a PC. To be used with Servo-Plus Evolution models. See pag. 14


C123N
Software "servonet"

H009-01
PERSONAL COMPUTER, LCD 17" monitor, keyboard, mouse, cables. The supply of the PC includes the installation of the software .

E161-11 BENCH, to hold the compression frame.

E161-11

C115-01
TWO WAY HYDRAULIC VALVE, to activate a second frame. Technical details: see pag. 245

C115-01

C106-10

C106-10
FLEXURAL DEVICE FOR CONCRETE BEAMS 100x100x400 mm and 150x150x600 mm

COMPRESSION/FLEXURAL TESTING MACHINES WITH DUAL MEASURING RANGE

FOR CEMENT AND MORTAR SPECIMENS, BRICKS, ROCKS, REFRACTORIES etc.

STANDARDS: **EN 196-1** / EN ISO 679 / ASTM C109, C348, C349
NF P18-411, P15-451 / UNE 80101 / DIN 1164
BS 3892, 4550, 4551

E161-01A + C127N + E172-01

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)

by using the suitable compression devices described in next pages (accessories E170 - E172-01)

The machines with digital readout are equipped with **"two suitable pressure transducers"** granting the Class 1 from 1/10 on both the measuring ranges.

The measuring range 0 - 15kN can be also used for compression tests on specimens with expected low strength values.

- Two columns high stiffness frame.
- Max. vertical daylight between platens: 185 mm
- Platens diameter: 153 mm
- Ram travel: 45 mm approx.
- Accuracy: Grade 1 starting from 1/10 of the scale for both the ranges.
- Two gauges dia. 200 mm:
  range 0-300kN, subdiv. 2,5kN
  range 0 - 50kN, subdiv. 0,5kN
- 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

E156 + E170

E160D + C127N + E170

COMPRESSION / FLEXURAL

Model	Dual range kN	Manual	Motorized	LOAD MEASURING SYSTEM: Gauges	Digitec mod. C108N (pag. 155)	Autotec mod. C098N (pag. 155)
E152	**300/50**	•		•		
E156	**300/50**		•	•		
E160 D	**500/15**		•		•	
E160-01 D	**250/15**		•		•	
E161-01 A	**250/15**		•			•
E161-03 A	**500/15**		•			•

ACCESSORIES FOR FLEXURE / COMPRESSION:

E172-01
FLEXURE DEVICE for 40,1x40x160 mm mortar specimens. EN 1015-11, EN 196-1, EN/ISO 679 See pag. 352

E170
COMPRESSION DEVICE for portions of prism 40,1x 40x160 mm broken in flexure. EN 196, EN/ISO 679, ASTM C349. See pag. 352

E172-01

E170

E171
COMPRESSION DEVICE for cubes 50 mm and 2" side. ASTM C109. See pag. 352

E171-01
COMPRESSION DEVICE for cubes 70,7 mm side. BS 4550. See pag. 352

E171

E171-01

E172-02
FLEXURE DEVICE for 40x40x160 mm mortar specimens. ASTM C348. See pag. 352

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)

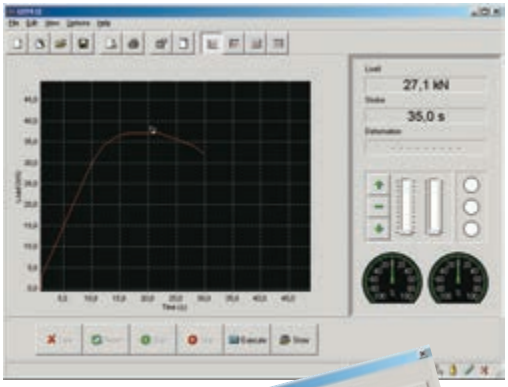
E161-12 SAFETY GUARDS, polycarbonate made, to CE Safety Directive, complete with hinges and lock

C121-51 STOP SWITCH on safety guards. See pag. 244

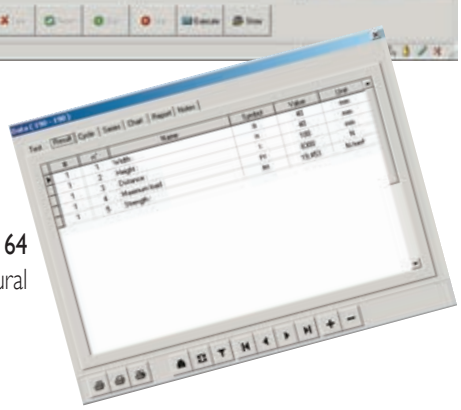
C097-05
CLASS 1, starting from 1% of the full range. With a special calibration procedure it is possible to grant Class 1 practically on the full range of the compression machine. Applicable only on digital machines.

E163
SOFTWARE for compression tests. Developed for the managing and the remote control from a PC. To be used with Digitec models. See pag. 14

E164
SOFTWARE for flexural tests. Developed for the managing and the remote control from a PC.
To be used with Digitec models. See pag. 14



E163
Software compression



E164
Software flexural

C123
SOFTWARE "Servonet" for compression and flexural tests. Developed for the fully automatic managing and remote control from a PC. To be used with Autotec models. See pag. 14

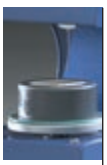
C106-10
FLEXURAL DEVICE FOR CONCRETE BEAMS 100x100x400 mm and 150x150x600 mm

C106-10

H009-01
PERSONAL COMPUTER, LCD 17" monitor, keyboard, mouse, cables. The supply of the PC includes the installation of the software.

E161-11 BENCH, to hold the compression frame.

E161-11



COMPRESSION AND FLEXURAL TESTING MACHINES WITH DUAL MEASURING RANGE

To test cement and mortar specimens, bricks, rocks, refractories etc.

Cyber-Plus or Servo-Plus Evolution Touch Screen Digital System

STANDARDS: **EN 196-1** / EN ISO 679 / ASTM C109, C348, C349 / NF P18-411, P15-451 / UNE 80101
DIN 1164 / BS 3892, 4550, 4551

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)

by using the suitable compression devices described in next pages (accessories E170 - E172-01)

The machines with digital readout are equipped with **"two suitable pressure transducers"** granting the Class 1 from 1/10 on both the measuring ranges.

The measuring range 0 - 15kN can be also used for compression tests on specimens with expected low strength values.

- Two columns high stiffness frame.
- Max. vertical daylight between platens: 185 mm
- Platens diameter: 153 mm
- Ram travel: 45 mm approx.
- Accuracy: Grade 1 starting from 1/10 of the scale for both the ranges.
- Supplied complete with lower compression platen and coupling piece to easily fix the compression devices.
- Power supply: 230V 1ph 50Hz 750W
- Weight: 310 - 340 kg

E161-01N + C127N + E172-01

E160N + C127N + E172-01

E161-01N + C104-04 + C127N + E172-01

ACCESSORIES:

C104-04
CONSOLE HOUSING THE SERVO-PLUS EVOLUTION
The pump assembly and the digital system are encased to enhance the design and look of the machine.

C104-05
ONLINE REMOTE ASSISTANCE PACKAGE
The machine features a connection to Internet through which Matest Customer Service provides real time support to analyze the problem, to find possible solution, and to carry out a proper test execution.

COMPRESSION / FLEXURAL

Model	Dual range kN	Motorized	LOAD MEASURING SYSTEM	
			Cyber-Plus Evolution mod. C109N (pag. 158)	Servo-Plus Evolution mod. C104N (pag. 158)
E160 N	**500/15**	•	•	
E160-01 N	**250/15**	•	•	
E161-01 N	**250/15**	•		•
E161-03 N	**500/15**	•		•

ACCESSORIES FOR FLEXURE / COMPRESSION:

E172-01
FLEXURE DEVICE for 40,1x40x160 mm mortar specimens.
EN 1015-11, EN 196-1, EN/ISO 679 See pag. 352

E170
COMPRESSION DEVICE for portions of prism 40,1x 40x160 mm broken in flexure. EN 196, EN/ISO 679, ASTM C349. See pag. 352

E172-01

E170

E171
COMPRESSION DEVICE for cubes 50 mm and 2" side. ASTM C109.
See pag. 352

E171-01
COMPRESSION DEVICE for cubes 70,7 mm side. BS 4550.
See pag. 352

E171

E171-01

E172-02
FLEXURE DEVICE for 40x40x160 mm mortar specimens. ASTM C348.
See pag. 352

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)

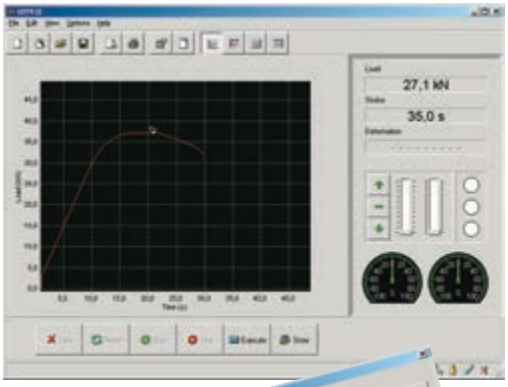
E161-12 SAFETY GUARDS, polycarbonate made, to CE Safety Directive, complete with hinges and lock

C121-51 STOP SWITCH on safety guards. See pag. 244

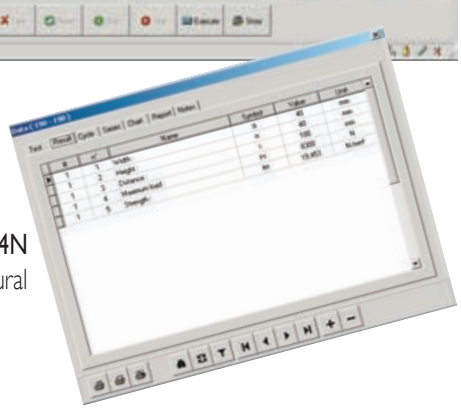
C097-05
CLASS 1, starting from 1% of the full range. With a special calibration procedure it is possible to grant Class 1 practically on the full range of the compression machine.

E163N
SOFTWARE for compression tests. Developed for the managing and the remote control from a PC.
To be used with Cyber-Plus Evolution models. See pag. 14

E164N
SOFTWARE for flexural tests. Developed for the managing and the remote control from a PC.
To be used with Cyber-Plus Evolution models. See pag. 14



E163N
Software compression



E164N
Software flexural

C123N
SOFTWARE "Servonet" for compression and flexural tests. Developed for the fully automatic managing and remote control from a PC. To be used with Servo-Plus Evolution models.
See pag. 14

C106-10

C106-10
FLEXURAL DEVICE FOR CONCRETE BEAMS
100x100x400 mm and
150x150x600 mm

H009-01
PERSONAL COMPUTER, LCD 17" monitor, keyboard, mouse, cables. The supply of the PC includes the installation of the software.

E161-11 BENCH, to hold the compression frame.

C115-01
TWO WAY HYDRAULIC VALVE, to activate a second frame.
Technical details: see pag. 245

C115-01

COMPRESSION AND FLEXURAL TESTING MACHINE "HIGH PERFORMANCE" WITH DUAL TESTING CHAMBER AND TWO INDEPENDENT MEASURING RANGES 300 kN AND 15 kN WITH LOAD CELLS

Cyber-Plus or Servo-Plus Evolution Touch Screen Digital System

STANDARDS: **EN 196-1** / EN ISO 679 / ASTM C109, C348, C349 / NF P18-411, P15-451 / UNE 80101
DIN 1164 / BS 3892, 4550, 4551

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 - E172-01)

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).

- Max. vertical daylight between platens: 189 mm
- Platens diameter: 165 mm
- Ram travel: 35 mm approx.

E181N + C127N with compression devices

E183N + C127N with compression devices

- Accuracy: Grade 1 starting from 1/10 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 approx.

COMPRESSION / FLEXURAL

Model	Dual range kN	LOAD MEASURING SYSTEM: Cyber-Plus Evolution mod. C109N (pag. 158)	LOAD MEASURING SYSTEM: Servo-Plus Evolution mod. C104N (pag. 158)
E181 N	**300/15**	•	
E183 N	**300/15**		•

ACCESSORIES FOR DUAL CHAMBER:

C104-05
ONLINE REMOTE ASSISTANCE PACKAGE
The machine features a connection to Internet through which Matest Customer Service provides real time support to analyze the problem, to find possible solution, and to carry out a proper test execution.

E172-01
FLEXURE DEVICE for 40,1x40x160 mm mortar specimens. EN 1015-11, EN 196-1, EN/ISO 679 See pag. 352

E172-01

E170
COMPRESSION DEVICE for portions of prism 40,1x 40x160 mm broken in flexure. EN 196, EN/ISO 679, ASTM C349. See pag. 352

E170

E171
COMPRESSION DEVICE for cubes 50 mm and 2" side. ASTM C109. See pag. 352

E171

E171-01
COMPRESSION DEVICE for cubes 70,7 mm side. BS 4550. See pag. 352

E171-01

E172-02
FLEXURE DEVICE for 40x40x160 mm mortar specimens. ASTM C348. See pag. 322

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.

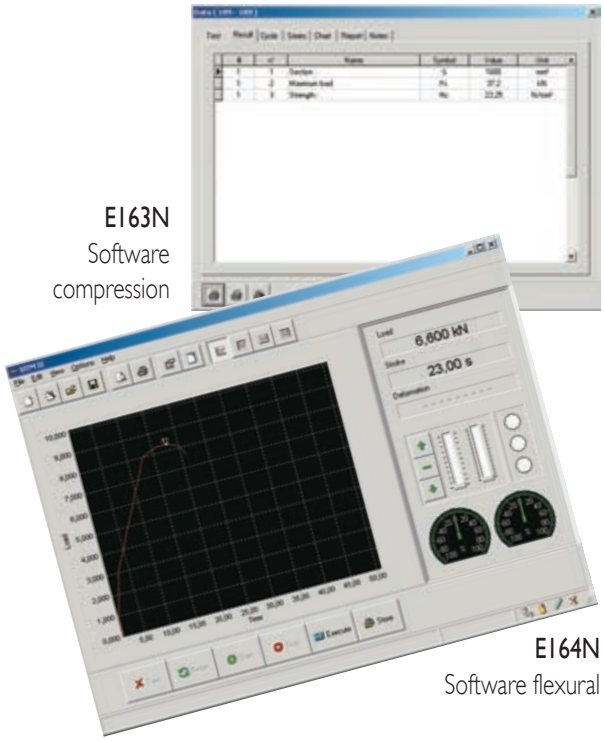
C127-11 THERMO-PAPER roll for printer (pack of 10 rolls)

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.

E163N
SOFTWARE for compression tests. Developed for the managing and the remote control from a PC. To be used with mod. E181N.
See pag. 14

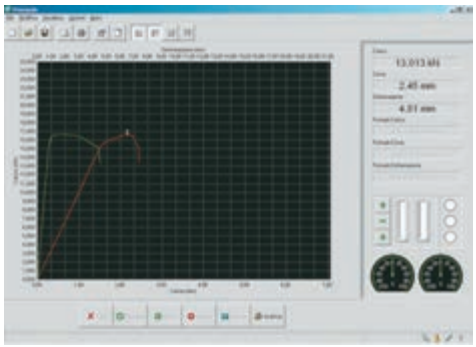
E164N
SOFTWARE for flexural tests. Developed for the managing and the remote control from a PC.
To be used with mod. E181N. See pag. 14



E163N
Software compression

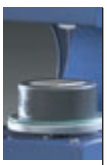
E164N
Software flexural

C123N
SOFTWARE "Servonet" for compression and flexural tests. Developed for the fully automatic managing and remote control from a PC. To be used with mod. E183N.
See pag. 14



C123N
Software "servonet"

H009-01
PERSONAL COMPUTER, LCD 17" monitor, keyboard, mouse, cables. The supply of the PC includes the installation of the software.



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: 153x153xh185 mm

MODELS:

E170

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

STANDARDS: **EN 196-1** / ASTM C349 / NF P15-451
EN/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

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 40,1x40x160mm prism broken in flexure

STANDARD: DIN 1164

Identical to mod. E170 but with compression platens having 40x62,5 mm size, as requested by DIN Standards.
Weight: 12 kg

E170-01

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

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:
153x153xh185 mm
Weight: 12 kg

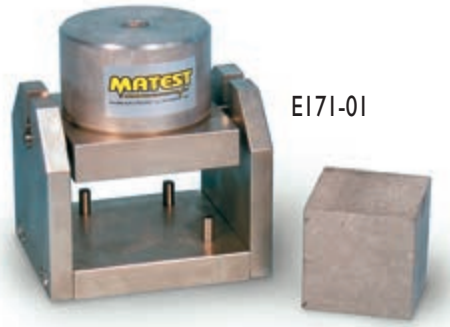
E171

E171-01

Compression device for cube 70,7 mm side

STANDARD: BS 4550

It can be used also to test cores max. 70 mm height
Dimensions: 150x130xh185
Weight: 9 kg



E171-01

E172-01

Flexure device for 40,1x40x160 mm prisms

STANDARDS: **EN 196-1 / EN 1015-11** / NF P15:451 / DIN 1164
EN/ISO 679

Upper bearer is seat ball assembled. The distance between lower bearers is 100 mm and one of them has a spherical seat. Cadmium plated for rust protection.
Dimensions: 160x153xh185 mm
Weight: 11 kg

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

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 pag. 168 ÷ 218)

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 pag. 312÷315) complete with pressure transducer used in conjunction with a concrete digital compression machine (Digitec, Autotec, Cyber-Plus / Servo-Plus Evolution, see pag. 168 ÷ 218).

C055 exemple

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 pag. 316÷319) complete with two pressure transducers used in conjunction with a concrete digital compression machine (Cyber-Plus / Servo-Plus Evolution model only, see pag. 168 ÷ 218).

C056 exemple

C092-06

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 two concrete compression frames.

GROUP EXEMPLE

- Group formed by one concrete flexural frame and one mortar compression frame.

GROUP EXEMPLE

E190N + E183N

E190N

Determination of MODULUS OF ELASTICITY in compression of products and systems for the protection and repair of concrete structures (Mortars) System: Automatic with pace rate control also when releasing the load

STANDARD : **EN 13412**

It can be used with a MATEST testing machine to be selected among the Servo-Plus Evolution models (ref. C104N, see pag. 158).

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.

C134

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.

- 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 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

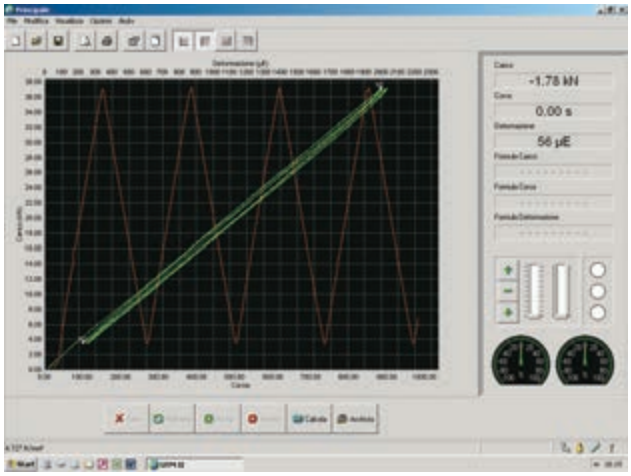
C125-15 KIT for the application of single use extensometers composed by: glue, welder, solder, cleaning liquid, accessories, the whole in carrying case

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.

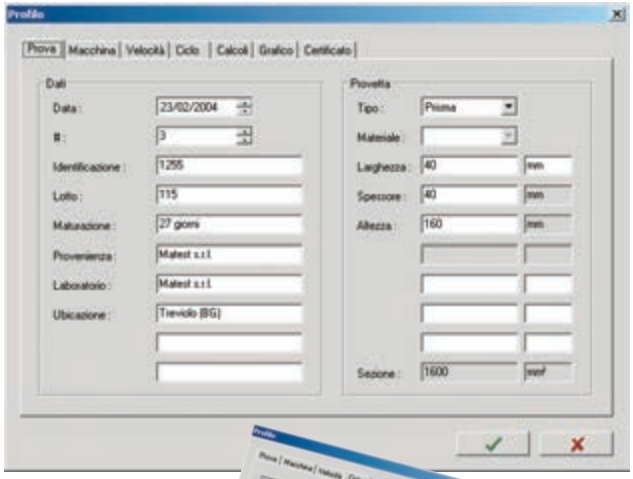
AS AN ALTERNATIVE:

B) C134
EXTENSOMETER / COMPRESSOMETER, ELECTRONIC, UNIVERSAL, MECHANICAL FRAME.
It can be used only with samples having minimum height of 130 mm.
Technical details: see pag. 222

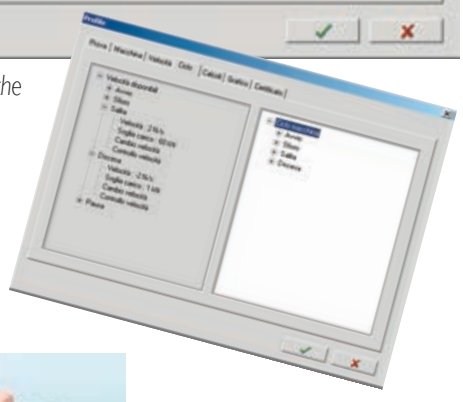
C134-10
TEMPLATE, to regulate and calibrate the base length of the C134 extensometer



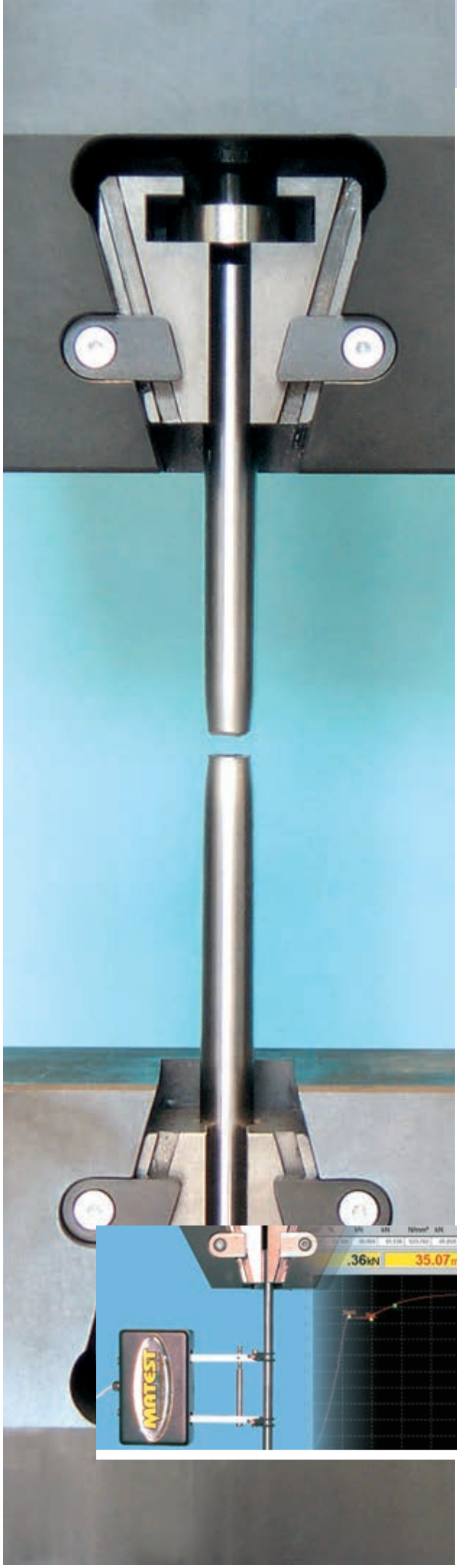
Screen during a test and marker indicating any change.



Personalisation of the test certificate.

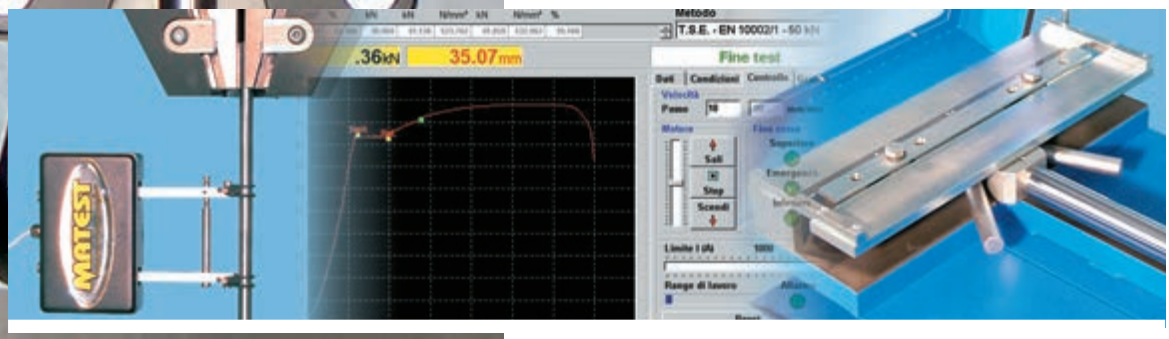


Personalisation and composition of a test profile.



Section H STEEL

In this section Matest proposes a wide range of universal electro-mechanical 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.



H003N

Universal hydraulic servo-controlled machine 600 kN capacity *with Touch-Screen Servo-Plus Evolution* digital system, to perform static tensile tests on metallic materials.

STANDARDS: **EN 10002 / EN ISO 6892, 7500-1** / ASTM A370

It basically consists of:

- Strong loading frame with a reading cell built into the piston
- Hydraulic Servo-Plus Evolution Touch-Screen system (technical details: see pag. 130; firmware details: see pag. 24), for the data acquisition, control and processing. The whole is built in a console.

The frame is designed to carry out tensile tests using the grips placed in the clamping heads. In the upper part, between the head and traverse, it is possible to carry out flexion, compression, bending, hardness, dishing tests, according to the International Standards by using the suitable (see accessories) devices.
The hydraulic servocontrolled unit regulates the load rate by the Computer. An emergency device stops the machine in any moment as per the International Safety Standards.

A control pedal situated on the frame governs the movement of the lower tensile head (excursion 0÷580mm with electric end of stroke switches) for an easier positioning of the specimen according to its length. The machine is supplied complete with loading frame, control console and bed frame, while the software (mod. H009), the extensometers (mod. H014 to H014-10) the grips and the printer **"are options and must be ordered separately"** according to the needs of the user.

TECHNICAL FEATURES:

Capacity	600kN
Max. crosshead stroke	200 mm
Max. distance between the jaws	465 mm
Width flexion joke	190 mm
Max. flexion knives distance	1000 mm
Compression plates light	235 mm
Load reading	Sensing by loading cell. Resolution 0,01% U.V.
Accuracy	Class 1 EN 10002-2 Only reading scale 1:1-1:20 U.V.
Stroke reading	Sensing by linear transducer Resolution 0,01 mm
Deformation reading	Sensing by electronic extensometer (accessory) Resolution 0,001 mm
Accuracy	Class B 2 (B 1 for base up to 50 mm) ASTM E83
Needed height	4050 mm
Frame weight	2600 kg approx.
Rack dimensions	610x630xh.1600 mm
Power supply	230 V 1ph 50Hz 2kW

H003N with accessories

H003-99
KIT FOR MACHINE DELIVERY
The kit is composed by different mechanical devices to flatwise the machine allowing its transport. The amount of this kit is fully reimbursed to the customer if the kit is returned to Matest after the delivery.

ACCESSORIES FOR MOD. H003N

ROUND AND FLAT GRIPS. One set consists of two double pairs that must be placed into the upper and lower tensile heads.

H003-03 Set of Grips for Flat specimens 2 ÷ 18 mm and Round specimens dia 5 ÷ 12 mm

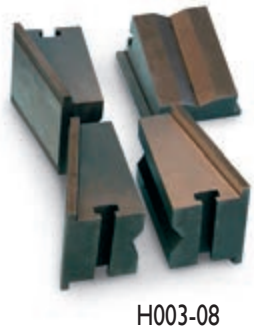
H003-04 Set of Grips for Flat specimens 18 ÷ 36 mm

H003-07 Set of Grips for Round specimens dia. 12 ÷ 24 mm

H003-08 Set of Grips for Round specimens dia. 25 ÷ 40 mm

C128 Graphic Printer A4 format, for the printing of the test Diagram or Certificate.

H003-03



H003-08

NOTE: for the software (H009N) and the extensometers (H014 ÷ H014-10) see pag. 365, 366.

ACCESSORIES FOR TESTS ON METALS:

H003-11 Flexure test

STANDARD: UNI 559
The equipment is composed by a couple of lower bearers with adjustable supports and an upper blade.
Maximum load: 200 kN
Maximum distance between the lower bearers: 1000 mm
Width of the bearers: 120 mm
Diameter of the bearers: 50 mm
Weight: 70 kg

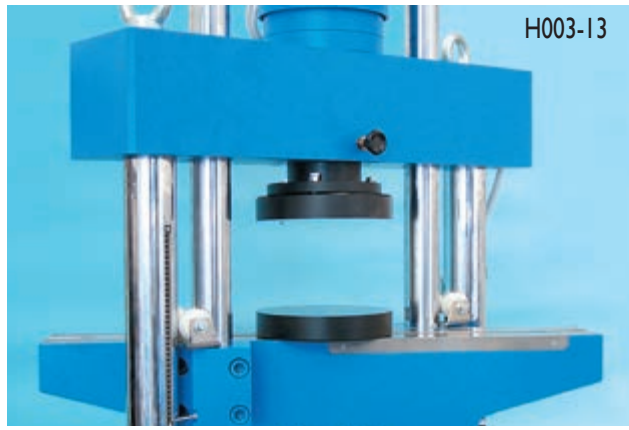
H003-11

H003-12 Bending test

STANDARDS: UNI 564 / ASTM E290
The equipment is composed by a couple of lower bearers with adjustable supports and an upper blade.
Maximum load: 200 kN
Maximum distance between the lower bearers: 1000 mm
Width of the bearers: 120 mm
Diameter of the bearers: 50 mm
Weight: 70 kg
Note: bearers with different diameters are available on request.

H003-13 Compression test

STANDARD: UNI 558
The equipment is composed by an upper plate with seat ball assembly and by a lower plate.
Maximum load: 600 kN
Diameter of the compression plates: 90 mm
Weight: 25 kg



H003-13

H003-14 Test on electro welded wire nets

Device for the seizing of electro welded wire nets; this equipment must be used with the grips for flat specimens.
Weight: 5 kg

ACCESSORIES FOR TESTS ON CONCRETE:

H003-21

Compression test on concrete cube specimens, max 150 mm side.
The appliance is composed by:
An upper compression plate 287 mm. diameter complete with seat ball assembly. A lower compression plate 287 mm. diameter
Maximum distance between the compression plates: 185 mm.
Weight: 60 kg

H003-22

Flexure test on concrete beams with dimensions 100x100x400/500 mm. and 150x150x600/750 mm.
STANDARDS: **EN 12390-5** / BS 1881:118 / ASTM C78, C293 AASHTO T97 / NF P18-407 / UNI 6133
Composed by two lower and one upper bearers
Maximum load: 200 kN
Maximum distance between the lower bearers: 1000 mm.
Width of the bearers: 160 mm.
Weight: 40 kg

H002N

Hydraulic servo-controlled machine 600 kN capacity *with Touch-Screen Servo-Plus Evolution* digital system, to perform static tensile tests on metallic materials

STANDARDS: **EN 10002 / EN ISO 6892, 7500-1** / ASTM A370

The machine basically consists of :
- Sturdy loading frame with electric cell for load reading and built in piston displacement transducer
- Hydraulic unit and Servo-Plus Evolution Touch-Screen system (technical details: see pag. 130; firmware details: see pag. 24), housed in a console, for data acquisition, control and processing.

The frame is designed to perform tensile tests using the jaws placed in the clamping heads, in accordance with the mentioned International Standards.
The hydraulic servo-controlled unit regulates the load rate.
An emergency device allows to stop the machine at any moment as per CE Safety Standards.
The lower tensile head can be adjusted in height through an electric motor, for an easier positioning of the specimen according to its length.

Jaws are pneumatically activated through a compressor (accessory mod V206)
The machine is supplied complete with loading frame and control console, while, software (H009), jaws, printer and extensometers (H014 to H014-10) described in the next pages **"are optionals and must be ordered separately"** according to the needs of the user.

TECHNICAL SPECIFICATIONS:

Capacity	600kN
Distance between jaws min/max	100/800mm
Suitable distance between jaws for test	450mm
Upper hydraulic loading piston, stroke	300mm
Lower tensile head, stroke	400mm
Ideal distance between jaws for tests	500mm
Daylight between vertical columns	440mm
Load reading	Sensing by load cell Resolution 0,01% U.V.
Accuracy	Class 1 EN 10002-2
Stroke reading	Sensing by linear transducer Resolution 0,01mm
Needed height	3200mm
Frame dimensions	860x480x3000mm
Console dimensions	610x630x1600mm
Total weight:	2200kg approx.
Power supply	230V 1ph 50Hz 2kW

H002

ACCESSORIES FOR H002N MACHINE

JAWS for tests on round and flat specimens.
One set consists of two double pairs of jaws that must be placed into the upper and lower tensile heads.

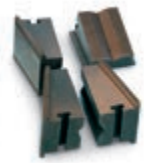
H002-03 Set of jaws for Flat specimens 1-12mm thickness, max. width 65mm, and Round specimens 1-12mm diameter

H002-04 Set of jaws for Round specimens 13-23mm diameter

H002-05 Set of jaws for Round specimens 24-32mm diameter

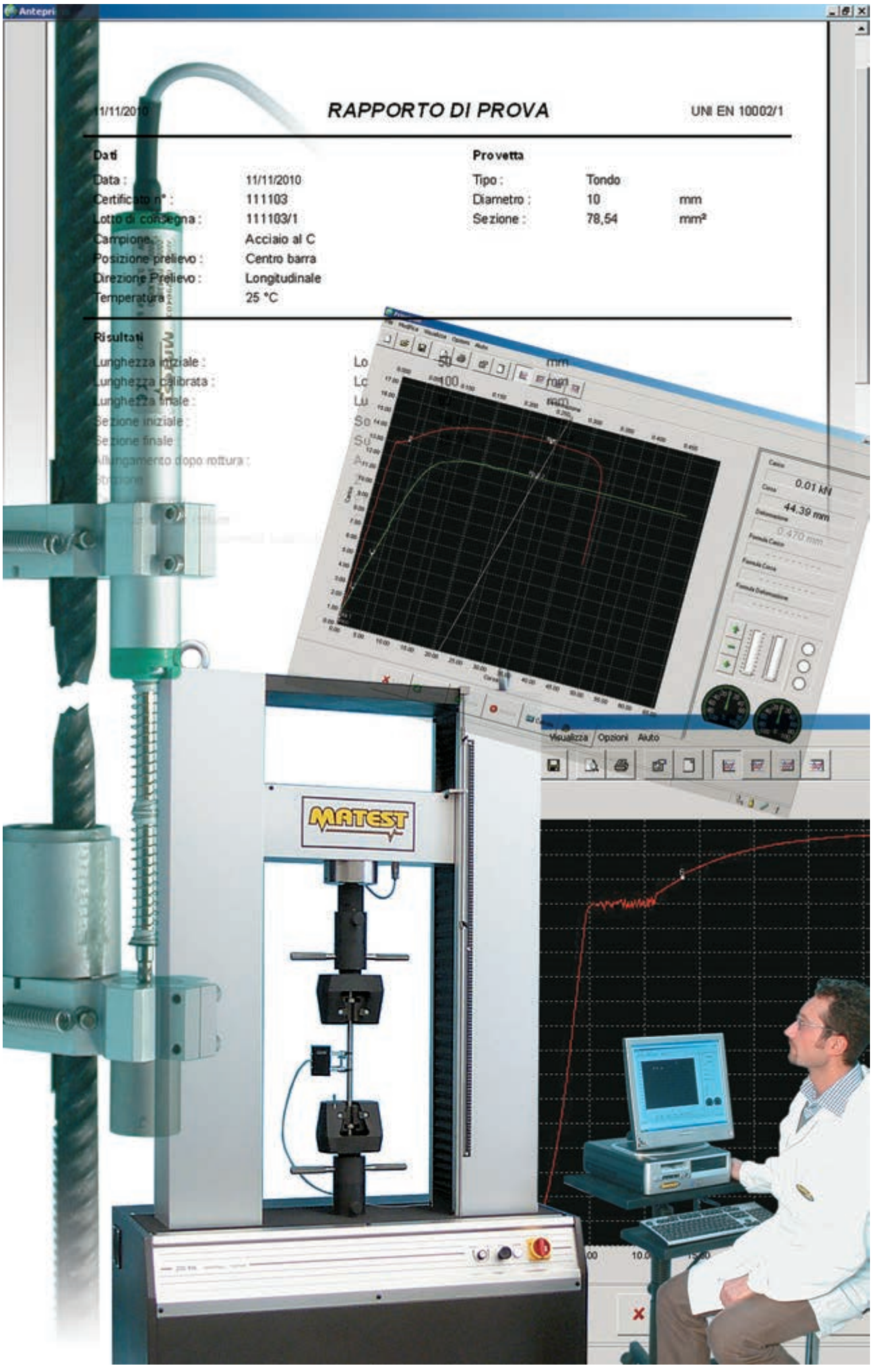
V207 Laboratory Air COMPRESSOR. Technical details: see pag. 488

H002-03



H002-04

NOTE:
The SOFTWARE mod. H009N and the EXTENSOMETER mod. H014 to H014-10 are described at pag. 365, 366


RAPPORTO DI PROVA
UNI EN 10002/1
Dati
Data : 11/11/2010
Certificato n° : 111103
Lotto di consegna : 111103/1
Campione : Acciaio al C
Posizione prelievo : Centro barra
Direzione Prelievo : Longitudinale
Temperatura : 25 °C
Provetta
Tipo : Tondo
Diametro : 10 mm
Sezione : 78,54 mm²
Risultati
Lunghezza iniziale :
Lunghezza calibrata :
Lunghezza finale :
Sezione iniziale :
Sezione finale :
Allungamento dopo rottura :
MATEST
Visualizza Opzioni Aiuto

Servo-controlled electromechanical universal testing machine

This appliance is designed to be used in Laboratories for Quality Control and Research on Metals, Plastics, Composed Materials, Wires, Ropes, Paper, Textiles etc.
The machine is suitable to make tensile and elongation tests on different materials following the **EN 10002 / EN ISO 6892, 7500-1** ASTM A370 Standards.

The machine is composed by a strong base containing the transmission components and the Hardware control instruments.
The base carries two columns that guide the cross-bar; they are made of high resistance steel with ground hard chrome surfacing.
The big diameter and the position where the columns are fitted grant a high lateral rigidity. The system is suitable to realise both tests with single direction or dual direction.
In order to grant no clearance, the transmission of the movement to the mobile cross-bar takes place through two re-circulating spheres screws with pre-loaded female screws.
High attention is given to the assembling system of the screws and their groups - bearings put in the base and in the upper head.
The mobile cross-bar with big section together with all other elements of the machine being properly dimensioned grant a very good "Rigidity of the machine" (see UNI ISO 5893 Standards).
The moving up and down of the cross bar on the columns happens through sintered bushes with low friction coefficient.
On the mobile cross-bar there are some holes for the mounting of the load cells.

The Load Cell is made in stainless steel and reads both tensile and compression loads with a very high precision.
It is in conformity with the **EN 10002-2 / EN ISO 6892, 7500-1** Standards.
Features of the load cell referred to ISO 376 Standards.

Accuracy class	1
Repeatability error	≤ ± 0.145%
Interpolation error	≤ ± 0.090 %
Error on zero	≤ ± 0.03 %
Reversibility error	≤ ± 0.240%
Non linearity error	≤ ± 0.04 %
Maximum overload capacity	200%

In order to follow the specific needs of each single application, different load cells with different capacities within the nominal capacity of the machine can be installed on the frame.
Different connections for the installation of the seizing devices are on the mobile cross-bar and on the base (see accessories at following pages).
The machine is delivered with different safety devices limiting the maximum travel of the cross-bar. There is also an adjustable device that allows setting a personalised upper and lower travel limit following the used appliances.

The control section is made by a series of cards inside the base of the machine that are managing the control units and the reading units positioned on the machine.
The acquisition card, with a powerful microprocessor and converter AD 24 bits, takes all the working dates and through a RS232 connection it sends all these dates to the Personal Computer, which controls all the functions of the machine and makes the elaboration of all the calculations through the program UTM2.

On the base there are:
A device which allows an easy and speedy positioning of the mobile cross-bar. A push button to interrupt the test execution at any time. A series of connectors for the connection to the control PC and to the auxiliaries appliances (extensometer, load cells etc.)
General switch/Safety switch.

NOTE:
The SOFTWARE mod. H009N and the EXTENSOMETER mod. H014 to H014-10 are described at pag. 365, 366

H007 + H009 + H009-01

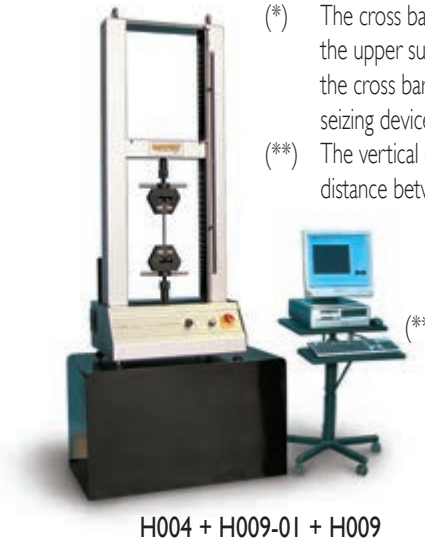
The frames protecting the columns and the screws are made of anodised aluminium, the internal sides are closed with anti-dust bellows and all the outside and internal parts are properly treated against the corrosion.
Following equipments are not delivered with the machine and have consequently to be ordered separately (see following pages):

- Personal computer model H009-01 (indispensable for the working of the machine).
- Standard UTM 2 software model H009 (indispensable for the working of the appliance).
- Special personalised programs (following the customer demand)
- Accessories for the seizing of the specimens.
- Printer model C128
- Extensometers model H014 to H014-10
- Other accessories

H008 + H009-01 + H009

- The voltage must not have peaks of tension, over-tensions and transitory over-currents or drops of voltage higher than 10% of the nominal voltage.
- Working temperature from +10° C. up to +38° C.
- Humidity range from +10% up to +90%, without condensation.

H005 + H009-01 + H009



H004 + H009-01 + H009

AVAILABLE MODELS:

MODEL	H004	H005	H006	H007	H008
LOAD CAPACITY kN	10	50	100	200	600
TEST SPEED mm/min					
Minimum	0,01	0,01	0,01	0,01	0,01
Maximum	500	500	500	480	300
POSITIONING SPEED mm/min.	500	500	500	480	250
CROSS BAR TRAVEL (*) mm	1130	1130	1180	1150	1500
OPENING OF THE TESTING CHAMBER					
Vertical mm (**)	1253	1251	1310	1280	1510
Horizontal mm	421	421	600	600	713
MAXIMUM DISTANCE BETWEEN THE TENSILE HEADS mm (***)	630	612	510	480	550
DIMENSIONS mm					
height	1708	1845	2340	2340	3000
width	550	810	1370	1370	1465
depth	683	670	700	700	930
WEIGHT kg	250	370	1000	1150	2600
POWER SUPPLY	230V 1ph 50 Hz	230V 1ph 50 Hz	400V 3ph 50 Hz	400V 3ph 50 Hz	400V 3ph 50 Hz
ABSORBED POWER W	1000	1200	2000	3000	3000

(*) The cross bar travel is referred to the distance between the upper surface of the base and the lower surface of the cross bar and it doesn't include the load cell, the seizing devices, the different equipments etc.

(**) The vertical opening of the testing chamber is the distance between the upper surface of the base and the lower surface of the crossbar, without load cells, seizing devices and other devices.

(***) The maximum distance between the tensile heads is the distance between the grips when the crossbar is at its upper dead point (load cell is installed). Practically it is the free length of the specimen between the tensile heads.

... follows ...

ACCESSORIES FOR:

MACHINE CODE	H004	H005	H006	H007	H008
CAPACITY	10 kN	50 kN	100 kN	200 kN	600 kN
Couplings for installation of the tensile heads or the devices	H005-40	H005-40	H007-40	H007-40	
Tensile heads	H005-11	H005-11	H007-11	H007-11	H008-11
Flat seizing grips for specimens as follows:					
Flat spec. thickness 0÷10 mm Width max 25 mm Round specimens Ø 3÷5 mm	H005-21	H005-21			
Flat spec. thickness 0÷10 mm Width max 50 mm Round specimens Ø 3÷10 mm			H007-21	H007-21	
Flat spec. thickness 11÷22 mm Width max 50 mm			H007-22	H007-22	
Flat spec. thickness 0÷12 mm Width max 70 mm Round specimens Ø 3÷10 mm					H008-21
Flat spec. thickness 12÷24 mm Width max 70 mm					H008-22
Flat spec. thickness 24÷36 mm Width max 70 mm					H008-23
"V" shape seizing grips for round specimens:					
Dia. 5 ÷ 12 mm	H005-31	H005-31			
Dia. 11 ÷ 18 mm			H007-31	H007-31	
Dia. 18 ÷ 25 mm			H007-32	H007-32	
Dia. 25 ÷ 32 mm			H007-33	H007-33	
Dia. 11 ÷ 22 mm					H008-31
Dia. 23 ÷ 34 mm					H008-32
Dia. 35 ÷ 45 mm					H008-33
Dia. 45 ÷ 55 mm					H008-34
Compression device	H005-41	H005-41	H007-41	H007-41	H008-41
Knurled roller clamping device	H005-42	H005-42			
Device for test on wire and ropes	H005-43	H005-43			
Flexural and bending device in three spots	H005-44	H005-44	H007-44	H007-44	H008-44
Device to centre the specimens		H005-51	H005-51	H005-51	

H005-11 - H007-11 - H008-11

Couple of tensile heads with different capacities. They are made of treated steel carefully worked and have a shape, which is granting an auto-tightening of the seizing grips on the specimen. A screw device allows the right operation of the seizing grips and grants a right blocking of the specimen starting from the lowest loads and reducing at the top the moving of the crossbar during the penetration of the knurling on the specimens.
Each couple of tensile Heads is delivered complete with:
- Spanner for the assembling and the disassembling of the seiwing Grips
- Pack of special grease for lubrication

H005-21

Flat Grips - Thickness 0÷10 mm
Width max 25 mm and Round Grips dia. 3÷5 mm
One set consist of a double pair of grips.

H005-31

Round Grips with Section "V"
dia. 5÷12 mm
One set consists of a double pair of grips.

H005-41

Compression Device
Consisting of an articulated upper plate and a lower fixed one.

H005-42

Knurled Roller Clamping Device
Consisting of a pair of grips with max. capacity 20kN suitable for test on plastic films with a considerable thickness and hardness and similar materials.

H005-43

Device for tests on wires and ropes
Consisting of a pair of self-aligned rollers for tensile tests on wires and ropes of thin section with max. load capacity of 20 kN.

H005-44

Flexural and Bending test device in three spots
Suitable for flexural and bending tests on round and flat specimens.

H005-51

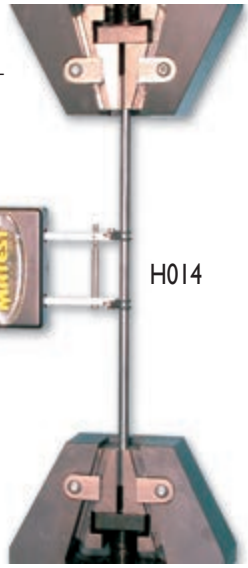
Device to centre the specimens
This device is composed by a pair of rollers installed on settable supports screwed on the tensile heads.
By setting the supports in relation with the dimensions of the specimen, the user will obtain a stop that allows a rapid and right positioning of the specimen in the flat grips.
This accessory can be used only on machine with 50 kN, 100 kN and 200 kN capacity (models H005, H006, H007).

ACCESSORIES FOR MOD. H003N, H002N and from MOD. H004 to H008:

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.



H014

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. H003N
Dimensions: 105 x 630 mm
Weight: 1000 g

H003-18

H003-18
mounted on H003N machine

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.

H014-07

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 27 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
Measuring base: 25 – 50 – 60 – 70 mm. Transducer stroke: 50 mm

H014-06
with accessories

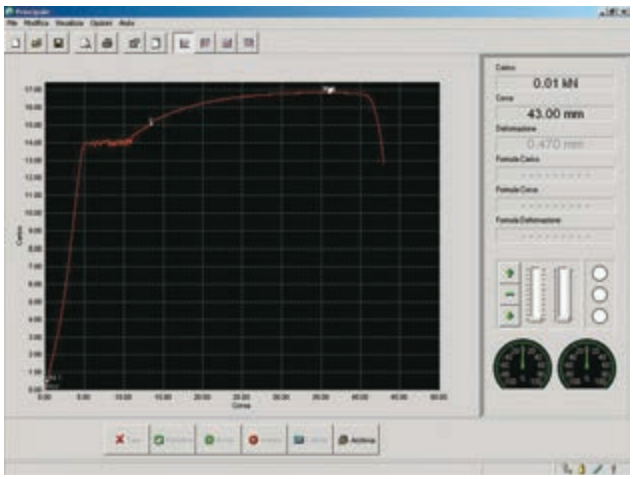
... follows ...

ACCESSORIES FOR MOD. H003N, H002N and from MOD. H004 to H008:

H009N
UTM2 SOFTWARE

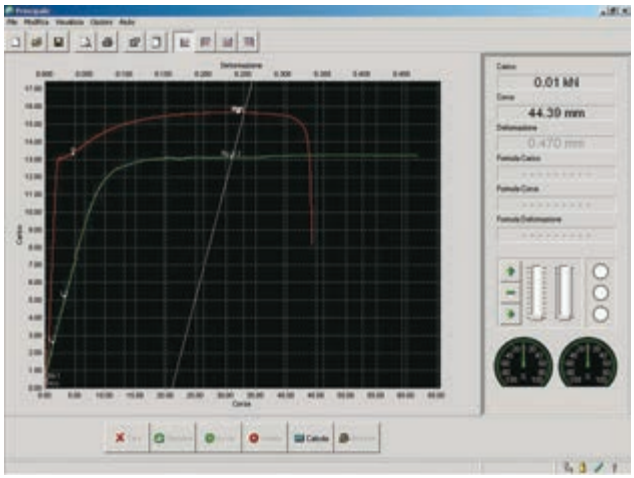
STANDARDS: **EN 10002-1** / ISO 527, 178, 604, 898-1, 3506-1, 10113, 12275 / ASTM A370

This Software, that has been developed following the UTM2, has been realised following the way of working of Microsoft windows operating system.
The software has been conceived realised in an interactive way and 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.



Tensile test on a steel specimen without extensometer; it visualises the starting of the specimen breaking with the possibility to increase the dimensions of the area of the graph by means of the zoom function.

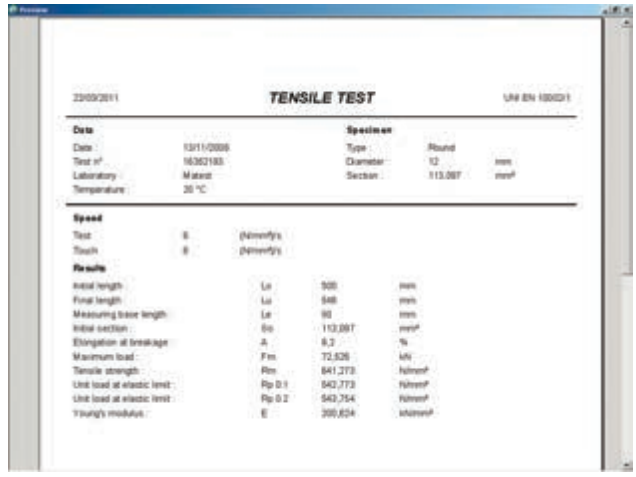
The conception of this software supports a wide range of calculation needs and tensile, compression, flexure test profiles.
The user can realise new personalised test profiles: definition of the test data as the date of the test, the certificate number, the lot of the material delivered, the origin of the specimen, the test temperature… and definition of the specific dates of the specimen as type, dimensions measuring unit…



Tensile test on a steel specimen using tan extensometer, showing the symbols of the considered dimensions and the relative tracing in different colours selectable by the user.

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….
For some calculations the end user can set the test execution parameters corresponding to the calculation algorithms as an example for the deviation of the Rp proportionality he can introduce the percentage %.

The software allows a speedy and easy management of all the machine parameters 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, value of starting of the test calculation….
The test setting happens by dividing the process in different phases or speed charts, for each one of these charts the user can set the required kind 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 test mode or the breaking limit can also be selected.
The software allows personalising and setting the visualising 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 as titles, margins….



Example of test certificate

At the end of the test the user can decide if the selected calculations must be effected and/or if he wants to save the test in the file. 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.

C12 8
LASER PRINTER, bench model, for graphics and certificates with direct connection via USB.

S205-05

UNITRONIC 50 kN, UNIVERSAL MULTIPURPOSE 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.

S205-05 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 dia. 1 - 5mm
H005-31 "V" shape seizing grips for round specimens dia. 5 - 12mm

Optional accessories:

H014-06 to **H014-10**
Extensometer, electronic, for tensile deformation strength tests.

H009N Software for visualisation in real time of load/deformation, graphic, test certificate etc.

S205-05 accessories for tensile test

At pag. 364 and 365 of the catalogue there are listed devices to test plastics, wires, ropes, flexural and bending tests and various models of extensometers

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 pag. 414

S206N

UNITRONIC 200kN "Matest made"

UNIVERSAL ELECTROMECHANICAL FRAME 200kN CAPACITY FOR TENSILE TESTS ON METAL, WITH SERVOCONTROLLED SYSTEM OF LOAD OR DISPLACEMENT/STRAIN.

The machine is also suitable for tests on:

- Bituminous mixtures (Marshall, Duriez, Leutner shear, Splitting tensile)
- Concrete (flexure on beams and clay tiles, splitting on cylinders, cubes and block pavers, punching)
- Cement and mortar (compression and flexure)
- Soil (CBR)

Technical details: see pag. 420

S206N

UNIVERSAL TENSILE/COMPRESSION MACHINE

Touch-Screen **digital system**

- 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, 7500-1** / ASTM C39, E4 / BS 1610 / NF P 18-411 / DIN 51220 / AASHTO T22

This machine of compact design, is utilized to carry out tensile tests on steel reinforced bars from dia. 6 to 25 mm. and flat max. 25x15 mm. It can also carry out compression tests on concrete cube specimens max. side 150 mm. and cylinders max. dia. 160x320 mm.

The 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 tungsten steel, while the jaws are hardened over 65 HRC. The "V" autoclamping form allows a quick and practical churking of the specimen. Hardware technical details: see pag. 24.

The machine is supplied complete with pair of jaw-holders, but **"without"** accessoires for the tensile and compression tests, which must be ordered separately (see accessories).

TECHNICAL SPECIFICATIONS:

- Maximum tensile load: 500 kN
- Maximum compression load: 1500 kN
- Distance between the jaws: min. 300 mm - max. 400 mm
- Distance between the compression platens: 340 mm
- Distance between the columns: 270 mm
- Piston's stroke: 100 mm
- Precision and repeatability: ± 1% of read value
- Power supply: 230 V 1 ph 50 Hz 750 W
- Dimensions: 780x420x1700
- Weight: 850 ÷ 900 kg

H011-01N with accessories

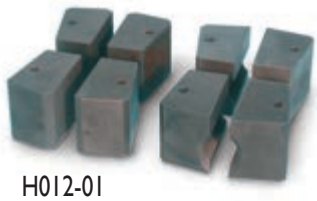
H011N with accessories

Model	Motorized	Gauge	Cyber-Plus Evolution mod. C109N (pag. 158)	Servo-Plus Evolution mod. C104N (pag. 158)
H010	•	•		
H011 N	•		•	
H011-01 N	•			•

H010
with accessories

ACCESSORIES for H010, H011N and H011-01N:
FOR TENSILE TESTS ON ROUND AND FLAT STEEL SPECIMENS:

H012-01
Set of 4 Jaws, upper and lower, for round steel specimens from dia. 6 to 15 mm., and flat specimens from 6 to 15 mm. thickness (max. width 25 mm).



H012-01

H012-02

H012-02
Set of 4 Jaws upper and lower for round specimens from dia. 15 to 25 mm

FOR COMPRESSION TESTS ON CONCRETE CUBE AND CYLINDER SPECIMENS:

H013-01
Upper compression platen foreseen of seat ball, fixing device, lower compression platen and distance pieces test cylinders max dia. 160x320 mm. and cubes 150 mm. max side.
The platens have dia. 216 mm. and are hardened and rectified as requested by Standards.

H013-01

H013-02
Safety Guards to CE Directive, polycarbonate made, complete with hinges an 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 pag. 14

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

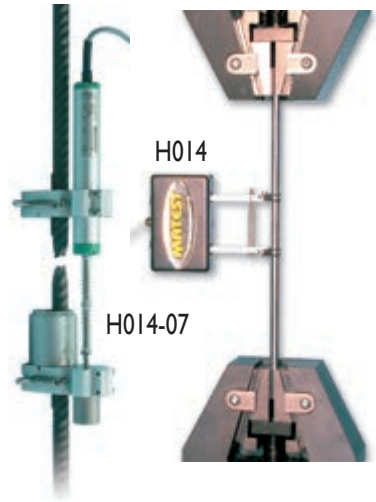
SPARE PARTS:

H011-11N
Electronic digital display unit with microprocessor "Cyber-Plus Evolution" complete.

H011-12N
Hydraulic and digital servocontrolled system "Servo-Plus Evolution" complete.

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.



H014

H014-07

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 4,5 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

H014-10 Extensometer for flat specimens, width max. 25 mm; thickness max. 10 mm. Transducer stroke: 50 mm
Measuring base: 25 – 50 – 60 – 70 mm.

H020

Marking-off machine

Automatic, motorised
STANDARD: UNI 556

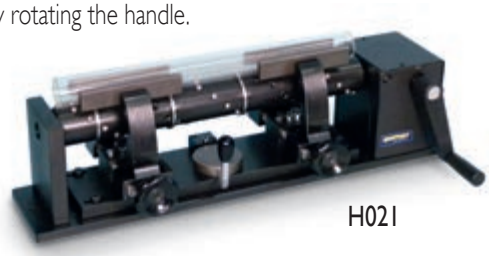
Used to mark off specimens with round, square shape and with improved bond for the measurement of the percentage elongation after their breaking, in accordance with the Standards.
The machine can mark specimens as follows:
- Round from 4 mm up to 50 mm. diameter.
- Flat from 4 mm. up to 50 mm thickness.
- Square from 4 mm. to 45 mm. side.

Useful length 300 mm.
Marking steps: 5 or 10 mm. selectable with lateral graduation.
Marking speed: 60 marks per minute.
Power supply 400 V 3ph 50 Hz
Dimensions: 530x480x445 mm.
Weight: approx. 58 kg

H020

H021

Marking-off machine, same to mod. H020, but hand operated by rotating the handle.



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: 125x125xh 180 mm
Weight: 12 kg

H054

Pliers, special-shaped, to take cooled specimens from the bath and place them directly into the Charpy Pendulum.

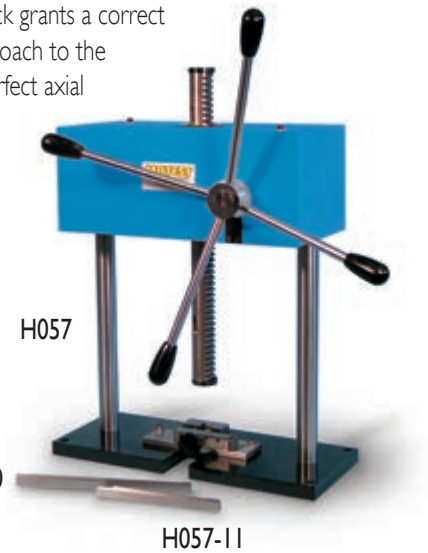
H052

H054

H057

Broaching machine

Used to make notchings on impact test bars for resilience tests.
The piston with rack grants a correct alignment of the broach to the specimen and a perfect axial thrust.



H057

H057-10

ACCESSORIES:

H057-11

H057-10
Broach for "V" notchings on specimens with square section 10x10 mm

H057-11
Broach for "U" notchings on specimens with square section 10x10 mm

C351

Specimen cutting machine

It accepts blades up to dia. 350 mm
Shear capacity: 120 mm
Complete with cutting blade for metals dia. 350 mm
Power supply: 230 V 1F 50 Hz 2000W
Dimensions: 560x460x390. Weight: 20 kg

C351

SPARE PART:
C351-11 CUTTING BLADE for metal.

Pendulum impact Charpy testers for resilience tests

STANDARDS: **EN 10045-1** / ASTM E23 / UNI 4431, 4714 / ISO TC/7 / BS 131 / EURONORM 7-55

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: 500x1000xh1820 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: 800 x 578 xh 1400 mm. Weight: 450 kg

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: 300J with 0,1J resolution.
Supplied complete with knife-edge to perform the test as per ASTM Standard.
Power supply:
380V 3ph 50Hz 400W
Dimensions:
2200 x 800 xh 2300 mm
Weight: 750 kg

H062-01

ACCESSORY: KNIFE-EDGE to perform resilience tests according to EN 10045-1 and BS 131 Standards
H060-03 KNIFE-EDGE for H060N tester
H062-03 KNIFE-EDGE for H062 and H062-01 testers

H065N

Cold bend testing machine

STANDARDS: **EN ISO 7438, UNI EN 10080, EN ISO 15630-1**
ASTM A615, ASTM A615M / D.M. 14/1/2008

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: mm 1540x800xh 1300
- Weight: 350 kg

H065-01

H065N

ACCESSORY:

H065-01
Safety guards to CE Safety Directives.

This equipment has been studied and designed to perform bending tests on steel bars for reinforced concrete.
The test consists in bending the bar at 180° or to bend the same at 90° and then straighten if of at least 20°.
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 interchange-ability 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).

H065N detail

TABLE OF THE AVAILABLE MANDRELS AND BRACKETS FROM Ø 5 TO Ø 40 ACCORDING TO: EN, ASTM, D.M. SPEC.

Mandel Model	Mandel 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.

Section S SOIL

For the realization of civil engineering structures, the engineer during the design stage must base his calculations according to the soil properties where the structure will have to integrate. This section studies and analyses a soil sample to evaluate and to know its characteristics, by proposing 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.

SAMPLING AND EVALUATION

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 cm2 and 10 cm2 surface
Lifting device for sounding rod, accessories
Dimensions: 1080x360x220 mm. Weight: 72 kg

S050

S051

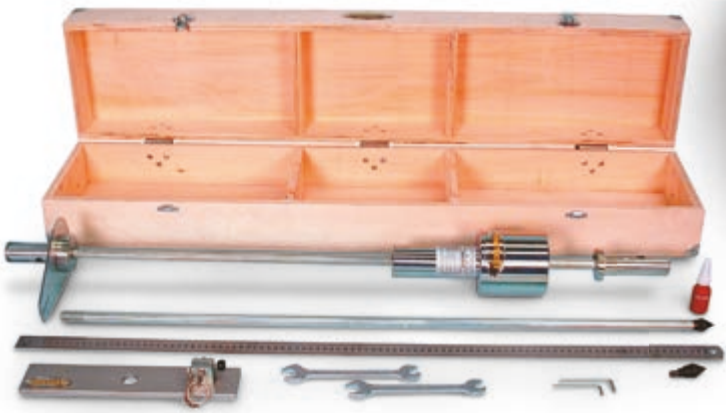
Dynamic cone penetrometer (DCP) Matest Made

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 20 mm dia.
- Bar wrench, spanners, accessories.

Dimensions: 1210 x 340x190 mm. Weight: 29 kg

ACCESSORIES:
S051-10 Drop Sliding Hammer 4,6 kg weight.

SPARE PARTS:
S051-11 Penetration cone
S051-12 Extension rod, 400 mm long



S051

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 (dia. x height) 16x32, 20x40, 25,4x50,8 mm, extension rod 500 mm long, tools, carrying case.
Dimensions: 500 x 300 x 100 mm
Weight : 4 kg approx.

ACCESSORY / SPARE:
S057-01 Extension rod, 500 mm long

S057

SAMPLING AND EVALUATION

S052KIT

Soil prospecting and sampling kit Matest Made

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 80 mm dia.
S093-01 Auger head 100 mm dia.
S094-01 Auger head 150 mm dia.
S052-01 Dutch soil auger head, Edelman type, 150 mm dia.
S052-02 Gravel auger head 50 mm dia.
S092ASTA Extension rod 1 m long with "T" handle
S095 n° 5 extension rods, 1 m long
S053 Soil sampler 38 mm dia. complete with stainless steel sample tube dia. 38x230mm, jarring link, "T" handle.
S053-04 n° 5 Stainless steel sample tubes dia. 38x230mm
S052-03 Plastic cap ends for sample tubes dia. 38x230mm (12 pieces)
S054 Hand extruder for sample tube dia. 38x230mm
S052-04 Stillson wrenches (2 pieces)
S052-05 Wooden carrying case.

Dimensions: 1080x360x2200mm. Total weight: 50 kg approx.

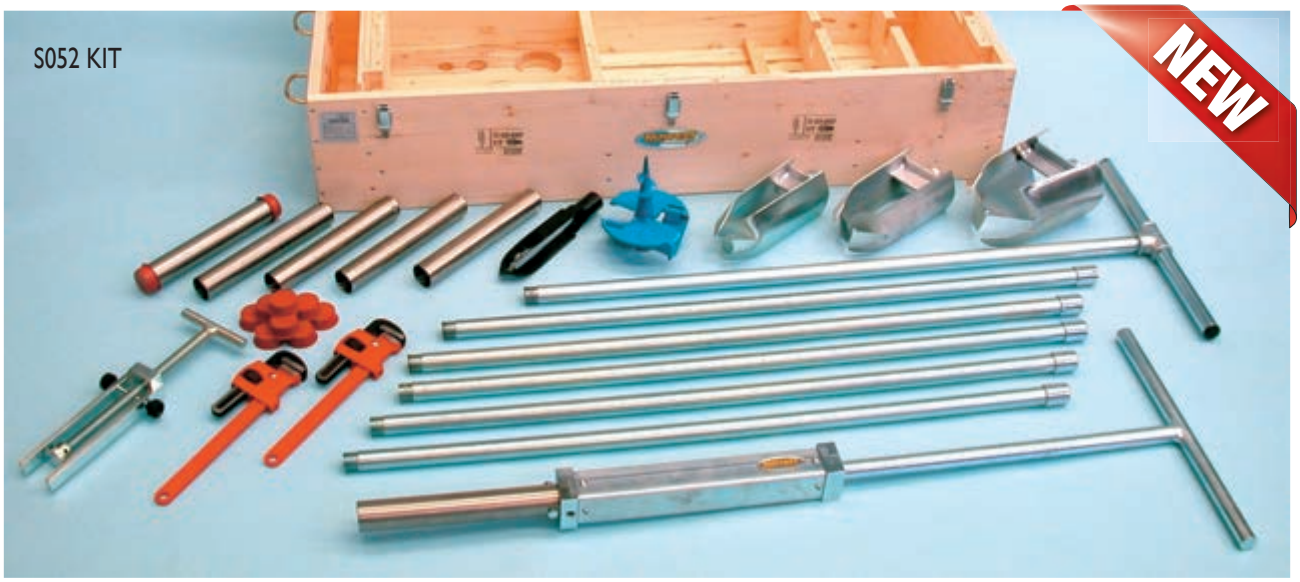
S051-01

Mackintosh prospecting kit Matest Made

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 borehole friction to a minimum, permitting easy operation to considerable 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
Weight: 45 kg approx.



SOIL SAMPLING

Hand Augers

STANDARDS: ASTM D 420, D 1452 / CNR a VI n° 25
AASHTO T86, T202
Designed for soil investigations and explorations.
Complete with "T" handle.
Made of special galvanized steel.

S095

S094 KIT

S093 KIT

S092 KIT

MODELS:

		Weight kg
S092 KIT	Hand Auger, 80 mm dia. x 1 m long	4
S093 KIT	Hand Auger, 100 mm dia. x 1 m long	5
S094 KIT	Hand Auger, 150 mm dia. 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 2 HP, two strokes, without speed inverter.
Fitted with two handwheels, to be used just by one operator.
Drilling holes up to dia. 200 mm and max. depth of 1000 mm
It does not accept extension rods.
Weight: 10 kg

S096

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.
Weight: 30 kg

ACCESSORIES:

S097-01 Auger 60 mm dia. x 1 m long
S097-02 Auger 80 mm dia. x 1 m long
S097-03 Auger 100 mm dia. x 1 m long
S097-04 Auger 150 mm dia. x 1 m long
S097-05 Auger 200 mm dia. x 1 m long

DENSITY AND EVALUATION

Surface soil samplers

Used to take field 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 / CNR no. 22
Sampling tube is 73 mm inside diameter by 66 mm high.
Drop hammer is 5 kg
Total weight: 10 kg

SPARE PART:

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 set S083KIT includes:

S083-01 Driving rammer for 100mm dia. core cutter. Weight 13.5 kg

S083-02 Driving dolly for 100mm dia. core cutter. Weight 1 kg

S083-03 Core cutter (sampling tube) 100mm dia. by 130mm length. Weight: 1 kg

Total weight: 15.5 kg

Water level indicator

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

S061

MODELS:

S061 Water level indicator, 50 m cable length
S061-01 Water level indicator, 100 m cable length
S061-02 Water level indicator, 200 m cable length

S053

Soil sampler 38 mm dia

Used to obtain indisturbed soil samples of dia. 1 1/2" (38 mm)
The sampler is formed by:
T handle with extension rod, 900 mm long
Jarring link 3/4"
Stainless sample tube dia. 1 1/2" x 9" (38x230 mm). Weight: 7 kg

ACCESSORY AND SPARE-PART:

S054 Hand extruder used to extrude the soil specimens dia. 1 1/2" from the sample tube.

S053-04 Spare stainless sample tube dia. 1 1/2 x 9"

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 pag. 81, 82

E095 + B028-03

SOIL EVALUATION

POCKET PENETROMETERS AND SHEAR VANES

STANDARD: ASTM D 2573-94

MODELS:

S065
DIAL POCKET PENETROMETER, for the classification of cohesive soils in terms of consistency, shear strength and approximate unconfined compression strength.
Direct value read in kgf/cm^2 on the dial graduated from 0 to 6 kgf/cm^2. Peak hold feature; zero setting by push button.
Weight: 300 g

S066
DIAL POCKET PENETROMETER, identical to mod. S065 but with dial range 1-14 kg f/cm^2, suitable for very compacted soils.

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.
Complete with 5 plungers Ø 6,4 - 10 - 15 - 20 - 25 mm.
Weight: 400 g

S070
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 dia. 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 (dia. 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-PART:

S076-01
Stainless steel vane 10x20 mm (dia. x height) for S075 and S076 devices.

MELTING POT, to melt wax and to cover soil samples keeping them to the original humidity.
See mod. A106
section "A" pag. 29

A106

COMPACTION AND MOISTURE

S086

Proving 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

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 dia. 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: 8 kg

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

S059

GEOGAUGE

Non nuclear gauge for site soil compaction control, stiffness and young modulus

STANDARD: ASTM D6758

S059

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.

The GeoGauge 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 GeoGauge 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 GeoGauge 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 Geo-Gauge operation).

S060

Nuclear moisture density gauge

STANDARDS: ASTM D6938, D2950, D1040 / 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 25 mm. increments. Stores up to 320 field tests, transferable to PC or printer.
Gage dimensions: 400x220x140 mm
Weight: 14 kg

S060

ACCESSORY:

S060-10 Infrared interface, complete with cable to PC and software.

S060-01

Nuclear Moisture Density Gauge

STANDARDS: ASTM Standard Test Methods D6938, D2950, C1040 and AASHTO T310

This gauge offers two modes of operation:

DIRECT TRANSMISSION MODE is designed for measurements of soils, stone or other materials where both density and moisture content are desired. Direct transmission testing typically offers better precision and control of depth of measurement is the preferred method. Dry Density, Wet Density, Moisture, Percent Moisture and Percent Proctor are provided when testing in the soil mode.

BACKSCATTER MODE is rapid and nondestructive. Gamma rays enter the test material and those scattered trough the material and reaching the detectors are counted. Backscatter is primarily used to determine density on layers of asphalt and concrete.

S060-01

Specifications:

- The microprocessor displays all function directly.
- Multiple offsets available to adjust to virtually any field condition.
- Test results in as little as 1 minute allow additional compactive effort to be applied immediately if necessary.
- NI-CAD rechargeable battery, 64h standby.
- AC charger 220V, DC adapter 12-14 V.
- Dimensions: 591x376x231 mm.
- Weight: 13,2 kg.

S079

S077

Earth resistivity meter

STANDARDS: ASTM G57 / BS 1377:3

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:
Resisitivity measuring instrument with Software
Dimensions: 210x170x90 mm
Weight: 2 kg
2 potential copper electrodes
2 current electrodes
2 cable reels with 300 m of cable
2 cable reels with 100 m of cable
2 hammers, set of standard accessories

S078-01

S077

ACCESSORY:

S078-01

Rechargeable accumulator, two pieces

Energy source for geoelectrical surveys (in alternative to dry batteries or generators).
Dimensions: 35x25x24 cm. Weight: 6 kg

S079

Seismograph, three channels

Applications:
- Depth determination of bedrock.
- Determination of elastic-dynamic properties of surface deposits.
- Foundation studies.
- Preliminary investigations for the realization of important works.
- Cost estimation for excavation.
- Evaluation of elastic-dynamic modules of materials.
- Downhole survey with tridimensional borehole geophone.
- Microseismics.

The seismograph is supplied complete with set of accessories to perform seismic refraction tests.
This seismograph can perform also **"Downhole"** and **"Crosshole"** measurements by adding suitable kit of devices (optional accessories on request).
Dimensions: 210x170x90mm
Weight: 2 kg

UNIVERSAL EXTRUDERS

STANDARDS: ASTM D698, D1587, D1883 / BS 598:107, 1377:4, 1924:2

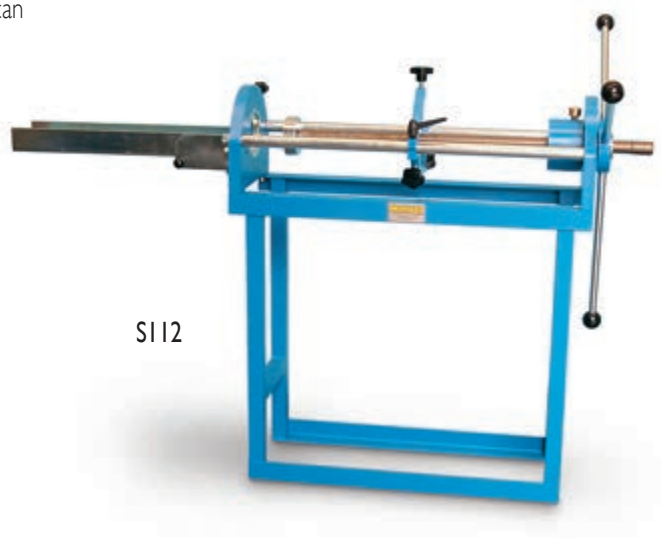
S111

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 dia. 35 up to 150 mm (external dia. 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 dia. 38,1 (1 1/2"), 83, 100 mm.
Power supply: 230V 1ph 50Hz 1300W
Dimensions (working position): 2741 x 635 xh 1200 mm
Weight: 160 kg

S112
Screw extruder - hand operated

The unit extrudes samples from dia. 35 to 101,6 mm with max. stroke of 650 mm. Supplied complete with adaptors to extrude samples having dia. 38,1 (1 1/2"), 83, 100 mm, supporting bench, sample receiving table both adjustable in height and lowerable.
Dimensions: 1700x700x1200 mm
Weight: 90 kg



S112

S114
Universal extruder

Used to extrude samples having dia. 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: dia. 300x500 mm
Weight: 30 kg

S114

ADAPTORS (ring and tamper) for S111 and S112 Extruders:

S113-10 Dia. 38,1 mm (1 ½") (spare)
S113-11 Dia. 50,8 mm (2")
S113-12 Dia. 76,2 mm (3")
S113-13 Dia. 101,6 mm (4")
S113-14 Dia. 83 mm (spare)
S113-15 Dia. 100 mm (spare)
S113-16 Dia. 35 mm
S113-17 Dia. 150 mm (only for mod. S111)

S118

Die cutting soil 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 dia. is 120 mm and max. vertical daylight is 470 mm
Dimensions: 500x300x900 mm
Weight: 30 kg

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				Hollow Punch	Tamper
Consolidation	Ø	50,47	xh	20 mm	**S122**	**S123**
Consolidation	Ø	63,50	xh	20 mm	**S122-19**	**S123-05**
Consolidation	Ø	71,40	xh	20 mm	**S122-01**	**S123-01**
Consolidation	Ø	75,00	xh	20 mm	**S122-17**	**S123-04**
Consolidation	Ø	79,80	xh	20 mm	**S122-02**	**S123-02**
Consolidation	Ø	112,80	xh	25 mm	**S122-03**	**S123-03**
Consolid. Permeab.	Ø	50,47	xh	20 mm	**S122-04**	**S123**
Consolid. Permeab.	Ø	63,50	xh	20 mm	**S122-20**	**S123-05**
Consolid. Permeab.	Ø	71,40	xh	20 mm	**S122-05**	**S123-01**
Consolid. Permeab.	Ø	75,00	xh	20 mm	**S122-18**	**S123-04**
Consolid. Permeab.	Ø	79,80	xh	20 mm	**S122-06**	**S123-02**
Consolid. Permeab.	Ø	112,80	xh	25 mm	**S122-07**	**S123-03**
Shear	Ø	50	xh	25 mm	**S122-08**	**S123-08**
Shear	Ø	60	xh	25 mm	**S122-09**	**S123-09**
Shear	Ø	100	xh	25 mm	**S122-10**	**S123-10**
Shear	▨	60x60	xh	25 mm	**S122-11**	**S123-11**
Shear	▨	100x100	xh	25 mm	**S122-12**	**S123-12**
Triaxial + Unconf.	Ø	38	xh	76 mm	**S122-13**	**S123-13**
Triaxial	Ø	50	xh	100 mm	**S122-14**	**S123-14**
Triaxial	Ø	70	xh	140 mm	**S122-15**	**S123-15**
Triaxial	Ø	100	xh	200 mm	**S122-16**	**S123-16**

V112-01 STANDARDS: ASTM D421 / BS 1377:2, 1924:1
PORCELAIN MORTAR dia. 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 dia. 38 to 110 mm. Supplied complete with three sets of platens for samples dia. 38-50, 47-60 mm, wire saw and 6 blades.
Dimensions: dia. 460x720 mm
Weight: 20 kg

ACCESSORY:

S120-01 Upper trimming platen available from dia. 38 to 110 mm.
When ordering please specify required diameter.

SOIL AND WATER ANALYSIS

S132N
Colour standard chart

ORGANIC IMPURITIES IN SOILS

STANDARDS: ASTM C40-11 method / AASHTO T21 / UNI 8020-14

For the determination of the Organic impurities in soils and fine aggregates.

The chart has 5 glass reference scales.

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

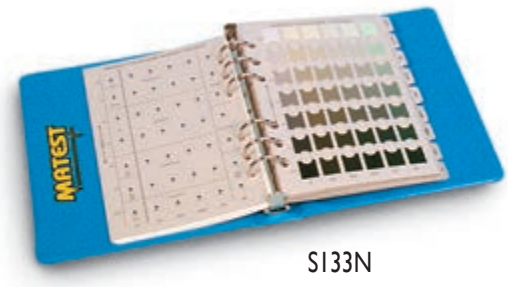
S132-03 Graduated impurities test bottle, stoppered, pyrex glass, 1000 ml - ASTM C40

V300-24 Sodium Hydroxide, pack of 1000 g

S133N
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.

S138

ORGANIC MATTER TEST SET.

STANDARD: BS 1377

Formed by different bottles, reagents and accessories to perform about 50 tests for each of the soil factors on the following tests: pH - pH Nitrate - Ammonia - Nitrate Nitrogen etc.

S138

CHEMICAL ANALYSIS OF SOILS

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

ACCESSORY:

V300-30
Ion exchange resin, 500 g

Chloride and sulphate 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.

B073-01

Magnetic stirrer/heater

for titration and stirring of liquid and semi-solid materials.
Plate dia. 150 mm.
Variable speed and temperature by electronic regulators.
Supplied complete with magnetic teflon coated follower.
Power supply:
230 V 1 ph 50/60 Hz 700 W

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

V215-01

pH / mV / °C meter, portable, waterproof
Range pH: -2,00 to 16,00 - Resolut. 0,01 pH
mV: +/- 699,9 to +/- 1999 - Resolut. 0,1mV - 1mV
Temperature: -20,0 to 120,0°C - Resolut. 0,1°C
Automatic 1 or 2 points calibration with 3 memorised buffers.
Automatic temperature compensation.
Power supply: 9V battery, 100 hours use.
Supplied complete with: electrode, temperature probe, battery, calibration solutions.
Weight. 180 g

V215-01

NOTE: Complete range of pH meters at pag. 489

MOISTURE AND PARTICLE DENSITY OF SOILS

C279-02

A117 + A116-11 + A116-12

A028
Universal carbide meter

STANDARD: BS 6576 / AASHTO T217 / ASTM D4944
UNE 7804

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 pag. 30

SPARE-PART:

A028-11 Carbide Ampoules (pack of 100)

A028-11

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

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

A116-11

A116-12

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

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: 230 V 1ph 50/60 Hz

V023-01

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

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.

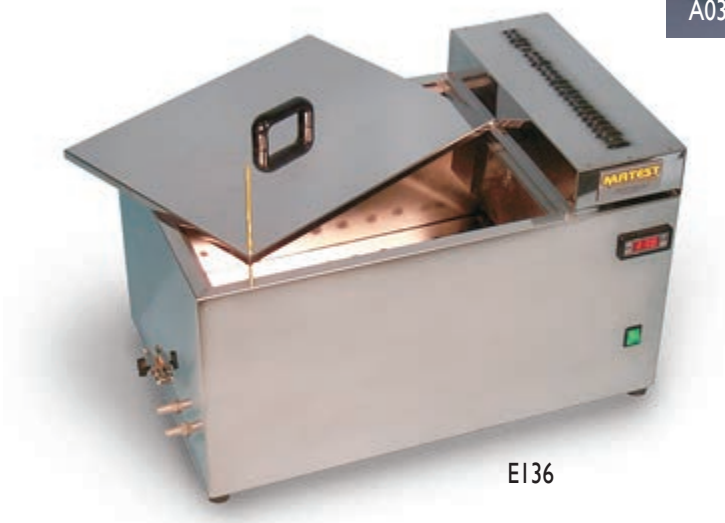
Temperature range: ambient to 90°C., accuracy +/- 0,5°C.

Internal dimensions: 510x350x230 mm

Overall dimensions: 680x420x420 mm

Power supply: 230V 1ph 50Hz 2000W

Weight: 28 kg approx.



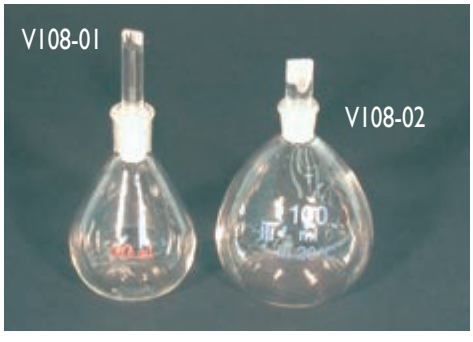
Specific gravity bottle, Gay Lussac type

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:

V108 Capacity 25 ml
V108-01 Capacity 50 ml
V108-02 Capacity 100 ml
V108-03 Capacity 250 ml



Desiccators borosilicate glass

Complete with perforated porcelain plate.

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

ACCESSORY:

V300-15 Desiccators salts Silica gel box 1000 g

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

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.

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

S155 KIT complete set

Particle size analysis of soils

Hydrometer method

STANDARDS: ASTM D422 / AASHTO T88 / UNE 103.102

This equipment 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)

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, circulation unit. 230V 1ph 50Hz 1000W

S155-10 GLASS 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.

NOTE: each item can be ordered separately.

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

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.

ACCESSORIES 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.

SPARE PARTS for S156-01 KIT Stirrer:

S156-11 Anti-splash baffle

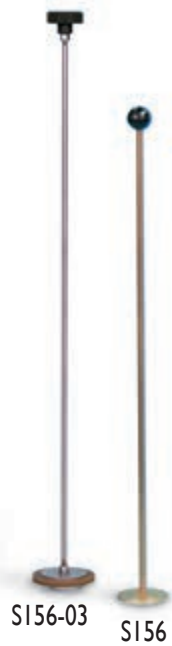
S156-12 Paddle

S156-13 Cup (beaker)

C306-03

S155 KIT

S156-01 KIT



S143-KIT complete set

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, dia. 90 by 50 mm height.

V172-03 SOIL HYDROMETER, long stem, 0.995 to 1030 g/ml. (BS, NF)

S155-04 GLASS TANK, dimensions: 600x300x380 mm.

S155-09 HEATER, **"professional type"**, complete with thermostat, cooling coil, circulation unit. 230V 1ph 50Hz 1000W

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 Separate 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 pag. 56

S157 KIT

Blue methylene 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 the aggregates. The set comprises:

S157-01 Electric stirrer adjustable from 400 to 700 rpm, complete with 70 mm dia. propeller. 230V 1ph 50/60 Hz

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 90 mm dia. (pack of 100)

S157-04 Glass rod dia. 8x300 mm

S157-05 2000 ml capacity plastic beaker

V300-28 Methylene blue, 100 g

V300-29 Kaolinite, 500 g

Total Weight: 10 kg

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.

To perform the test S157-01 and S157-06 devices are also needed.

Power supply: 230V 1ph 50Hz

Dimensions: 300x400x350mm approx. Weight: 10 kg

S158-20 KIT

Sand equivalent test set (complete)

ASSESSMENT OF FINE AGGREGATES

STANDARDS: **EN 933-8** / NF XP18-598 / CNR N.27
UNI 8520-15 / UNE 83131

The set comprises:

S158-03 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 EN/ASTM

S158-13 Weighted foot assembly for sand level

A052-37 Sieve, dia. 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

S158 KIT

Sand equivalent test set (complete)

STANDARDS: ASTM D2419 / AASHTO T176

The set is identical to mod. S158-20 KIT except:

S158-01 Plexiglass measuring cylinder, engraved at 100 and 380 mm, with transparent adhesive label, graduated in mm and inch (5 pieces)

S158-04 Measuring can 88 ml capacity

S158-07 Weighted foot assembly for sand level

A052-44 Sieve dia. 200 mm, opening 4,75 mm

S159-01 KIT

Sand equivalent test set (simple)

STANDARDS: **EN 933-8** / NF XP18-598 / UNI 8520-15
CNR N.27 / UNE 83131

The set comprises:

S158-03 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 EN/ASTM

S158-13 Weighted foot assembly for sand level

S158-09 Concentrated stock solution, 1000 ml

Total Weight: 5 kg

S159 KIT

Sand equivalent test set (simple)

STANDARDS: ASTM D2419 / AASHTO T176

The set comprises the items of mod. S159-01 KIT, except:

S158-01 Plexiglass measuring cylinder engraved at 100 and 380 mm, with transparent adhesive label, graduated in mm and inch (4 pieces).

S158-04 Measuring can 88 ml capacity

S158-07 Weighted foot assembly for sand level

NOTE: Each item can be ordered separately.

ACCESSORIES:

S159-11

Carrying case, plastic, housing the sand equivalent set mod. S159 KIT, or S159-01 KIT except the bottle V121

S158-08 Metallic funnel, conforming to **EN 933-8** / NF XP18-598 UNI 8520/15 Specifications.

Measuring Cylinders

Available Models :

S158-01
PLEXIGLASS MEASURING CYLINDER, engraved at 100 and 380 mm, with transparent adhesive label graduated in mm and inches.
STANDARDS: ASTM D2419
AASHTO T176

S158-01 S158-01G S158-03

IN ALTERNATIVE:

S158-01G
PLEXIGLASS MEASURING CYLINDER, engraved at 100 and 380 mm with additional **"engraved scale from 0 to 380 mm"**
STANDARDS: ASTM D2419 / AASHTO T176

S158-03
PLEXIGLASS MEASURING CYLINDER, engraved at 100 and 380 mm
STANDARDS: EN 933-8 / NF XP18-598
CNR N. 27 / UNI 8520-15
UNE 83131

S160 N

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 S160-01 N)
Power supply: 230V 1ph 50 Hz 250 W
Dimensions: 700x360x350 mm.
Weight: 30 kg

S160 N + S158-03 + S158-02

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

S160-01 N

Motorized sand equivalent shaker

As described, 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.

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

S170-05 S170 S170-01

LIQUID LIMIT: casagrande method

STANDARDS: ASTM D4318 / CEN ISO / TS 17892-12
AASHTO T89 / UNI 10014 /NF P94-051,
comparable to: BS 1377:2 / UNE 103 103-94

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 operatred through crank (left or right side)
- motor operated at 120 drops/min speed, ensuring better uniformity and accuracy

MODELS:

S170

Liquid limit device

Hand operated with **"left side crank"** and hard rubber base.

STANDARDS: ASTM D4318 / UNI CEN ISO / TS 17892-12
AASHTO T89 / UNI 10014,
comparable to: BS 1377:2 / UNE 103 103-94

Weight: 3 kg

S170-05

Liquid limit device

Hand operated.

Same to mod. S170, but with **"right side crank"**.

S170-01 Liquid limit device

Hand operated with bakelite base, chromed cup.
STANDARD: NF P94-051. Weight: 3 kg

S172

Liquid limit device

Motor operated with hard rubber base.

STANDARDS: ASTM D4318 / UNI CEN ISO / TS 17892-12
AASHTO T89 / UNI 10014,
comparable to: BS 1377:2 / UNE 103 103-94

Power supply : 230V 1ph 50Hz. Weight: 4,5 kg

S172-01 Liquid limit device STANDARD: NF P94-051

Motor operated with bakelite base, chromed cup.

Power supply: 230V 1ph 50 Hz. Weight: 4,5 kg

S172 S172-01

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 T79 Spec.

S173-04 Grooving tool, to ASTM D 4318 Specifications

S173-04P Grooving tool, hard plastic made. Pack of 10 pcs. Standard: ASTM D 4318

S173-05 Grooving tool, to NF P94-051 Specifications

S173-06 Grooving tool, to BS 1377:2 Specification

S173-06P Grooving tool, hard plastic made. Pack of 10 pcs. Standard: BS 1377:2

S173-04P

S173-01 S173-08 S173-02 S173-07 S173-04 S173-05 S173-03 S173-06

SPARE PARTS:

S173-01 Brass cup. (ASTM, BS, UNI, UNE, AASHTO).

S173-07 Chromed cup (NF P94-051).

S173-08 Coupling piece between cup and device, hand operated models

S173-09 Coupling piece between cup and device, motor operated models

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, dia. 45x12,7 mm (2 pieces)
V122-03 Crystallizing dish, dia. 57x32 mm
S175-03 Shrinkage prong plate, made from plexiglass material with three metal prongs
S175-04 Glass evaporating dish, dia. 120 mm flat bottom
V100-01 Graduated cylinder 25 ml. capacity
V192 Flexible spatula, 100 mm. blade

Weight: 2 kg

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
CEN ISO-TS 17892-12

The plastic limit determines the lowest moisture content of a soil, by wich a sample can be rolled into threads 3 mm. dia. 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 3 mm dia.
V114-03 Mixing porcelain dish 120 mm dia.
V192 Flexible spatula, 100 mm. blade
V122 Aluminium moisture tins dia. 55x35 mm. (Q.ty 6)

Weight: 5 kg

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:

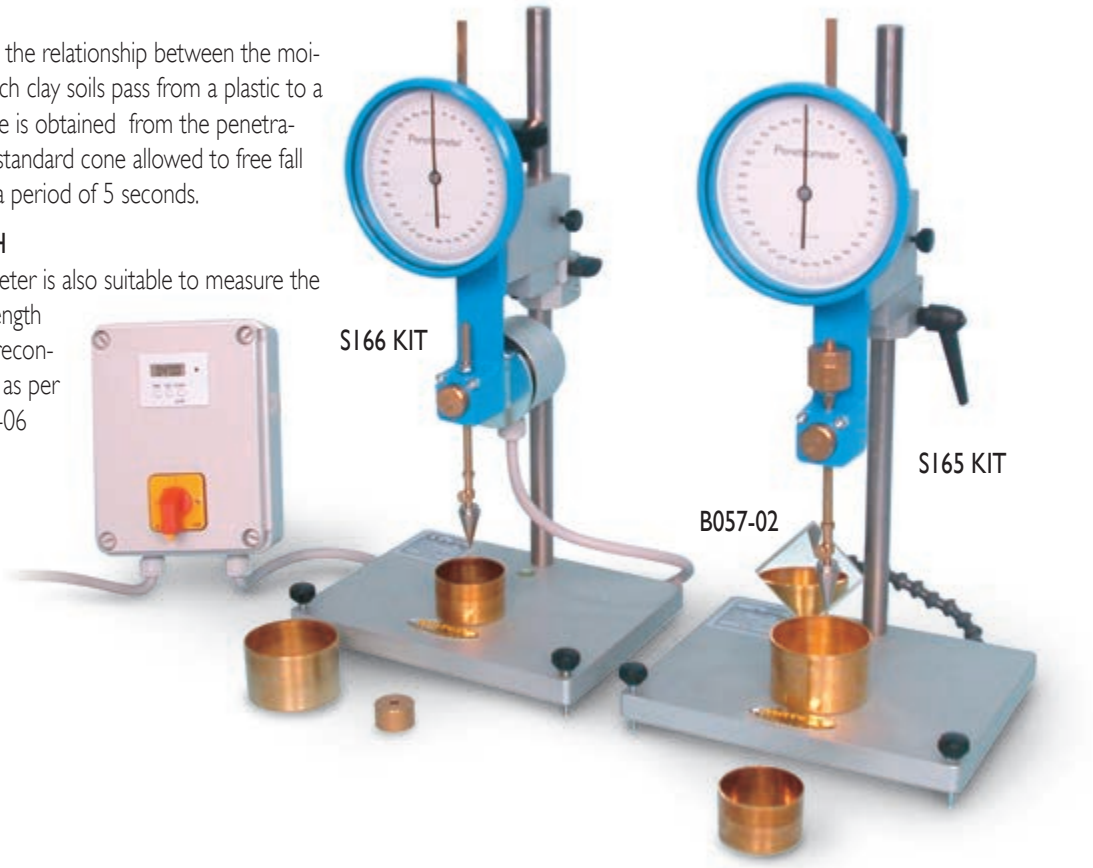
- **Liquid Limit determination.** STANDARDS: CEN ISO/TS 17892-12 / BS 1377:2 / NF P94-052-1
- **Shear Strength determination.** STANDARD: CEN ISO/TS 17892-06

LIQUID LIMIT

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

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 dia. 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 50Hz 200W
Dimensions: 220x280x410 mm
Weight: 15 kg approx.

ACCESSORIES:

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 60g 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 400g (shear strength test)

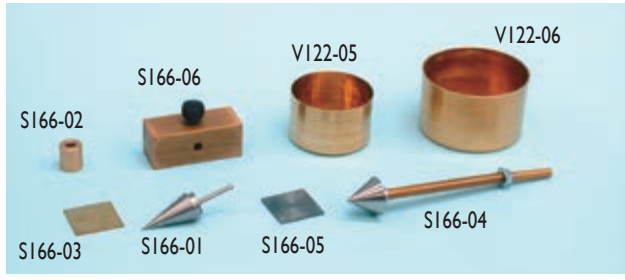
SPARE PARTS:

S166-01 Test cone 35 mm long and 30° angle.

S166-02 Weight 20g to be added to the cone 30° angle, to get a total weight of 100g

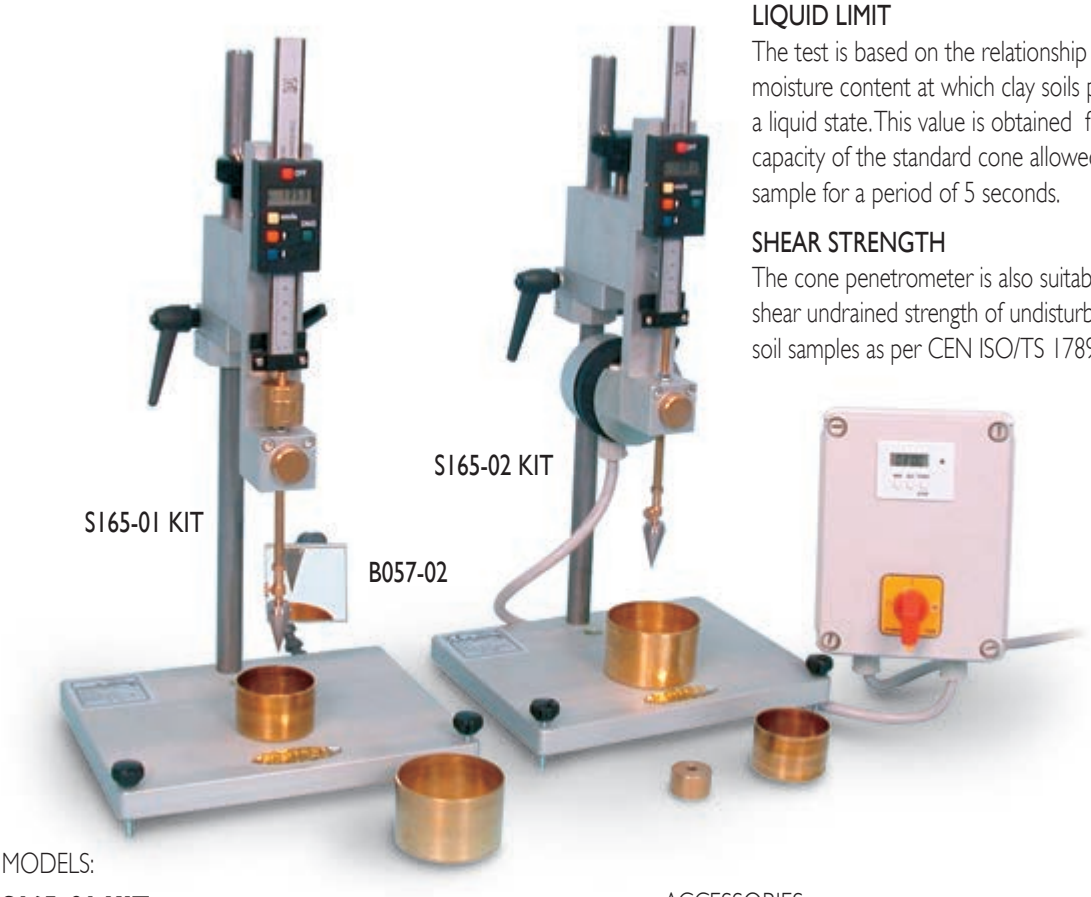
V122-05 Brass cup dia. 55x35 mm

V122-06 Brass cup dia. 70x45 mm



Cone penetrometer method for:

- **Liquid Limit determination.** STANDARDS: CEN ISO/TS 17892-12 / BS 1377:2 / NF P94-052-1
- **Shear Strength determination.** STANDARD: CEN ISO/TS 17892-06



LIQUID LIMIT

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

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:

S165-01 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 dia. 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 50Hz 200W
Dimensions: 220x280x410 mm
Weight: 15 kg approx.

ACCESSORIES:

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 60g 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 400g (shear strength test)

SPARE PARTS:

S166-01 Test cone 35 mm long and 30° angle.

S166-02 Weight 20g to be added to the cone 30° angle, to get a total weight of 100g

V122-05 Brass cup dia. 55x35 mm

V122-06 Brass cup dia. 70x45 mm

PROCTOR TEST: MOISTURE-DENSITY RELATIONSHIP

STANDARDS: **EN 13286-2** / ASTM D558, D698, D1557 / AASHTO T99, T134, T180 / BS 1377:4, 1924:2
CNR N° 69 / NF P94-093, P98-231-1 / DIN 18127 / NLT-108-91 / UNE 103-500, 103-501

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:

Code	Description Proctor Mould	Standards	Int. dia. mm	Body height mm	Volume ml	Weight kg
S185	Standard	ASTM / AASHTO / NF / CNR	101,6	116,4	944	4,5
S186	Modified	ASTM / AASHTO / CNR	152,4	116,4	2124	10
S189	Split Standard	ASTM / AASHTO / NF / CNR	101,6	116,4	944	5
S190	Split Modified	ASTM / AASHTO / CNR	152,4	116,4	2124	10
S190-01 KIT	Modified	NF	152	152	2758	10
S190-02 KIT	Split Modified	NF	152	152	2758	11
S191	Standard	BS	105	115,5	1000	5
S191-01	Standard	UNE 103-500	102	122,4	1000	5
S191-02 KIT	Modified	UNE 103-501, NLT-108-91	152	127	2320	10
S194*	Standard	EN 13286:2 comparable to DIN	100 ± 1	120 ± 1	942	9
S194-01 KIT*	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 KIT*	Split Standard	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, S190-01KIT, S190-02KIT, S191, S191-01, 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 pag. 400) can be used.

MODELS:

Code	Description	Standards	Rammer dia. mm	Fall height mm	Rammer weight kg	Total weight kg
S187	Standard Proctor rammer	ASTM / AASHTO CNR / UNE / 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 / AASHTO CNR / UNE / NLT / 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** / DIN 18127

Used to compact the EN moulds, it is supplied complete with T handle, plated against corrosion.

MODELS:

S194-09
PLATE, dia. 99,5 mm thickness 10 mm

S194-10
PLATE, dia. 149,5 mm thickness 10 mm

S194-11
PLATE, dia. 249,5 mm thickness 20 mm

Cutting collar

Coupled to the Proctor mould body, it gets easier the soil sampling

MODELS:

S185-01 Dia. 4"
S200-09 Dia. 6"

S114
UNIVERSAL EXTRUDER for moulds dia. 100, 150 mm; 4", 6"
Technical details at pag. 384

S199

Automatic, programmable PROCTOR / CBR Compactor with microprocessor, "high technology"

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 to 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, 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.

Data introduction screen

S199-11

S199 with mould and rammer

The compactor accepts moulds having dia. 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: 165 kg

NEEDED ACCESSORIES:

S199-06 STANDARD RAMMER 50 +/- 0,2 mm dia. and 2500 +/- 10 g weight

S199-07 MODIFIED RAMMER 50 +/- 0,2 mm dia. and 4535 +/- 5 g weight

Conforming to: EN 13286-47 / BS 1377:4 / DIN 18127 UNE 7255, 7365, 103-501-94 Standards.

OR:

S199-08 STANDARD RAMMER 50,8 +/- 0,13 mm dia. and 2491,25 +/- 1,25 g weight

S199-09 MODIFIED RAMMER 50,8 +/- 0,13 mm dia. and 4537 +/- 3 g weight

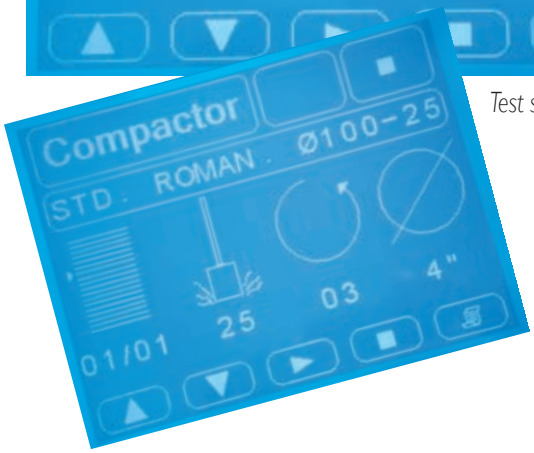
Conforming to: ASTM D558, D559, D698, D1557, D1883 NF P94-066/93 / CNR UNI 10009 CNR N. 69 / ASHTO T99, T180, T193

OR:

S199-13 STANDARD RAMMER, 50 ± 0,4 mm dia. and 2700 ± 10 g weight

S199-14 STANDARD RAMMER, 50 ± 0,4 mm dia. and 4900 ± 10 g weight

Conforming to: AS 1289 (Australian) Standard.



Test screens

S199 + **S199-12** with accessories

ACCESSORIES:

S199-11

SAFETY GUARDS to CE Directive. If the door is opened when the Compactor is working, it stops automatically.

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,

SPARE PARTS:

S198-22 Calibrated rod holding the rammer.

S198-23 Kit of two devices fixing the mould to the table.

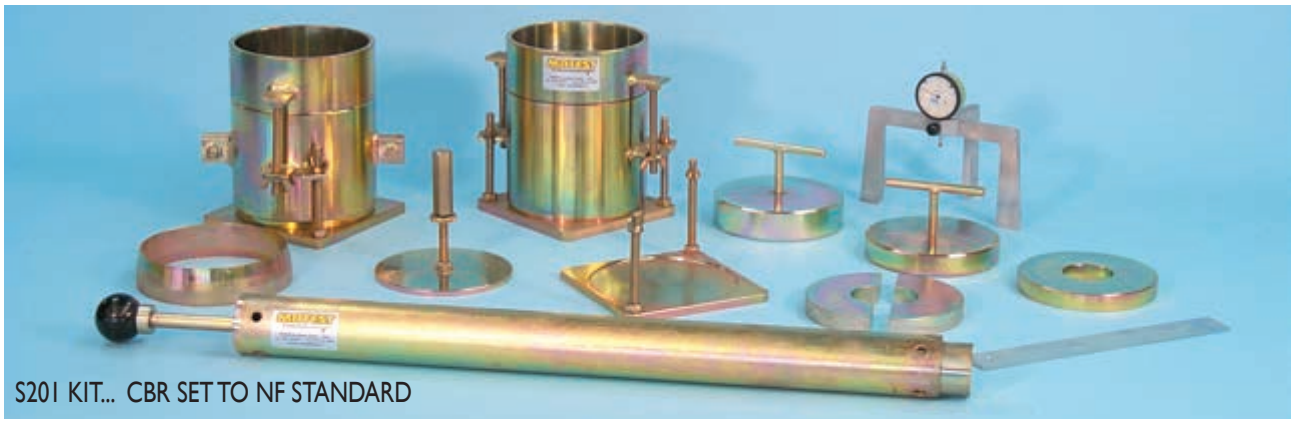
CALIFORNIA BEARING RATIO - CBR

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

S200-01... CBR SET TO ASTM, AASHTO, CNR/UNI, UNE STANDARDS


S201 KIT... CBR SET TO NF STANDARD

S202 KIT... CBR SET TO BS, EN 13286-4 STANDARDS

S203 KIT... 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

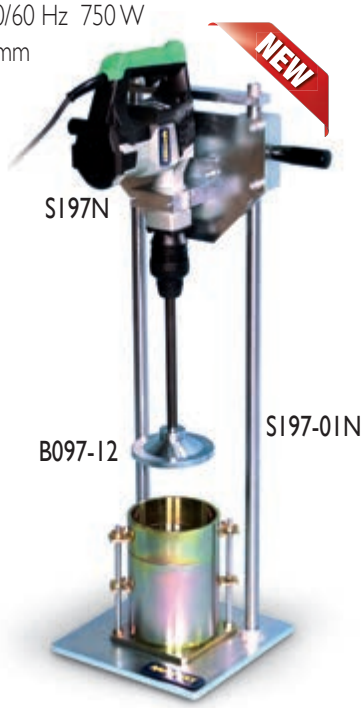
Description	Standards			
	ASTM D1883 CNR UNI 1009 UNE 103-502 AASHTO T193	EN 13286-47	NF P94-078 NF P94-093 NFP98-231-1	EN 13286-4 BS 1377:4 BS 1924:2
CBR mould complete with collar and perforated base:				
Dia. 6" (152,4 mm) x 7" (177,8 mm) height	**S200-01**			
Dia. 150 mm x 120 mm height		**S203 KIT**		
Dia. 152 mm x 152 mm height			**S201 KIT**	
Dia. 152 mm x 127 mm height				**S202 KIT**
Split CBR mould with collar and peforated base:				
Dia. 6" (152,4 mm) x 7" (177,8 mm) height	**S200-13**			
Dia 150 mm x 120 mm height		**S203-01 KIT**		
Dia 152 mm x 152 mm height			**S201-01 KIT**	
Solid base plate for CBR mould	**S200-12**	**S194-15**	**S201-12**	**S202-03**
Perforated base plate for CBR mould	**S200-10**	**S194-14**	**S201-10**	**S202-10**
Filter screen, stainless steel dia. 149 mm mesh 0,150 mm (ASTM n° 100)	**S200-02**	**S200-02**	**S200-02**	**S200-02**
Spacer disc with "T" handle:				
Dia. 5 15/16" (150,8 mm) x 2,416" (61,4 mm) height	**S200-03**			
Dia. 149,5 x 36 mm height		**S194-21**		
Dia. 151 x 25,4 mm height			**S201-02**	
Dia. 151x36 mm height			**S201-06**	
Dia. 150x50 mm height				**S202-07**
Perforated (sweel) plate with adjustable stem	**S200-04**	**S194-23**	**S200-04**	**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**	**S188-01**	**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 dia. 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 pag. 384)	**S114**	**S114**	**S114**	**S114**

S197N

Vibrating compaction hammer

STANDARDS: **EN 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 pag. 78).
Supplied without tampers and support frame which must be ordered separately.
Power supply: 230 V 1ph 50/60 Hz 750 W
Dimensions: 105x430x270 mm
Weight: 7 kg



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.
Weight: 70 kg

B097-12
CBR and Proctor Tamping foot, 146 mm dia., complete with shank.

COMPRESSIVE STRENGTH OF SOIL-CEMENT MIXTURES
STANDARD: **EN 13286-41, 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 pag. 342) or concrete (see pag. 168 ÷ 219) machines are suitable to perform this test.

Determination of strength of stabilized soil

STANDARDS: **EN 13286-53** / 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 dia. 50 by 122 mm to obtain specimen dia. 50x50 mm high of fine and medium grained soil (NF)
S195-02 Mould dia. 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 dia. 100 by 242 mm to obtain specimen dia. 100x100 mm high of coarse grained soil (EN, BS)
S195-20 Mould dia. 100 by 342 mm to obtain specimen dia. 100x200 mm high of coarse grained soil (EN, BS)
S195-03 Base and upper piston dia. 50 by 36 mm
S195-16 Base and upper piston dia. 100 by 71 mm
S195-04 Penetration and demoulding piston dia. 50 by 125 mm
S195-05 Penetration and demoulding piston dia. 50 by 175 mm
S195-17 Penetration and demoulding piston dia. 100 by 245 mm
S195-21 Penetration and demoulding piston dia. 100 by 345 mm
S195-09 Collecting cylinder dia. 56 by 60 mm
S195-10 Collecting cylinder dia. 56 by 110 mm
S195-18 Collecting cylinder dia. 106 by 110 mm
S195-22 Collecting cylinder dia. 106 by 210 mm
S195-11 Set of 2 displacing collars dia. 50 by 5 mm
S195-06 Set of 2 displacing collars dia, 50 by 6 mm
S195-12 Set of 2 displacing collars dia. 50 by 8,33 mm
S195-23 Set of 2 displacing collars dia. 50 by 10 mm
S195-07 Set of 2 displacing collars dia. 50 by 12,5 mm
S195-24 Set of 2 displacing collars dia. 50 by 16,66 mm
S195-08 Set of 2 displacing collars dia. 50 by 25 mm
S195-13 Set of 2 displacing collars dia. 100 by 10 mm
S195-14 Set of 2 displacing collars dia. 100 by 16,66 mm
S195-25 Set of 2 displacing collars dia. 100 by 20 mm
S195-19 Set of 2 displacing collars dia. 100 by 25 mm
S195-27 Set of 12 displacing collars dia. 100 by 33,33 mm
S195-28 Set of 2 displacing collars dia. 100 by 50 mm

RELATIVE DENSITY OF COHESIONLESS SOIL

VIBRATING TABLE METHOD

This test covers the determination of the maximum dry density and the water content (humidity/density ratio) of cohesionless mixtures to be used in road construction, and where the max density by the impact method is lower than the vibratory method.
The relative density set is proposed in two versions according to EN or ASTM Specifications:

S238 KIT

Relative density of cohesionless soils

STANDARD: **EN 13286-5**
The set is composed by:

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.

S238-11 Relative density mould 0,5 cu. ft. capacity with accessories.
S238-12 Surcharge weight and base with handle to EN for the 0,5 cu. ft. mould.
S238-16 Relative density gauge measuring set.
Power supply: 230V 1ph 50/60Hz
Total weight: 290 kg approx.

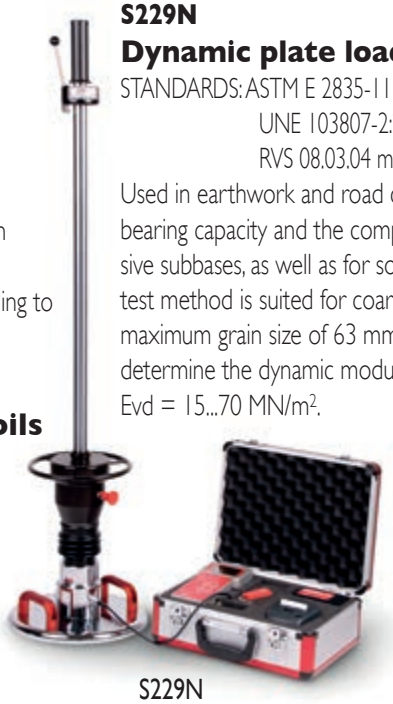
S238-01 KIT

Relative density of cohesionless soils

STANDARDS: ASTM D4253, D4254
The set is composed by:

S238-10 Vibrating electromagnetic table, as above described.
S238-11 Relative density mould 0,5 cu. ft. capacity + accessories.
S238-13 Relative density mould 0,1 cu. ft. capacity + accessories.
S238-14 Surcharge weight and base with handle to ASTM for the 0,5 cu. ft. mould.
S238-15 Surcharge weight and base with handle to ASTM for the 0,1 cu. ft. mould.
S238-16 Relative density gauge measuring set.
Power supply:
230V 1ph 50/60Hz
Total weight:
310 kg approx.

S238-01 KIT



S229N

S229N

Dynamic plate load test Light Weight Deflectometer

STANDARDS: ASTM E 2835-11 / TP BF-StB part B 8.3
UNE 103807-2:2008 / TB 10102-2004, J338-2004
RVS 08.03.04 march 2008

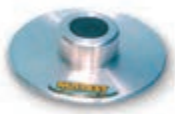
Used in earthwork and road construction to determine the soil bearing capacity and the compaction quality of soils and non cohesive subbases, as well as for soil improvement applications. The test method is suited for coarse-grain and mixed-grain soil having maximum grain size of 63 mm. The test method may be used to determine the dynamic modulus of deformation of soil in the range Evd = 15...70 MN/m^2.

ADVANTAGES over the static plate load tester:
- Immediate evaluation of each measurement
- Only 2 minutes per measurement point
- Time and cost-saving
- Easy to handle by one person
- Testing in location not really accessible

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 - choose, confirm, ready!
- Individual adjustment possibilities
- USB interface, GPS and thermal printer
- Max. impact force: 7,07 MN/m^2
- Duration of the impact 17 ms
- Load plate dia. 300x20 mm
- Temperature range 0 bis 40° C
- Storage capacity 1000 series of measured data
- Language for menu navigation selectable
- Made in Germany, certified production

The tester is supplied complete with loading unit, load plate, measuring instrument and application video on USB stick (in carrying case).
Printer, GPS and PC-Software are optional.
Total Weight: 30 kg



S229-14

ACCESSORIES:

S229-05 DROP weight of 15 kg with max. impact force of 10605N, complete of calibration certificate.
S229-10 PROTOCOL SOFTWARE. Add information about the measuring point and use the comfortable user interface for issuing and easy-view archiving of representative A4-protocols.
S229-11 THERMAL PRINTER. Small, quick printer with light resistant thermal paper.
S229-12 EXTERNAL GPS-Receiver. To proof the exact coordinates of the measuring point.
S229-13 TRANSPORT CART. Collapsible, for long distances at the site.
S229-14 MAGNETIC BASE PLATE. For proper positioning of loading unit.
S229-15 TRANSPORT BOX. Wood, for the safe transport and storage.

S131 KIT

Unconfined compression tester

STANDARDS: ASTM D2166 / AASHTO T208 / 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 dia. 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 10 x 0,01 mm

S212-03 Dial gauge holder

Dimensions: 380x460x1380 mm

Weight: 68 kg

S131 KIT

S210 KIT

CBR loading machine, hand operated, field model

STANDARDS: ASTM D1883 / AASHTO T193 / BS 1377:4
NF P94-078 / 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 10 x 0,01 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

Field CBR test set

STANDARDS: BS 1377:7 , 1924:2 / ASTM D4429
CNR UNI 10009

Used to determine quickly and efficiently the bearing capacity of soils on road constructions, foundations, road subgrades etc.

The S220KIT tester comprises:

S221-01 Mechanical jack 50 kN capacity

S370-09 Load ring 40 kN capacity

S212-01 CBR penetration piston

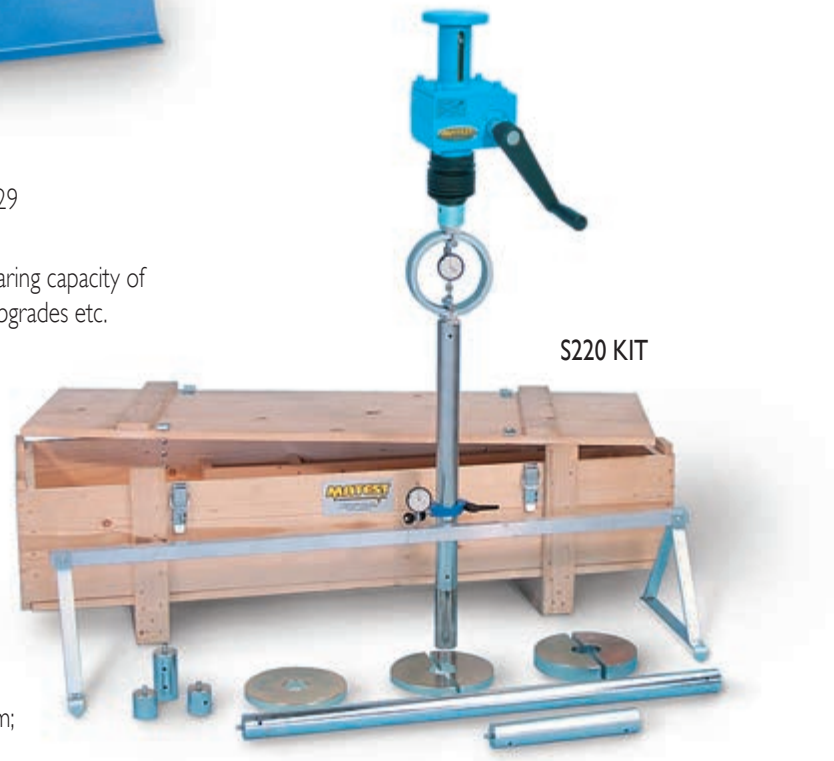
S377 Dial gauge 25 x 0,01 mm

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.



S220 KIT

CBR TESTING MACHINES

STANDARDS: **EN 13286-47** / ASTM D1883 / BS 1377-4:1990 / AASHTO T193 / CNR UNI 10009 / 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 10 x 0,01 mm
S212-03 Dial gauge holder
Dimensions:
430x380x1180 mm
Weight: 80 kg

S209 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: 230 V 1ph 50 Hz

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.

S211 KIT

CBR loading machine motorized, 50 kN 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 10 x 0,01 mm
S212-03 Dial gauge holder
Power supply: 230 V 1ph 50 Hz 750 W
Dimensions:
430x380x1180 mm
Weight: 98 kg

S211 KIT

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.

...follows...

S212N

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 (only with load cell 2,5 kN capacity mod. S337-31 and S215A frame. See page 410)

The speed rate is infinitely variable, easily and promptly selected.
Graphic display ¼ VGA color 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: 480x450xh1280 mm
Weight: 140 kg

ACCESSORIES for S212N and S213N 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 10 x 0,01 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

UNCONFINED test:

S212-08N	Upper + lower compression plates, dia. 100 mm + distance piece with rod
S212-03	Dial gauge holder
S376	Dial gauge 10 x 0,01 mm
S370-02S	Load ring 2kN with electric stop safety device
S374	Brake device to hold max. load

S213N

CBR/Marshall 2 speeds frame 50 kN

The frame is provided of two fix speed ranges, easily selectable by a frequency changer (inverter) activated by an electric switch:
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 50/60 Hz 750W
Dimensions: 450x400x1200 mm
Weight: 130 kg

S213-01N

CBR/Marshall 2 speeds frame 50 kN

Identical to mod. S213N but with speed ranges:
1 mm/min. for CBR tests
50,8 mm/min for Marshall tests.

S212N
with accessories for CBR test

S213N
with accessories for Marshall test

LOAD TEST FRAMES:

- CBR
- TWO SPEEDS
- UNIVERSAL MULTISPEED

COMBINED WITH "CYBER-PLUS 8 EVOLUTION", COMPUTERIZED TOUCH-SCREEN DIGITAL DISPLAY SYSTEM

Technical Specifications:
The frame is the same as for the previous load frames (mod. S211 KIT to S213N), 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 at pag. 412, Hardware technical details at pag. 24), 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, pag. 407
SUPPLIED COMPLETE except the software (see next page mod. S218N).

S216 KIT + CBR accessories

S214N KIT + MARSHALL accessories

S214N KIT NEW

CBR/Marshall 2 speeds load frame digital, computerized

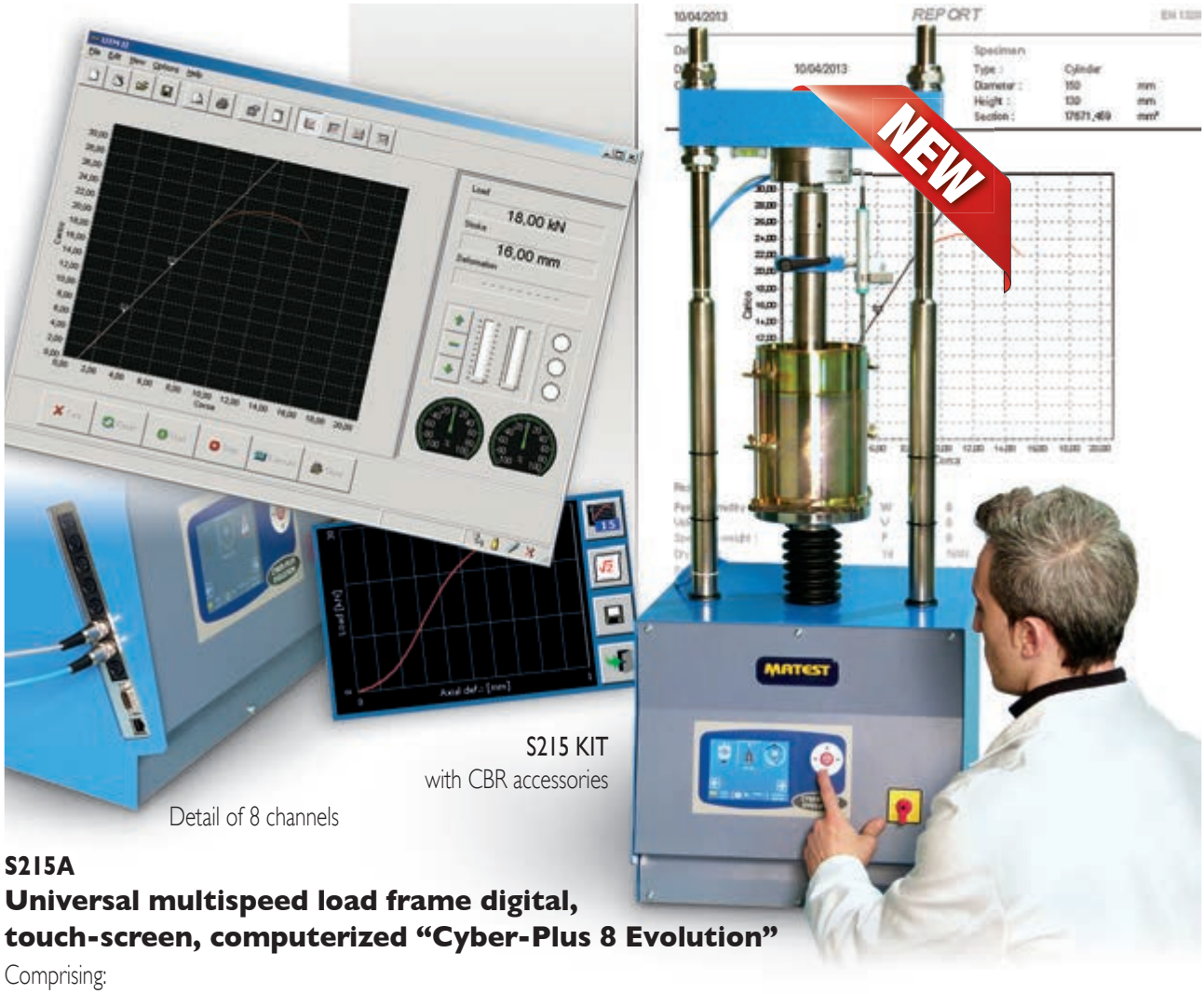
The frame is provided of two fix speed ranges, easily selectable by an electric switch:
1,27 mm/min. for CBR tests
50,8 mm/min for Marshall tests.
Technical details of the frame: see mod. S213N, pag. 408
Supplied complete with "Cyber-Plus 8 Evolution" system, load cell and displacement transducer, but **"without"** accessories and Software for CBR and Marshall tests, to be ordered separately (see accessories at next page).

S214-01N KIT NEW

CBR/Marshall 2 speeds load frame digital, computerized

Identical to mod. S214N KIT but with speed ranges:
1 mm/min. for CBR tests
50,8 mm/min for Marshall tests.

...follows...



Detail of 8 channels

S215 KIT
with CBR accessories

S215A

Universal multispeed load frame digital, touch-screen, computerized "Cyber-Plus 8 Evolution"

Comprising:

S212N Universal multispeed load frame 50 kN, touch-screen.
Technical spec.: see page 408

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 50kN capacity, complete with cable and connector.

S336-14 Linear Displacement Transducer 50mm 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).

ACCESSORIES FOR THE 2 SPEEDS AND THE MULTISPEED LOAD FRAMES, MOD. S214N 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, 100 mm dia. + distance piece with rod

SOFTWARES FOR THE FRAMES COMBINED WITH "CYBER-PLUS 8 EVOLUTION" SYSTEM:

S218N SOFTWARE UTM2 (Universal Testing Machine 2)
Licence for **CBR** Test
Standards: **EN 13286-47** / CNR UNI 10009 / ASTM D1883
BS 1377 / NF P94-078

S218-01N SOFTWARE UTM2 (Universal Testing Machine 2)
Licence for **UNCONFINED** test
Standard: ASTM D2166

B043-01N SOFTWARE UTM2 (Universal Testing Machine 2)
Licence for **MARSHALL** test
Standards: **EN 12697-34** / CNR N. 30 / ASTM D1559
BS 598 :107 / NF P98-251

B043-02N SOFTWARE UTM2 (Universal Testing Machine 2)
Licence for **TENSILE SPLITTING** test
Standards: **EN 12697-23** / CNR N. 134 / ASTM D4123

Description and technical details of Software UTM2: see pag. 14

C127N Graphic printer on thermo paper on board. (only for S214N KIT model)

H009-01 PERSONAL COMPUTER, complete with LCD monitor 17", keyboard, mouse, connection cables, installation and setting up of the purchased software.

C128 Laser printer, for the graphics and test certificate printing, with direct connection to Cyber-Plus 8.

RAPPORTO DI PROVA CBR
13,819 kN
15,24 mm
13,013 kN
MATEST
CBR TESTER

B044N SET

B044N-SET

Cyber-Plus 8 Evolution "Touch-Screen"

Acquisition and data processing system. 8 channels.
Developed for the implementation and upgrading of any type of existing machines (even not manufactured by Matest) applicable to:

- CBR loading machine motorized mod. S211 KIT.
- CBR/Marshall 2 speeds load frame mod. S213N.
- Marshall mechanical load frame mod. B042 KIT.

Cyber-Plus 8 Evolution allows:

- Acquisition up to 8 analogical/digital channels: load cell and linear displacement potentiometric vertical and/or horizontal transducers.

To perform the following tests:

- CBR TEST: **EN 13286-47** / CNR / UNI 10009
  ASTM D1883 / BS 1377 / NF P94-078.
- UNCONFINED TEST: ASTM D2166
- MARSHALL: **EN 12697-34** / ASTM D1559 / CNR N. 30
  NF P98-251-2 / BS 598 :107
- INDIRECT TENSILE TEST: **EN 12697-23** / ASTM D4123
- DETERMINATION OF THE WATER SENSIBILITY OF BITUMINOUS SPECIMENS: **EN 12697-12**
- Remote control of the digital unit through PC and UTMII software

Hardware specifications:

- 8 indipendent channels available for the load cells or potentiometrics transducers or strain gages for load, deformation 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.
- Automatic calculation and visualization of all the results according to the Standard.
- 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.)
- Safety function for automatic machine stop at max. reached load and deformation of the strain transducer.
- 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 pag. 24

B044N-SET is composed by:

B044N
CYBER-PLUS 8 EVOLUTION, Unit for data acquisition, as described
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, 50mm stroke, independent linearity +/- 0,1% complete with cable and connector

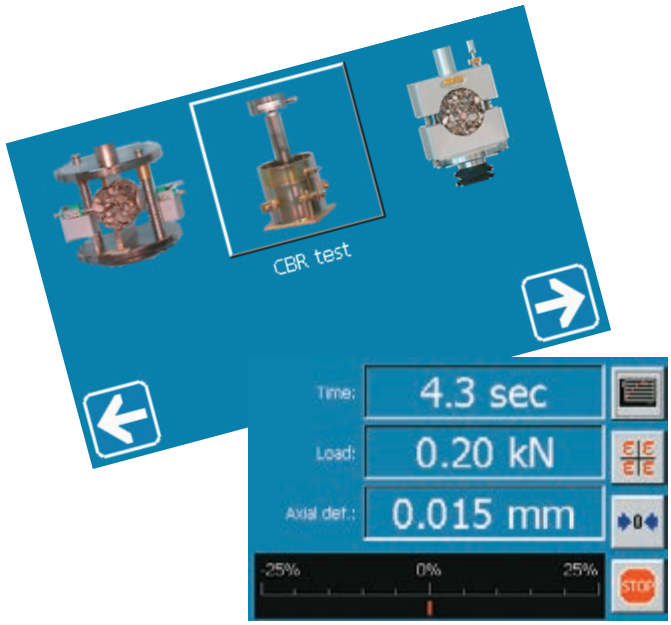
Accessories for fixing the load cell and transducer to the test machine.
The system is supplied fully calibrated with calibration certificate, and ready for use.
Every item can be ordered separately.

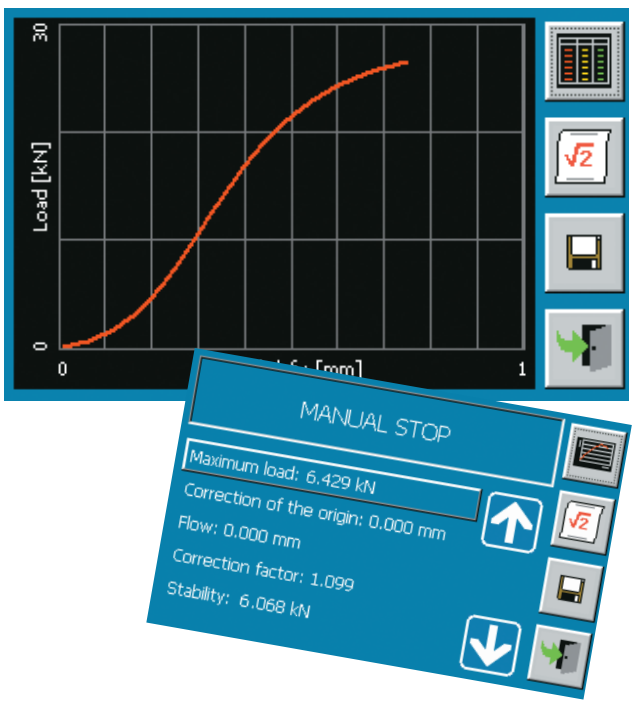
ACCESSORIES:

S218N
SOFTWARE UTM2 (Universal Testing Machine 2)
Licence for **CBR** Test
Standards: **EN 13286-47** / CNR/UNI 10009 / ASTM D1883
BS 1377 / NF P94-078

S218-01N
SOFTWARE UTM2 (Universal Testing Machine 2)
Licence for **UNCONFINED** Test
Standards: ASTM D1883

B043-01N
SOFTWARE UTM2 (Universal Testing Machine 2)
Licence for **MARSHALL** test
Data processing program for "X-Y STABILITY/FLOW"
Standards: **EN 12697-34** / CNR N. 30 / ASTM D1559
BS 598 :107 / NF P98-251-2





B043-02N
SOFTWARE UTM2 (Universal Testing Machine 2)
Licence for **INDIRECT TENSILE STRENGTH**
Standards: **EN 12697-23** / CNR N. 134 / ASTM D4123

Description and technical details of Software UTM2: see pag. 14

C127N Graphic printer on thermo paper on board.

H009-01
PERSONAL COMPUTER, complete with LCD monitor 17", 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.

S205

UNITRONIC 50 kN, UNIVERSAL MULTIPURPOSE COMPRESSION/FLEXURAL AND TENSILE FRAME FOR:

- COMPRESSION / FLEXURAL TESTS, 50 kN MAX. CAPACITY LOAD
- TENSILE TESTS, 25 kN MAX. CAPACITY LOAD (option mod. S205-05)

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

Concrete:
- FLEXURE ON BEAMS
- FLEXURE ON TILES

Cement:
- FLEXURE on 40x40x160mm specimens,
- COMPRESSION on cubes 40, 50, 70mm
- TENSILE on mortar briquettes (option mod. S205-05)

Metal, plastic, wires, ropes, textiles, papers etc.
- TENSILE TESTS, 25kN max capacity load (option mod. S205-05)

Clay blocks:
- PUNCHING

Rock and stones:
- UNIAXIAL SPLITTING TENSILE

Various materials:
By using suitable devices, Unitronic tester, within the limits of its max. 50 kN capacity for compression/flexural and 25 kN for tensile (see model S205-05), 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 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.

Hardware and software specifications:
- Negative blue graphic display **"320 x 240 pixel"**
- 4 analogue A/D outputs for transducers or load cells.
- Permanent memory and clock calendar
- Fully automatic test processing with real time acquisition and visualization of the load/displacement or deformation, curve load/time/deformation.
- Memory of more than 100 tests, with possibility to display/delete tests from the file storage
- Multi-languages function: Italian, English, French, Spanish

Technical data:
- Maximum compression capacity: 50kN
- Maximum tensile capacity: 25kN (model S205-05)
- Adjustable testing speed from 0,01 to 51mm/minute
- Adjustable pace rate from 1 to 15000N/sec.
- Max. ram travel: 100mm
- Daylight between columns: 380mm
- Max. vertical daylight: 850mm

Power supply: 230V 1F 50/60Hz 1500W
Dimensions: 500x450x1450mm
Weight: 130 kg approx

S205 / S205-05 with load cell

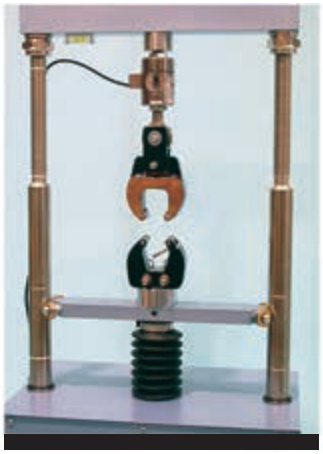
S205-05

UNITRONIC Compression / Tensile

The Unitronic frame S205 is modified and improved to perform also tensile tests with max. capacity of 25 kN.
(Note: this modification is possible only in MATEST factory)

CBR Test

Quick Triaxial



Tensile test on mortar briquettes

Clay Blocks Punching

Marshall Test

Tensile tests on metals, plastics, wires, textiles etc.

Direct shear (Leutner)

Cement Compression

Splitting Tensile

Cement Flexure

Unconfined Compression

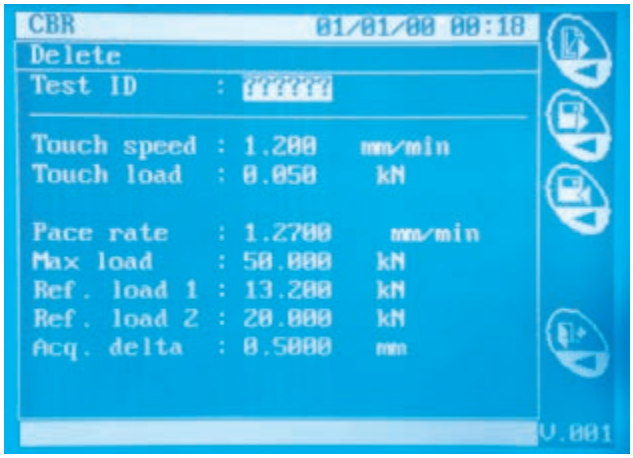
Concrete Flexure

Tile Flexure

Uniaxial Rock Splitting Tensile

S205: ACCESSORIES

UNITRONIC: SCREEN EXAMPLES



CBR Test

Main screen

S205 / S205-05

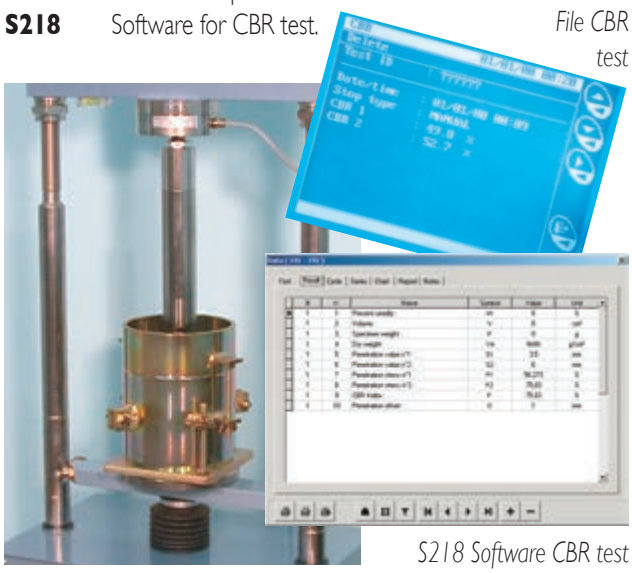
UNITRONIC, specific applications:

CBR: California Bearing Ratio test

Standards: **EN 13286-47:2006** / ASTM D1883 / BS 1377:4
AASHTO T193 / NF P94-078 / UNE 103-502
CNR UNI 10009

Test development with displacement control.

S205 Unitronic 50 kN
S337-34 Strain gauge load cell, 50 kN capacity.
S212-01 Penetration piston.
S218 Software for CBR test.



File CBR test

S218 Software CBR test

S205-16

Transverse / Deformation test on adhesives for tiles

STANDARD: **EN 12002**

Test development with displacement control.

S205 Unitronic 50 kN
S205-13 Flexure device with lower bearers and upper loading piston
S205-14 Strain gauge load cell 500 N capacity

Four point bending test method on glass-fibre reinforced cement

STANDARD: **EN 1170-4**

Test development with load control.

S205 Unitronic 50 kN
S337-34 Strain gauge load cell 50kN capacity
S205-16 Four-point bending device to test glass-fibre reinforced cement.
Rollers dimensions: dia. 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.
C109-11 Software for flexure tests on concrete beams.

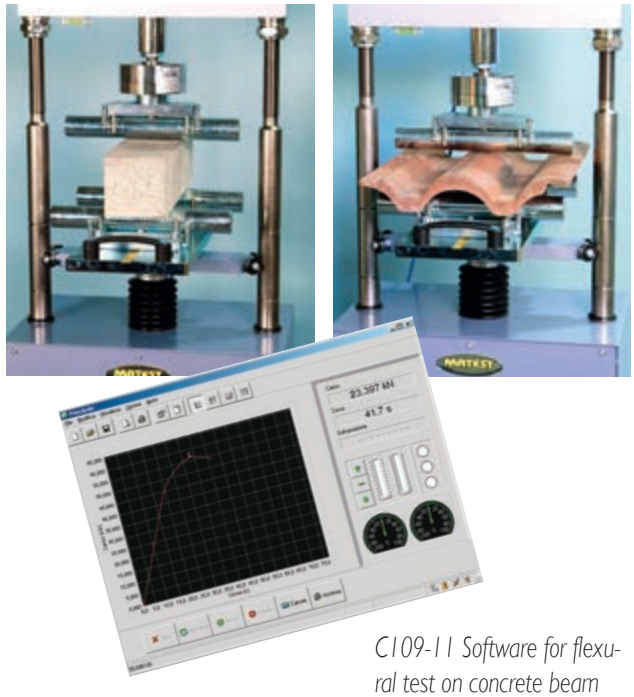
Flexural test with centre point on concrete beams and clay tiles

Standards: **EN 12390-5, 491, 538** / ASTM C78, C293
BS 1881:118 / NF P18-407 / UNE 83305 / UNI 6133
Test development with load control.

S205 Unitronic 50 kN
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 110 to 310mm, and upper central articulated bearer fixed to the load cell.
Bearer dimensions: 40 mm dia. by 310mm long
Weight : 20 kg approx.

C109-11 Software for flexure tests on concrete beams



C109-11 Software for flexural test on concrete beam

Punching test on clay blocks

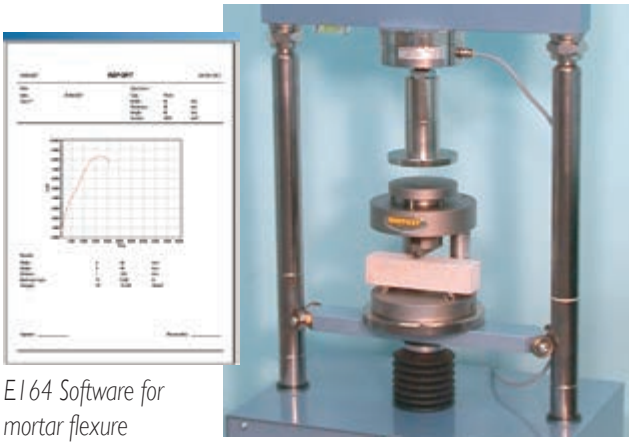
Standard: UNI 9730-3
Test development with load control.

S205 Unitronic 50 kN
S337-32 Strain gauge load cell 10 kN capacity.
C093-11 Flexural punching device.
S205-15 Holding beam for the punching device
C109-16 Software for punching test on clay blocks.

Flexural test on mortar prisms 40x40x160mm

Standards: **EN 196-1** / ASTM C348 / NF P15-451 / DIN 1164
EN ISO 679
Test development with load control.

S205 Unitronic 50 kN
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 pag. 352)
E164 Software for flexural tests.



E164 Software for mortar flexure

Compression test on mortar specimens (50kN max. load)

Standards: **EN 196-1** / EN ISO 679 / ASTM C109, C349
NF P18-411 / UNE 80101 / BS 3892 / DIN 1164
Test development with load control.

S205 Unitronic 50 kN
S337-34 Strain gauge load cell 50 kN capacity.
S212-05 Loading piston.
E170 Compression device on portion of 40x40x160mm specimens.
(devices for different specimens described at pag. 352)
E163 Software for compression tests.

E163 Software for mortar compression

... follows ...

S205: ACCESSORIES

Marshall stability test

Srandards: **EN 12697-34** / ASTM D1559 / AASHTO T245
BS 598 :107 / NF P98-251-2 / CNR N° 30
Test development with displacement control.

S205 Unitronic 50 kN
S337-34 Strain gauge load cell, 50 kN capacity.
S212-05 Loading piston.
B046N Stability mould.
B043-01 Software for Marshall test.

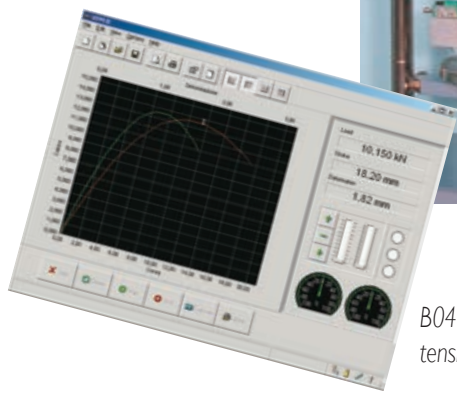
File Marshall test

B043-01 Software Marshall test

Splitting tensile test

Standards: **EN 12697-23** / ASTM D4123 / CNR N° 134
Test development with displacement control.

S205 Unitronic 50 kN
S337-34 Strain gauge load cell, 50 kN capacity.
S212-05 Loading piston.
B047-02 Splitting tensile device for samples dia. 4" and 6"
B047-04 Set of TWO displacement transducers with accessories.
B043-02 Software for Splitting Tensile test.

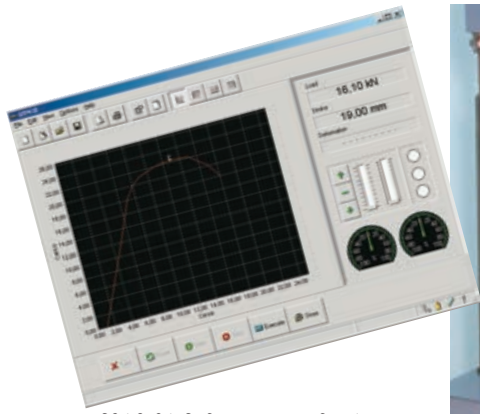


B043-02 Software splitting tensile test

Unconfined compression test

Standards: ASTM D2166 / BS 1377:7 / AASHTO T208
Test development with displacement control.

S205 Unitronic 50 kN
S337-31 Strain gauge load cell 2.5 kN capacity.
S212-08N Upper and lower compression platens dia. 100mm with accessories.
S218-01 Software for Unconfined Compression test.



S218-01 Software unconfined test

Quick triaxial test

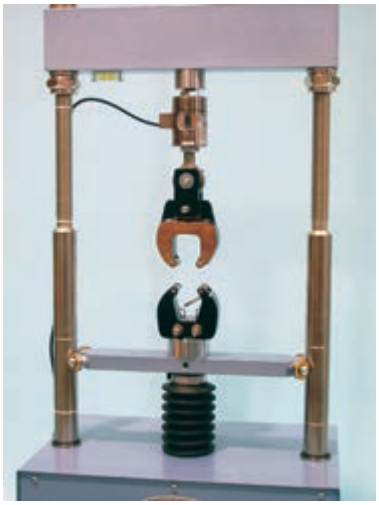
Standards: ASTM D2850 / BS 1377
Test development with displacement control.

S205 Unitronic 50 kN
S337-31 Strain gauge load cell 2.5 kN capacity.
S205-11 Loading piston with ball.
S305 Triaxial cell with accessories (see pag. 450)

Tensile test on mortar briquettes "8" shaped

Standards: ASTM C190, C307 / AASHTO T132
Test development with load control

Needed accessories:
S205-05 Unitronic Compression 50 kN / Tensile 25 kN
S337-32 Tensile/Compression strain load cell 10kN capacity
S205-07 Tensile jaws "8" shaped for mortar briquette
S205-08 Software for tensile test
E111 Briquette mould (see pag. 332)



Tensile tests on metals, plastics, wires, textiles etc.

Test development with load control

S205-05 Unitronic Compression 50 kN / Tensile 25 kN
S337-36 Tensile strain load cell 25kN capacity
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 dia. 3 - 5mm
H005-31 "V" shape seizing grips for round specimens dia. 5 - 12mm

Optional accessories:
H014-06 to **H014-10**
Extensometer, electronic, for tensile deformation strength tests. (See page 365)

H009 Software for visualisation in real time of load/deformation, graphic, test certificate etc.

At pag. 364 of the catalogue there are listed 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 S205-05 with devices for tensile tests of different materials, within the 25kN max. capacity load.

Uniaxial splitting tensile test of rock core specimens

Standard: ASTM D3967
Test development with load control.

S205 Unitronic 50 kN
S337-34 Strain gauge load cell 50 kN capacity.
S212-05 Loading piston.
E171 Compression device.

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 dia. 150mm or 100mm obtained from road cores or on laboratory made specimens.
Test development with displacement control.

S205 Unitronic 50 kN
S337-34 Strain gauge load cell, 50 kN capacity.
S212-05 Loading piston.
B047-10 LEUTNER testing head for specimens 150mm dia.
B047-11 Spacers for 100 mm dia. specimens with Leutner head.
B043-03 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.

S206N

UNITRONIC 200kN "Matest made"

UNIVERSAL ELECTROMECHANICAL FRAME, 200KN CAPACITY, "TOUCH-SCREEN" FOR:
- 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:
Roads (Marshall, Duriez, CBR etc.), Steel, Concrete, Cement, Wood, Plastic, etc.
The machine is composed by 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 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.

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 pag. 24

S206N

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 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: 950 x 560 x 2400 mm. Weight: 820 kg

S206N

UNITRONIC 200 kN, specific applications:

Duriez test on 80 and 120 mm dia. samples

STANDARD: NF P98-251-1/4

S206N Unitronic 200 kN
B096-01 Duriez set dia. 80 mm (see page 146)
B095-01 Duriez set dia. 120 mm (see page 146)
S206-21N Software for Duriez test

S206-21N
Software for Duriez test

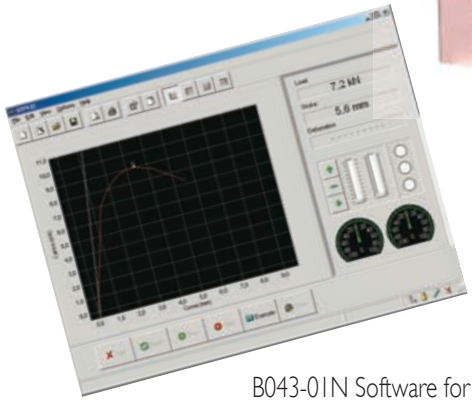
B095-01

Marshall stability test

STANDARDS: **EN 12697-34** / ASTM D1559 / AASHTO T245
BS 598:107 / NF P98-251-2 / CNR N° 30

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
B043-01N Software for Marshall test

B046N

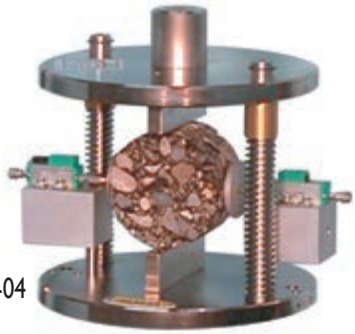


B043-01N Software for Marshall test

Splitting tensile test

STANDARDS: **EN 12697-23** / ASTM D4123 / CNR N° 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 dia. 4" and 6" (page 114)
B047-04 Set of TWO displacement transducers with accessories (page 114)
B043-02N Software for Splitting Tensile test (page 14)



B047-02 + B047-04

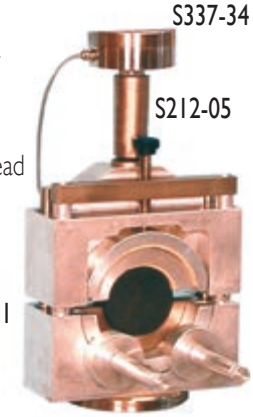
Direct shear (Leutner) between bituminous strata

STANDARD: ALP A StB t.4

Direct shear test (LEUTNER) on the connection between bituminous strata, carried out on asphalt cylinder specimens dia. 150mm or 100mm obtained from road cores or on laboratory made specimens.

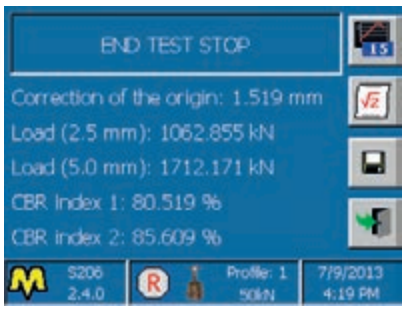
S206N Unitronic 200 kN
S337-34 Strain gauge load cell 50 kN capacity
S206-31 Flange/connector of the load cell S337-34
S212-05 Loading piston
B047-10 LEUTNER testing head for specimens 150mm dia.
B047-11 Spacers for 100mm dia. specimens with Leutner head
B043-03N Software for Leutner and Marshall tests.

S337-34
S212-05



B047-10 + B047-11

CBR Mould



CBR test results

CBR: California Bearing Ratio test

STANDARDS: **EN 13286-47** / ASTM D1883 / AASHTO T193
NF P94-078 / BS 1377:4 / CNR UNI 10009
UNE 103-502

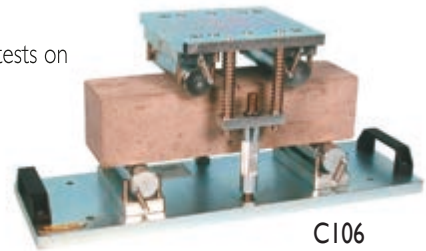
S206N Unitronic 200 kN
S337-34 Strain gauge load cell 50 kN capacity
S206-31 Flange/connector of the load cell S337-34
S212-01 Loading piston
S218N Software for CBR test (page 14)

... *follows* ...

Flexural test on concrete beams

STANDARDS: **EN 12390-5** / ASTM C78, C293 / AASHTO T97
NF P18-407 / BS 1881:118 / UNE 83305

S206N Unitronic 200 kN
C106 Flexure device (page 242)
C109-11N
Software for flexural tests on concrete beams.
(page 14)



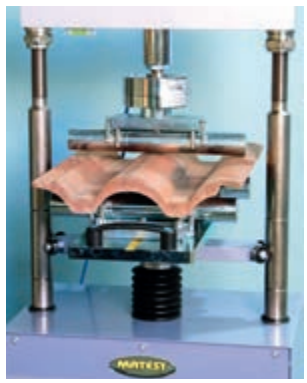
C106

ALTERNATIVE SOLUTION:

Flexural test with centre point on concrete beams and clay tiles

STANDARDS: **EN 12390-5, 491, 538** / ASTM C78, C293
NF P18-407 / BS 1881:118 / UNE 83305

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 315mm, and upper central articulated bearer fixed to the load cell.
Weight: 20kg approx.
C109-11N Software for flexural tests on concrete beams (page 14)
Suggested accessories:
S337-34 Strain gauge load cell 50 kN capacity (to replace the 200kN load cell)
S206-31 Flange/connector of the load cell S337-34



S205-18

Splitting tensile test on concrete cylinders

STANDARDS: **EN 12390-6** / ASTM C496 / NF P18-408 / BS 1881:117

S206N Unitronic 200 kN
C101-01 Splitting tensile test device (technical details and other devices: page 241)
C100-01 Packing strips for the device C101-01
C109-12N
Software for splitting tensile test.
(page 14)

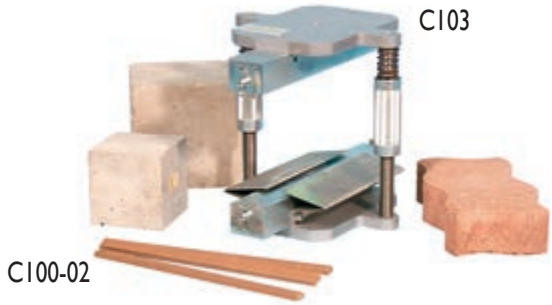
C101-01

C100-01

Splitting tensile test on concrete cubes and block pavers

STANDARDS: **EN 1338 / EN 12390-6**

S206N Unitronic 200 kN
C103 Splitting tensile test device (page 241)
C100-02 Packing strips for the device C103
C109-12N Software for Splitting tensile test (page 14)



C103

C100-02

S337-32

C093-11

S205-11

Clay blocks for flooring punching test

STANDARD: 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
C109-16N Software for the punching test

Four point bending test method on glass-fibre reinforced cement

STANDARD: **EN 1170-4**

Test development with load control.

S206N Unitronic 200 kN
S337-34 Strain gauge load cell 50kN capacity
S205-16 Four-point bending device to test glass-fibre reinforced cement.
Rollers dimensions: dia. 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 (page 14)
S206-31 Flange/Connector of the load cell S337-34

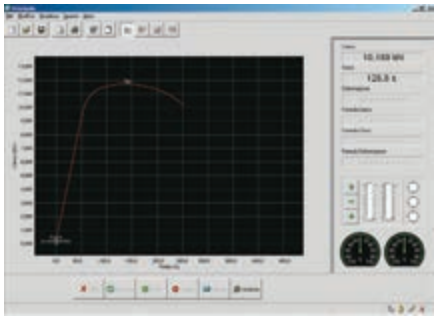
S205-16

Compression test on mortar specimens

STANDARDS: **EN 196-1** / ASTM C109, C349 / NF P15-451 / EN ISO 679 / DIN 1164 / BS 4550

S206N Unitronic 200 kN
E170 Compression device on portions of 40x40x160mm specimens (devices for different specimens described at page 352)
E163N Software for the compression test (page 14)

E170



C164N Graph of the flexural test execution

Flexural test on mortar prisms 40x40x160 mm

STANDARDS: EN 196-1 / ASTM C348 / NF P15-451 / DIN 1164 / EN ISO 679

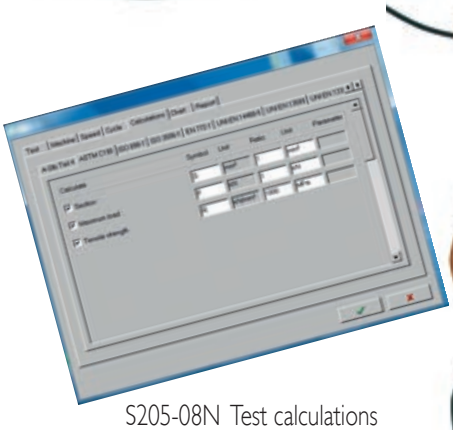
S206N Unitronic 200 kN
E172-01 Flexure device for 40x40x160mm specimens (available also ASTM, see page 352)
S337-32 Strain gauge load cell 10 kN capacity
S206-32 Flange/connector of the load cell S337-32
S164N Software for the flexural test (page 14)

E172-01

Tensile test on mortar briquettes "8" shaped

STANDARDS: ASTM C190, C307 / AASHTO T132

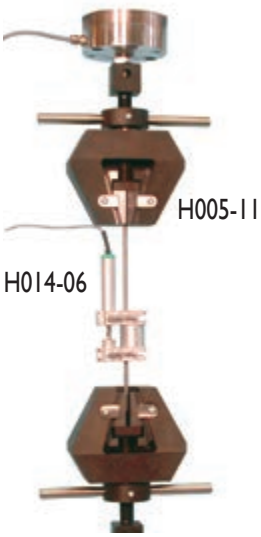
S206N Unitronic 200 kN
S205-07 Tensile jaws "8" shaped for mortar briquette
E111 Briquette mould (page 332)
S337-32 Strain gauge load cell Tensile/Compression 10kN capacity
S206-32 Flange/connector of the load cell S337-32
S205-08N Software for tensile tests



S205-08N Test calculations

S337-32

S205-07

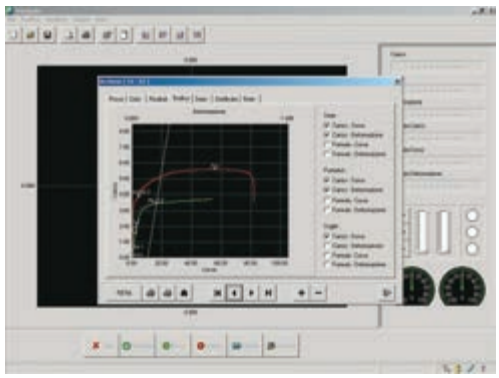


H005-11

H014-06

Tensile tests on metals, plastics, wires, etc.

S206N Unitronic 200 kN
H005-11 Tensile heads, upper and lower (page 334). Daylight between heads: min. 50mm / max. 420mm
S206-33 Flange/connector of the tensile heads H005-11
H005-21 Flat seizing grip for flat specimens 1 - 25 mm thickness by 25 mm max. width, and round specimens dia 3 - 5mm
H005-31 "V" shape seizing grips for round specimens dia. 5 - 12mm



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 (page 365)
H014-06 Extensometer for tensile deformation strength tests until breakage for round specimens dia. 4 - 11mm
H014-10 Extensometer for tensile deformation strength tests until breakage for flat specimens
H009N Software for load/deformation, graphs, test certificate

Technical specifications: see page 366 where there are also listed devices to test plastics, wires, ropes, flexural and bending tests and various models of extensometers.

On customer's demand it is possible to equip Unitronic 200 kN with tensile heads and grips to test round specimens up to 18 mm dia. and flat specimens up to 22 mm thickness (page 364)

NOTE:
Listed 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 / BS 1377:9 / CNR N° 92 and 146 / UNE 7391

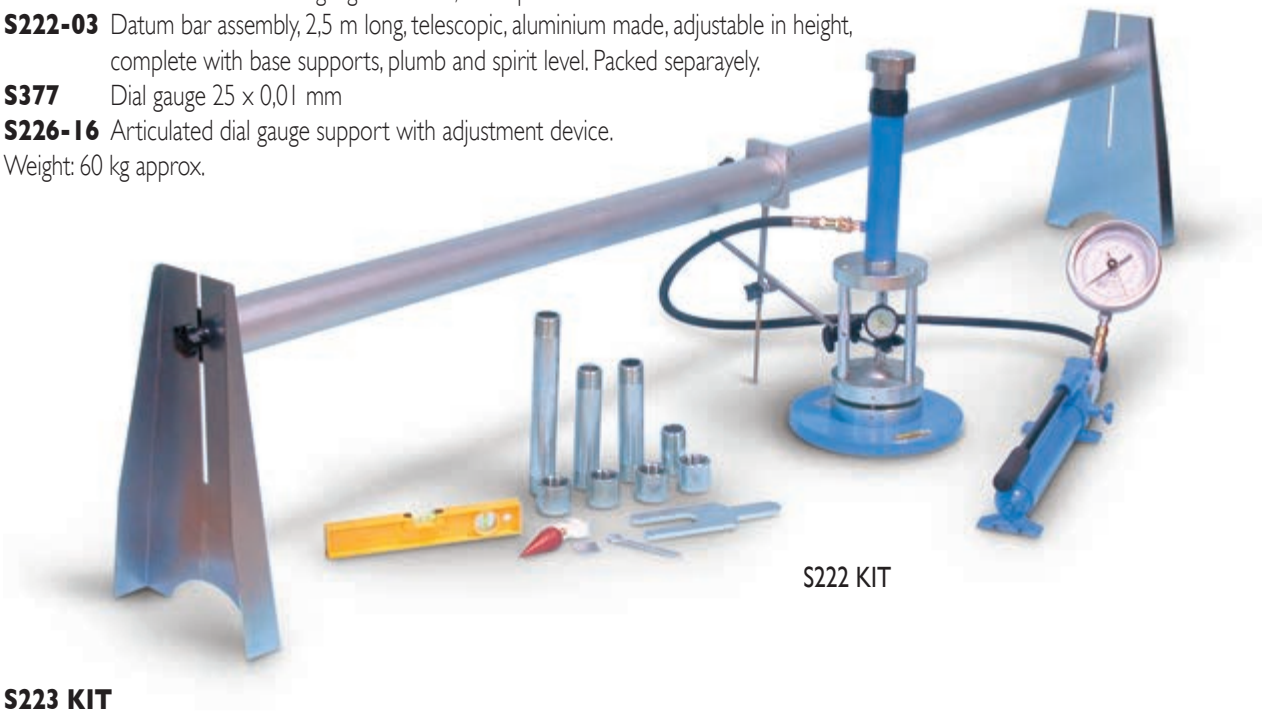
This test is performed for the determination of the bearing capacity of a soil in-situ on road constructions, foundations, road subgrades, airport and highway pavements.
A wide range of plate bearing test equipment are available, together with many accessories according to the different Standards and specific enduser needs.
All the models of hand pump are "Enerpac Made" and have double speed, ensuring fast approach.

NEW

S222 KIT
Plate bearing test equipment 100 kN capacity - 1 dial gauge model

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 Pressure gauge 0-100 kN, div. 0,5 kN.
S226-05 Load plate 300 mm dia.
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 25 x 0,01 mm
S226-16 Articulated dial gauge support with adjustment device.
Weight: 60 kg approx.



S222 KIT

S223 KIT
Plate bearing test equipment 100 kN capacity - 3 dial gauges model

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 Pressure gauge 0-100 kN, div. 0,5 kN.
S226-13 Upper spherical seat.
S226-05 Load plate 300 mm dia.
S226-06 Intermediate plate 160 mm dia.
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 pag. 427).
S377 n° 3 dial gauges 25 x 0,01 mm
S226-16 n° 3 articulated dial gauge supports with adjustment device.
Weight: 60 kg approx.

S223-01 / S223-02

ACCESSORY for S222 KIT and S223 KIT:

S223-01
PRESSURE GAUGE, range 0 - 50 kN, div. 0,25 kN with large dial dia. 200 mm, complete with fast connector, used **"for accurate readings at low loads"**, as for ex. pre-load of 0,5 kg/cmq.

S225 KIT

Plate bearing test equipment 200 kN capacity - 3 dial gauges model

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:

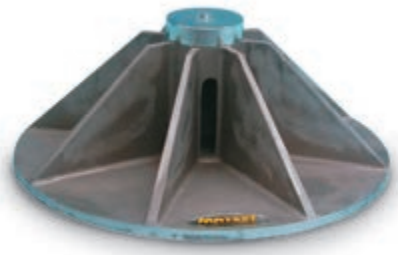
S225-01 Hydraulic jack 200 kN capacity, complete with hand pump, rubber pipe with fast connector, set of extension rods of different lengths, carrying case.
S225-02 Pressure gauge 0-200 kN, div. 1 kN.
S226-13 Upper spherical seat.
S226-05 Load plate 300 mm dia.
S226-06 Intermediate plate 160 mm dia.
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 pag. 427).
S377 n° 3 dial gauges 25 x 0,01 mm
S226-16 n° 3 articulated dial gauge supports with adjustment device.

Weight: 70 kg approx.

ACCESSORY for S225 KIT:

S223-02

PRESSURE GAUGE, range 0 - 50 kN, div. 0,25 kN with large dial dia. 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

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 pag. 149

S225 KIT
(similar to S223 KIT and S226 KIT)

S226 KIT

Plate bearing test equipment 500 kN capacity - 3 dial gauges model

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:

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 Pressure gauge 0-500 kN, div. 2 kN.
S226-05 Load plate 300 mm dia.
S226-06 Intermediate plate 160 mm dia.
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 pag. 427).
S377 n° 3 dial gauges 25 x 0,01 mm
S226-16 n° 3 articulated dial gauge supports with adjustment device.

Weight: 110 kg approx.

... follows ...

S224 KIT

Digital plate bearing test equipment 100 kN capacity
3 linear displacement transducers and Cyber-Plus 8 Evolution acquisition system

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.

S226-13 Upper spherical seat.

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 pag. 428

S224-21N Software for test data processing.

S226-05 Load plate 300 mm dia.

S226-06 Intermediate plate 160 mm dia.

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 pag. 427).

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 8 Evolution acquisition system

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.

S226-13 Upper spherical seat.

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 pag. 428

S224-21N Software for test data processing.

S226-05 Load plate 300 mm dia.

S226-06 Intermediate plate 160 mm dia.

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 pag. 427).

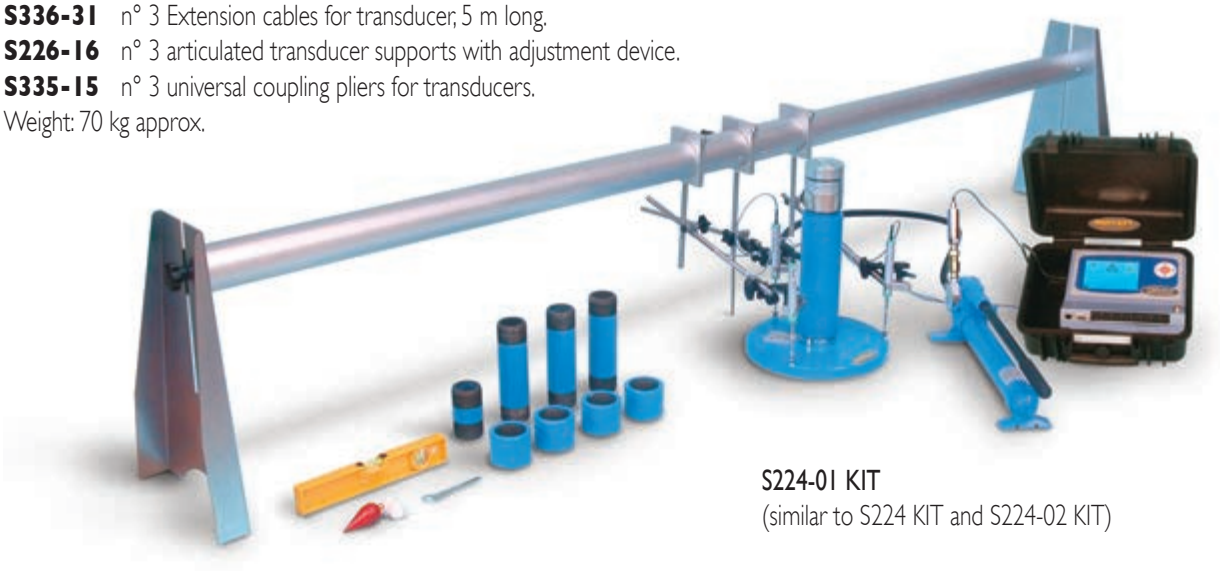
S336-14 n° 3 linear displacement transducers, 50 mm travel.

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 8 Evolution acquisition system

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:

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 pag. 428

S224-21N Software for test data processing

S226-05 Load plate 300 mm dia.

S226-06 Intermediate plate 160 mm dia.

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.

ACCESSORIES:

S226-01 Loading plate dia. 450 mm

S226-02 Loading plate dia. 600 mm

S226-03 Loading plate dia. 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

S226-01 + S226-02 + S226-03

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 models:
S223KIT, S225KIT, S226KIT, S224KIT, S224-01KIT, S224-02KIT.

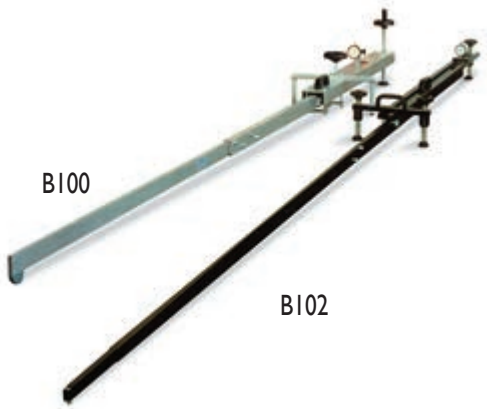
Weight: kg 7

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 pag. 148



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 (page 424 to 427) and for Field CBR/Unconfined test equipment mod. S131KIT, S210KIT, S220KIT (see page 406).
The calibration is carried out only at Matest factory.

C405-15N

CYBER-PLUS 8 EVOLUTION "TOUCH SCREEN"

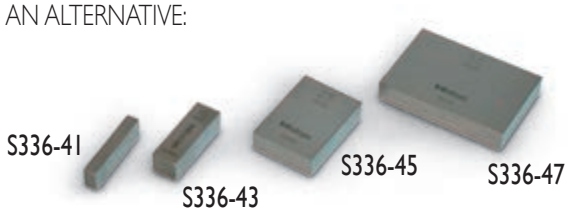
8 Channels acquisition and processing data system, 24 bit resolution. Electronic advanced technology, **"colour touch screen"** 1/4 VGA, high graphic performances, the unit automatically performs test and data processing. A certificate can be printed through a printer (optional) directly connected to the unit through the USB port The Cyber-Plus is equipped with slots for external pendrive or SD card infinite memory supports, it can be directly connected to a PC. 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 pag 24

C405-15N

S337-51

Calibration process between one displacement transducer and the data acquisition system C405-15N

AS AN ALTERNATIVE:

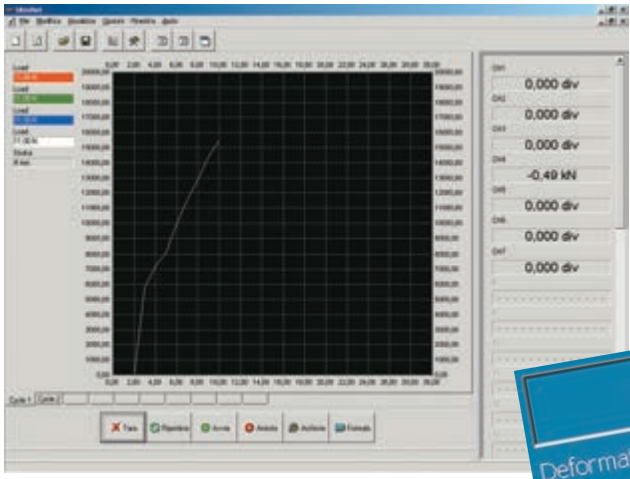


GAUGE BLOCKS. Grade 1
Used to calibrate the linear displacement transducers.

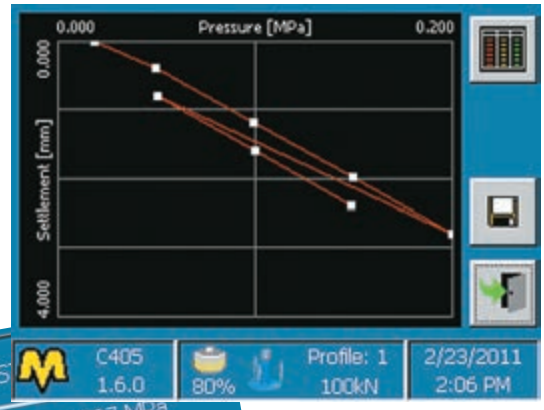
Available models:

S336-43 Gauge block, nominal length 10 mm
S336-45 Gauge block, nominal length 25 mm
S336-47 Gauge block, nominal length 50 mm

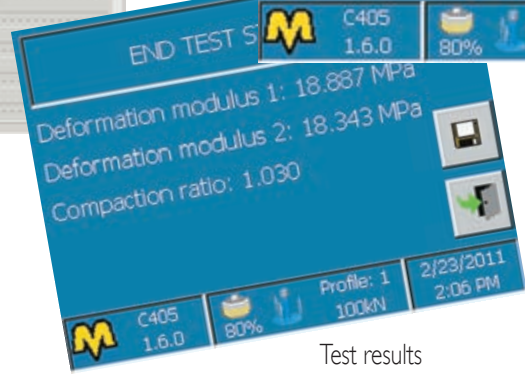
Test execution



Graph of end test



Test results: graph



Test results

30
Load [kN]
0
0
Axial def.: [mm]
CBR test
MATEST
CYBER-PLUS EVOLUTION
CYBER-PLUS EVOLUTION
Avvia
Arresta
Archivia
Formula

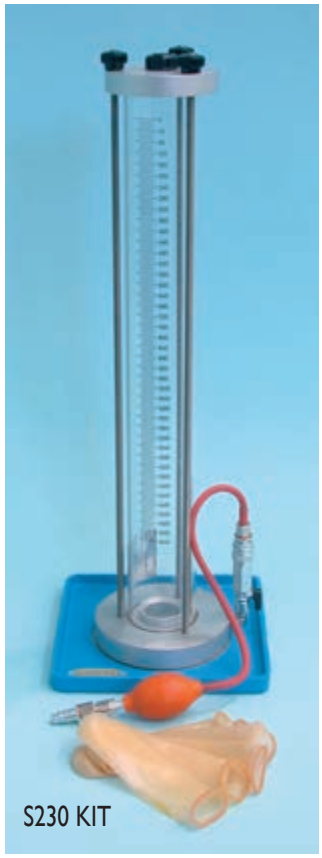
BALLOON DENSITY METHOD

S230 KIT

Balloon density apparatus, 1600 ml capacity

STANDARDS: ASTM D2167 / AASHTO T205 / 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: 8 kg


S230 KIT

SPARE PART for S230 KIT:

S230-01
Rubber balloons, pack of 12

S232 KIT

S233 KIT

S233 KIT

Balloon density apparatus, 6000 ml capacity

Identical to mod. S232 KIT, but with capacity of 6 litres.
Weight: 18 kg

SPARE PART for S233 KIT:

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 50 mm dia.
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

S232 KIT

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

SPARE PART for S232 KIT:

S232-01
Reinforced rubber membrane, pack of 6

SAND REPLACEMENT METHOD

S234 KIT

Sand density cone apparatus Ø 6,5" (165,1 mm)

STANDARDS: ASTM D1556 / AASHTO T191 / CNR N° 22
UNE 7371, 83109 / NF P94-061-3

Used to determine the in-situ density of fine graned compacted soil. The test consists in digging a hole into the ground and then collect, dry and weight the sampled soil. The hole is than filled with dry sand from the cone container.
The apparatus consists of:
S234-05 Metal double cone assembly with valve Ø 6,5"
S234-06 Metal base with fixed centre hole for cone housing
V121 N° 2 Plastic jar, 5 litre
Galvanized against corrosion.
Dimensions: 305x305x600 mm
Weight: 6 kg

ACCESSORY for S234 KIT:
S234-01
Calibrating container

S235

S234-01

S234 KIT

ACCESSORIES:
S235 STANDARD SAND for density tests, passing 600 micron and retained on 300 micron. Bag of 50 kg

S235-01 STANDARD SAND 0,4 mm to 2 mm. CNR N° 22 Bag of 50 kg

Sand replacement apparatus

STANDARDS: BS 1377:9, 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 (200 mm Ø is recommended for coarse grained soil and gravel).
Weight: 10÷24 kg

S231 KIT

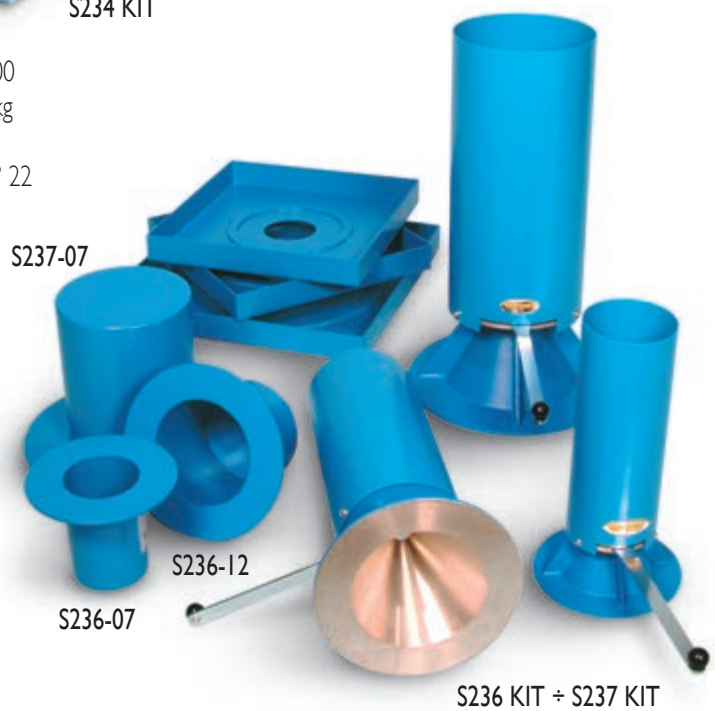
Sand density cone apparatus Ø 12" (304,8 mm)

Similar to mod. S234 KIT but recommended for coarse grained soil and gravel (over 38 mm diameter).
The apparatus consists of:
S231-05 Metal double cone assembly with valve, Ø 12"
S231-06 Metal base with fixed centre hole for cone housing.
S231-11 Plastic jar, 10 litre complete of cone fixing device..
Weight: 20 kg

ACCESSORY for S231 KIT:
S231-01
Calibrating container

S231-01

S231 KIT


S237-07

S236-12

S236-07

S236 KIT ÷ S237 KIT

Model:	Ø mm	Consisting of:	Pouring cylinder, shutter and upper cylinder	Metal tray with centre hole	Optional accessory: Calibrating container
S236 KIT	100		**S236-05**	**S236-06**	**S236-07**
S236-01 KIT	150		**S236-10**	**S236-11**	**S236-12**
S237 KIT	200		**S237-05**	**S237-06**	**S237-07**

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 75 mm dia., with three pressure take-off points. Formed by an acrylic plexiglass body held between two aluminium anodized end plates. Weight: 3 kg

S245-02
Constant head permeability cell 114 mm dia., 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

S245-03
Manometer tubes and stand, comprising three tubes of constant bore, graduated scale, tubing and connectors. Dimensions: 210x50x1160 mm. Weight: 5 kg

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

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 dia. 3, 4 and 6 mm for the different degrees of permeability, soaking reservoir with cock, tubing and connectors.
Dimensions: 1700x220x50 mm. Weight: 10 kg

S252 COMPACTION PERMEAMETER 4" dia. complete (technical details: see next page)

ACCESSORIES:

S252-01 PLEIN BASE and COLLAR for compaction tests

S252-02 MOULD BODY with two lateral water inlet/outlet

ALTERNATIVE:

S253 COMPACTION PERMEAMETER 6" dia. complete

ACCESSORIES:

S253-01 PLEIN BASE and COLLAR for compaction tests

S253-02 MOULD BODY with two lateral water inlet/outlet

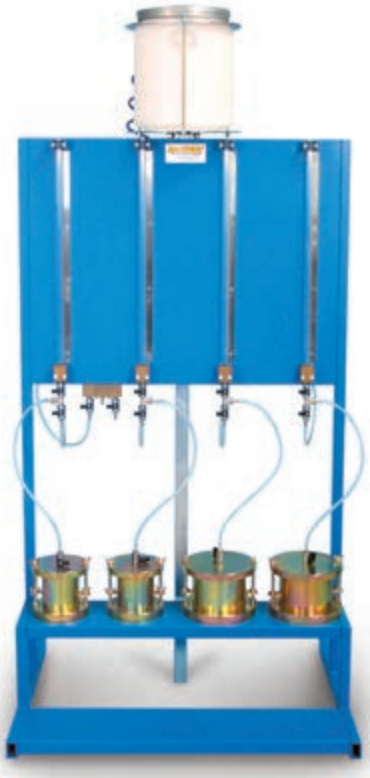
ACCESSORIES:

S355 De-airing tank 20 litre capacity made from acrylic plexiglass (see pag. 454)
S355-01 Water trap to collect the water condensation
V203 Portable vacuum pump, 230 V 1ph 50 Hz
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 dia. 4" and 6" to perform different types of tests at the same time.
Dimensions: 1050x900x2000/3850 mm
Weight: 75 kg



S248 with permeameters

S244

Pinhole test equipment

DISPERSIBILITY DETERMINATION
STANDARDS: BS 1377:5 / ASTM D4647
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.

S244

ACCESSORIES:

S245-04
CONSTANT LEVEL TANK. Details and picture: see previous page.

V230-02 TUBING, inside dia. 8 mm, 5 m long

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

S252 disassembled

MODELS:

S252
COMPACTION PERMEAMETER 4" dia. complete. Weight: 8 kg
ACCESSORIES:
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

S253
COMPACTION PERMEAMETER 6" dia. complete. Weight: 16 kg
ACCESSORIES:
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

S253-02
S253-01
S252-02
S252-01

ACCESSORIES:

CUTTING COLLAR, coupled to the Permeameter body, it gets easier the soil sampling.

MODELS:
S185-01 Dia. 4"
S200-09 Dia. 6"

S200-09

CONSOLIDATION TEST

STANDARDS: ASTM D2435-80, D3877, D4546 / BS 1377:5
AASHTO T216 / XP P94 090-1, P94-091
UNE 103-601, 103-602 / CEN-ISO-TS 17892-5

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.

ACCESSORIES:

DIAL GAUGE for vertical displacements.

S376
DIAL GAUGE 10 mm travel x 0,01 mm subdiv.
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
S336-31 EXTENSION CABLE 5 meters long
S336-32 EXTENSION CABLE 10 meters long

S337-51
CALIBRATION process of the displacement transducer to the data acquisition unit of the oedometer.

S260 with cell and dial gauge

S265

S336-11

S334

S260
with cell and S334 Cyber-Plus 8 Evolution

S334 NEW

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 pag. 462, Hardware details at pag. 24

S260-05N

Software OedoLab Reports - Matest made

Technical Data: see page 437

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 couple of porous stones
S268	50,47	20	20	**S122**	**S123**	**S274 KIT**
S268-05 NEW	63,5	31,67	20	**S122-19** NEW	**S123-05** NEW	**S274-10 KIT** NEW
S268-01	71,40	40	20	**S122-01**	**S123-01**	**S274-01 KIT**
S268-04	75,00	44,16	20	**S122-17**	**S123-04**	**S274-09 KIT**
S268-02	79,80	50	20	**S122-02**	**S123-02**	**S274-02 KIT**
S268-03*	112,80	100	25	**S122-03**	**S123-03**	**S274-03 KIT**

*The consolidation cell dia. 112,8 mm is made from aluminium.

Consolidation cells with 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 dia. mm	Specimen area cm²	Specimen thickness mm	Hollow punch	Specimen tamper	Spare couple of porous stones
S272	50,47	20	20	**S122-04**	**S123**	**S274-04 KIT**
S272-05 NEW	63,5	31,67	20	**S122-20** NEW	**S123-05** NEW	**S274-11 KIT** NEW
S272-01	71,40	40	20	**S122-05**	**S123-01**	**S274-05 KIT**
S272-04	75,00	44,16	20	**S122-18**	**S123-04**	**S274-08 KIT**
S272-02	79,80	50	20	**S122-06**	**S123-02**	**S274-06 KIT**
S272-03*	112,80	100	25	**S122-07**	**S123-03**	**S274-07 KIT**

*The consolidation cell dia. 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

... follows ...

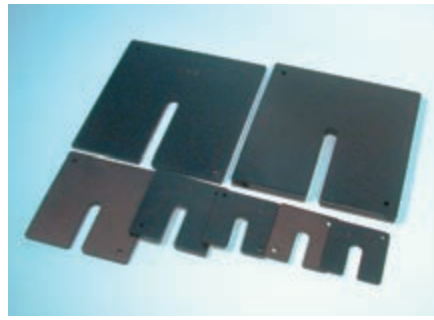
OEDOMETER: ACCESSORIES

Slotted weights

Steel made, painted against corrosion (mod. E066-02 brass made).

Available slotted weights:

Model	Weight	Model	Weight
E066-02	100 g	**S273-07**	4 kg
S273-06	250 g	**S273-02**	5 kg
S273-05	500 g	**S273-08**	8 kg
S273-04	1 kg	**S273-01**	10 kg
S273-03	2 kg		



KIT OF SLOTTED WEIGHTS

S273 KIT:	**S273-01 KIT:**	**S273-02 KIT:**
S273-01 = 4 x 10 kg	**S273-08** = 7 x 8 kg	**S273-01** = 6 x 10 kg
S273-02 = 1 x 5 kg	**S273-07** = 1 x 4 kg	**S273-02** = 3 x 5 kg
S273-03 = 2 x 2 kg	**S273-03** = 1 x 2 kg	**S273-03** = 1 x 2 kg
S273-04 = 1 x 1 kg	**S273-04** = 1 x 1 kg	**S273-04** = 1 x 1 kg
	S273-05 = 1 x 500 g	**S273-05** = 3 x 500 g
	S273-06 = 2 x 250 g	**S273-06** = 2 x 250 g
TOTAL: 50 kg	**TOTAL:** 64 kg	**TOTAL:** 80 kg

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

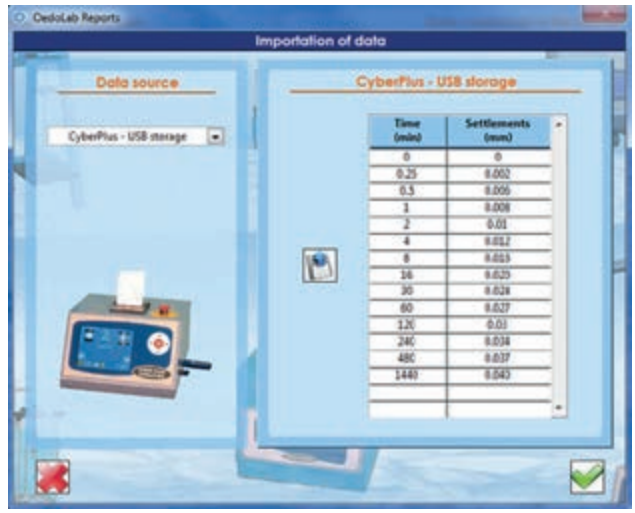
GRADE 1

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



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 (dia. 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.

S260-05N

Software OedoLab Reports - Matest made

NEW

STANDARDS: ASTM D2435-80 / XP P94-090-1 / CEN-ISO-TS 17892-5 / 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.

S260-05N Data feeding/acquisition

- 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:

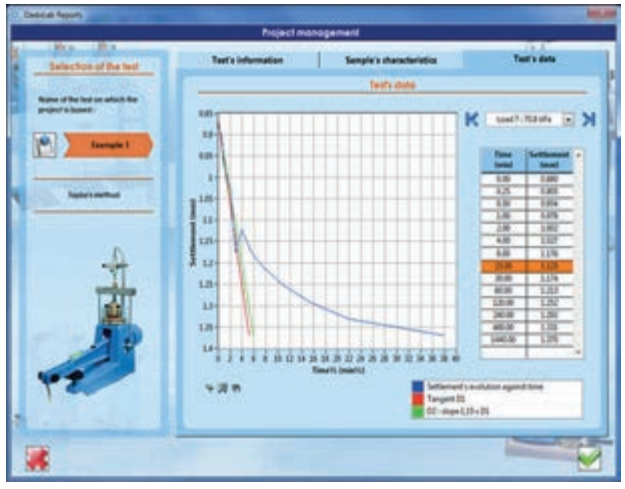
- Consolidation – root method.
- Void ratio.
- Water content.
- Densities.
- Compressibility.

- CHARTS:

- Settlements (mm) / Time (min).
- Void ratio (%) / Applied pressure (kPa).
- Passing (%) / Opening (mm).

PC specification:

- Operating system: Windows XP or more recent



S260-05N Test data visualization

S260-05N Results preview

... follows ...

Buyer's guide for one standard Consolidation system and one automatic Consolidation data acquisition/processing system.

Description	Model
Configuration for one standard Oedometer apparatus	
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

Description	Model
Configuration for one Oedometer apparatus with electronic measurement and data acquisition/processing:	
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

... follows ...

S262N

EDOTRONIC *"TOUCH SCREEN HIGH PERFORMANCE"* AUTOMATIC CONSOLIDATION APPARATUS (OEDOMETER).

STANDARD: ASTM D2435-80 / CEN - ISO - TS 17892-5 / BS 1377:5 / XP P094-090-1

This automatic consolidation system, ideal for modern and efficient laboratories, has been created to eliminate or reduce to the absolute minimum any forms of manual intervention, which the oedometer test requires. This therefore results in greater efficiency and cost effectiveness. This appliance is extremely simple and easy to use.

Specifications of the frame:

Edotronic, equipped with two coaxial cylinders, provides a precise and timely weight positioning with two ranges of measurement:

0 – 1499 (N) Newton
1500 – 15000 (N) Newton

Input of compressed air (filtered):	Max. 10 Bar
Resolution:	1 Newton
Precision:	1%
Maximum load:	15 kN (with 8 Bar input)

There is no need of weights as the cylinder and pneumatic piston take it to the desired weight in real time.
Weight application and removal are carried out automatically in the test sequences.

The load value is measured by a pressure transducer which is built in the regulation valve.
An additional high precision load cell will detect the effective load value and perform precise control through a closed loop system, granting repeatability and accuracy.

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.
- 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.
- Simple, rapid linearisation and calibration procedure.
- The appliance comes completely equipped with the relevant software.
- Possibility to select different languages.
- Hardware technical details: see page 24

The following **"are not included"**: software oedolab connect, consolidation cell, transducer, compressor, filter, that have to be ordered separately (see accessories).
Power supply: 230V 1ph 50/60Hz
Dimensions: 290 x 450 x h 610 mm. Weight : 30 kg

ACCESSORIES:

S262-12N SOFTWARE OEDOLAB CONNECT – MATEST MADE
Technical Data: see next page

V207 LABORATORY COMPRESSOR, tank capacity 50 litres, nominal pressure 10 Bar.

S262-11 AIR FILTER, auto-draining, it reduces up to one micron, complete with discharge.

S262N with accessories

S336-11
LINEAR DISPLACEMENT-DEFORMATION TRANSDUCER, accurate and versatile.
Transducer 10 mm travel.
Indipendent linearity < 0,3%

S337-51 Calibration process of the linear displacement transducer combined with the Edotronic.

S268 / S272-05
CONSOLIDATION CELLS, diffferent models: see pag. 435

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

S262-12N

Software OedoLab Connect – Matest made

STANDARD: ASTM D2435-80 / CEN - ISO - TS 17892-5 / 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 acquisition 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.

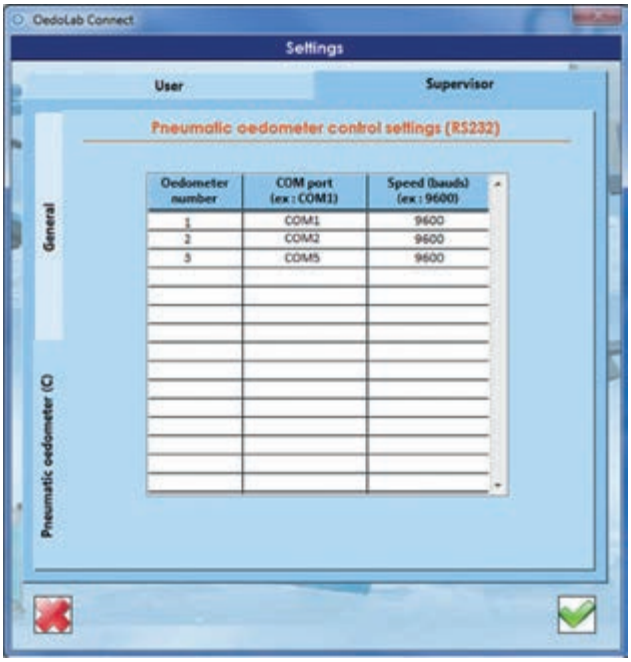
Once a consolidation step is completed, the software automatically shifts to the next level; hence re-performing all the control and acquisition operations needed to complete the test. Furthermore, by setting test parameters which are included in the Software and dedicated to the loading sequences control (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:

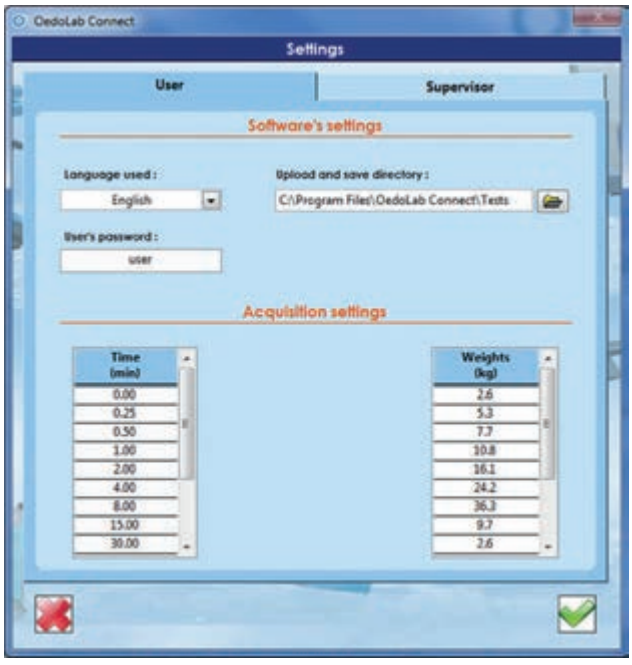
- Operating system: Windows XP or more recent.

Supplied complete with connection cable.

S262-12N Test view



S262-12N Control settings



S262-12N Acquisition settings

S262-12N Information about the test

Direct / Residual Shear Test Apparatus, digital "Touch-Screen"

NEW

STANDARDS: ASTM D3080-72 / BS 1377:7 / NF P94-071-1, NF P094-071-2 / AASHTO T235 / CEN-ISO-TS 17892-10

Used to determine the resistance to shearing of all types of soil specimens, both consolidated and drained, undisturbed or remoulded.
The machine can accommodate specimens dia. 50, 60, 100mm, and square 60x60, 10x100 mm.
The apparatus is equipped with a control closed loop motor with epicycloid reducers.
At the beginning of each test the machine performs an automatic and complete internal check, a position reset with the elimination of all possible positioning errors and all pauses.
The input of all the test patterns is achieved by the interaction of the "touch-screen" microprocessor, granting infinitesimal resolutions in short times.
All data are input and stored when the machine is in stand-by, without affecting the specimen under test with quick machine setting.
Possibility to fix maximum excursion of the shear box, so as to interrupt automatically the test.
Possibility 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.

Specifications of the frame:

- 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.

S277N KIT + S284

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: 1040 x 420 xh 1350 mm
Weight: 120 kg

Detail of the 8 connectors

The direct/residual shear testing machine is available in "THREE" versions:

S277N KIT DIGITAL BASIC VERSION

SHEARLAB

Digital Shear Testing Machine, comprising:

S277-10N 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)

S277-01N DATA ACQUISITION VERSION

AUTO SHEARLAB

Digital Shear Testing Machine, with incorporated Data Acquisition System and Basic Firmware, comprising:

S277-10N 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.

S277-01N + S284

ACCESSORIES:

S277-40N

SOFTWARE SHEAR-LAB REPORTS – MATEST MADE

Technical data: see page 445

S277-32

FIRMWARE activating 5 connectors foreseen on the shear frame S277-10N. They can be used as data acquisition and processing system for geotechnical tests.

Technical data: see S334 page 462

NOTE: these 5 channels can be used alternatively (not simultaneously) to the 3 channels of the shear frame.

GAUGE BLOCKS. Grade 1

Used to calibrate the linear displacement transducers (see page 446)

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.

...follows...

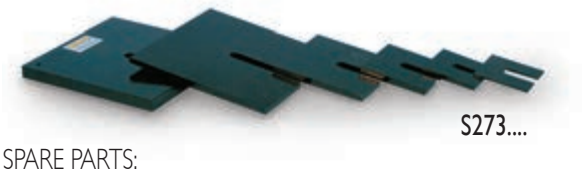
ACCESSORIES:

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 couple of porous stones
Round specimens dia. 50 mm	**S282**	**S286-03 KIT**
Round specimens dia. 60 mm	**S283**	**S286 KIT**
Round specimens dia. 100 mm	**S281**	**S286-04 KIT**
Square specimens 60x60 mm	**S284**	**S286-01 KIT**
Square specimens 100x100 mm	**S285**	**S286-02 KIT**

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
Dia. 50 x h 25 mm	**S122-08**	**S123-08**
Dia. 60 x h 25 mm	**S122-09**	**S123-09**
Dia. 100 x h 25 mm	**S122-10**	**S123-10**
Square 60x60 x h 25 mm	**S122-11**	**S123-11**
Square 100x100 x h 25 mm	**S122-12**	**S123-12**



S273....

SPARE PARTS:

Slotted weights. Steel made, painted against corrosion available models:

S273-06	250	g
S273-05	500	g
S273-04	1	kg
S273-03	2	kg
S273-07	4	kg
S273-02	5	kg
S273-08	8	kg
S273-01	10	kg

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 NEW 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

On request the shear machine can be equipped with load rings or load cells having capacity from 500 N to 5000 N:

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.

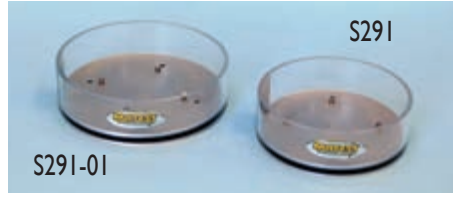
Produced in a rugged steel structure, it is supplied complete with three lever arms ratio 10:1 having each max. load up to 550 kg., centering devices and dial gauge holders.

Supplied without weights, water container, cells and dial gauges to be ordered separately.

Dimensions: 2300x450x900 mm

Weight: 150 kg approx.

S290 with accessories



S277-40N

Software ShearLab Reports - Matest made

STANDARDS: ASTM D3080-72 / NF P94-071-1 / NF P94-071-2 / BS 1377:7

NEW

To be used with the shear testing machine, data acquisition processing version, mod. S277-01N

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.

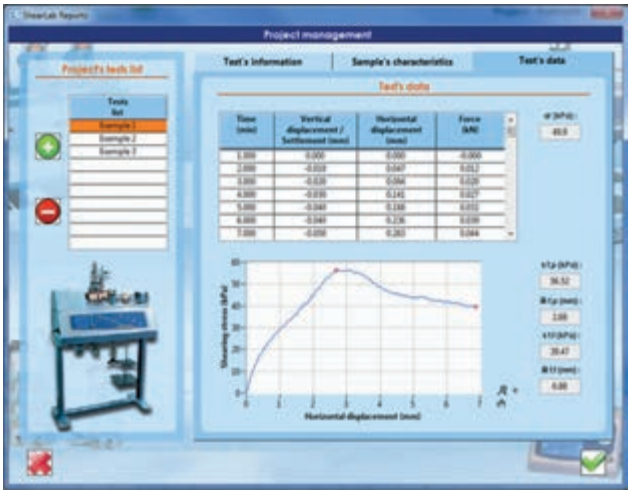
The new features of this software allow the users to:
- Create a test file from data entered manually or imported
- Create a project to perform calculations according to the selected standard
- Integrate test files to a project
- Elaborate, customize and print their test reports which can be read without the need of a specific software

S277-40N Data import

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.

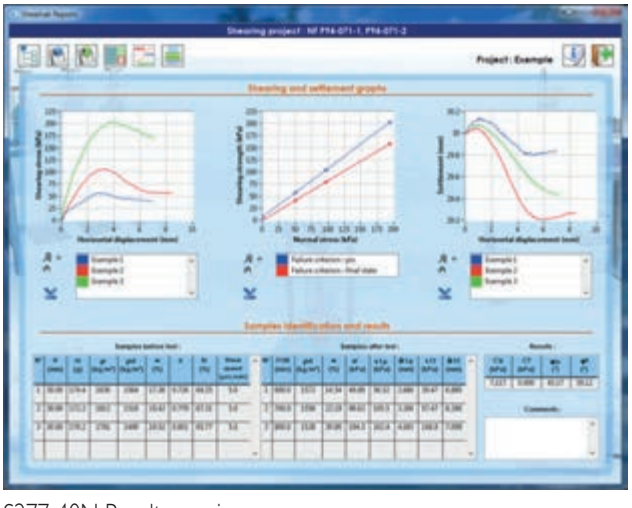
- The input information is the following:
  - Settlement in mm.
  - Time in min.
  - Horizontal displacement in mm.
  - Force in kN.
- In the project management window, the Software automatically calculates the shear parameters:
  - Peak strength in kPa.
  - Residual strength in kPa.
  - Peak displacement in mm.
  - Residual displacement in mm.
- Laboratory coefficients of:
  - Water content.
  - Densities.
  - Void ratio.



S277-40N Test data calculation

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).



S277-40N Results preview

PC specification:
- Operating system: Windows XP or more recent.

Supplied complete with connection cable.

...follows...

S277-02N DATA ACQUISITION/PROCESSING, PNEUMATIC, FULLY AUTOMATIC VERSION

SHEARTRONIC *"HIGH PERFORMANCE"*

Digital Shear Testing Machine, with incorporated Data Acquisition System + Software and Pneumatic Vertical Loading Device, Fully Automatic, comprising:

S277-11N Shear Frame with digital "Touch-Screen" microprocessor, complete with pneumatic vertical loading device automatically driven through SW, 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.

NOTE: Shear box, hollow punch, tamper (see accessories) and Software S277-41N **"are not included"** and have to be ordered separately

NOTE: The pneumatic shear machine mod. S277-02N requires an air compressed source.

S277-02N + S284

ACCESSORIES for mod. S277-02N:

V207 LABORATORY AIR COMPRESSOR, 50 litres capacity, 10 bar nominal pressure

S262-11 AIR FILTER, auto-draining, it reduces up to one micron, complete with discharge.

S277-41N
SOFTWARE SHEAR LAB CONNECT - MATEST MADE
For fully automatic data control, acquisition, processing and visualization in direct/residual shear tests, with graphics on all the test phases.

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)

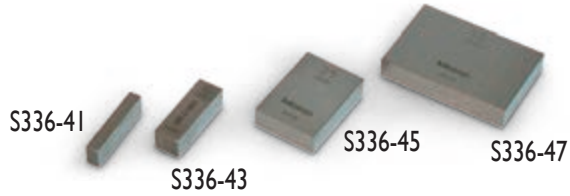
S280-15 Mounting device between the universal coupling pliers S335-15 and the shear machine to fix the vertical displacement transducer or dial gauge.

S280-16 Mounting device between the universal coupling pliers S335-15 and the shear machine to fix the horizontal displacement transducer or dial gauge.

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
S336-47 Gauge block, nominal length 50 mm



S277-41N

Software ShearLab Connect - Matest made

STANDARDS: ASTM D3080-72 / NF P94-071-1, P94-071-2 / BS 1377:7

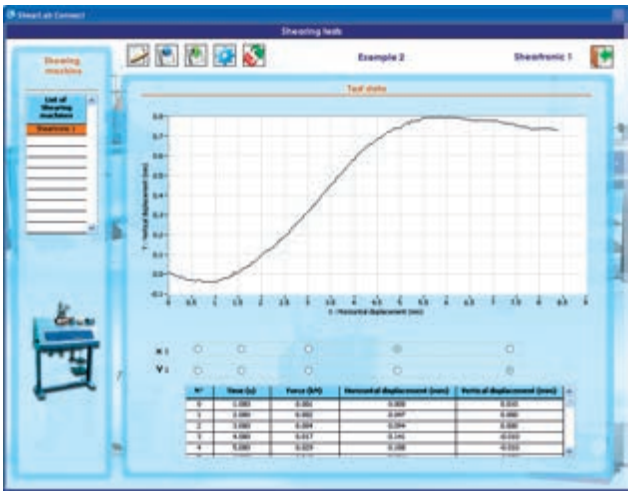
NEW

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 pag. 445.

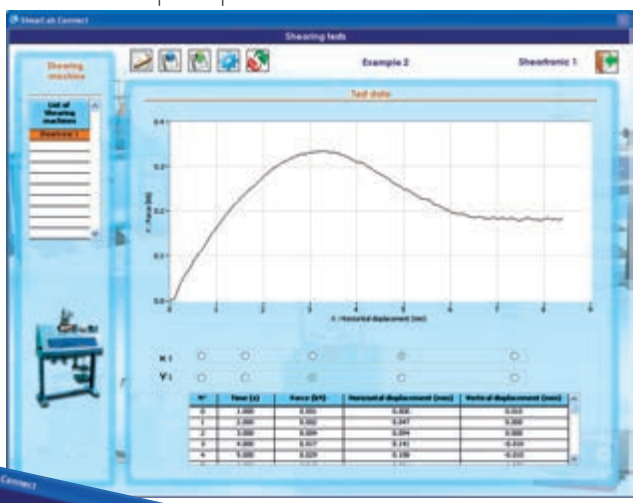
The program can be used in a very simple and intuitive way; a dedicated window allows to select the machine the user wants to work with while a test-specific setup guides the acquisition process, including data collection parameters that best fit the specific test. All test-specific initial, intermediate 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



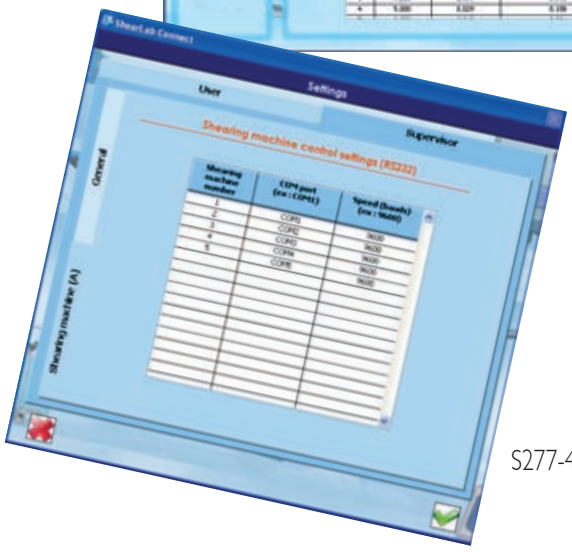
S277-41N Test-specific parameters

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.



S277-41N Control settings

TRIAXIAL TESTS

STANDARDS: BS 1377 part 8 / ASTM D2850-032, D4767-95, D7181-11 / NF P94-070, P94-074 / CEN-ISO /TS 17892-8,9

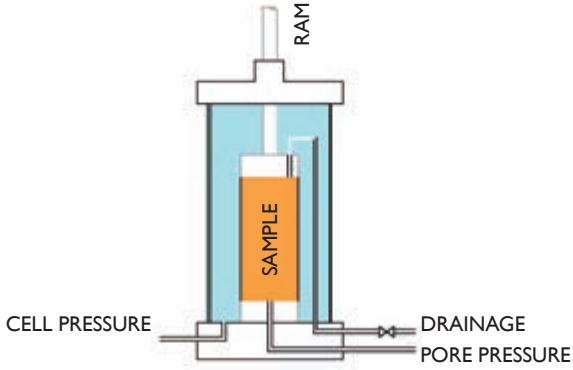
Introduction

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

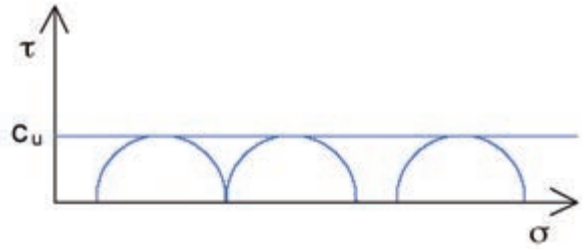
The most widely used testing apparatus for investigating the stress-strain behaviour and the strength parameters of soils is the triaxial apparatus.

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.



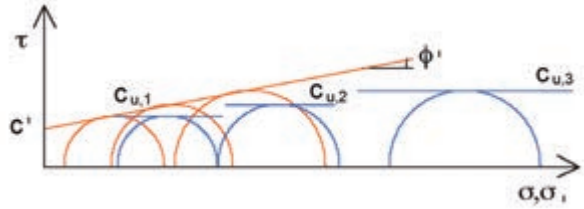
"UU" unconsolidated undrained test

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.



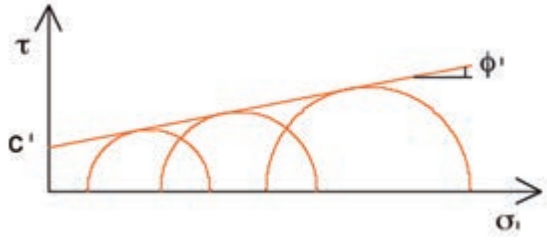
"CU" consolidated undrained test

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

Specifications of the frame:
- Maximum load capacity: 50kN
- Infinitesimal testing speed: from 0,00001 to 12 mm/min.
- Minimum vertical clearance: 400mm (140mm with ring)
- Maximum vertical clearance: 1100mm (840mm 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 pag. 24

S301N with load ring

- 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)

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: 490 x 510 xh 1800 mm
Weight: 115 kg

Detail of 8 channels

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 page 457

... *follows* ...

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 dia. 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 dia. 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

Note: Be aware that not all proving rings or load cells are suitable for all reachable axial force.
See "measure of the axial force applied" section, pag. 452

Accessories for Triaxial Cells:	Ø 38x76 mm	Ø 50x100 mm	Ø 70x140 mm	Ø 100x200 mm
Rubber membrane (pack of 10)	**S310**	**S310-01**	**S310-02**	**S310-03**
"O" ring (pack of 10)	**S311**	**S311-01**	**S311-02**	**S311-03**
Membrane stretcher	**S312**	**S312-01**	**S312-02**	**S312-03**
Split former	**S313**	**S313-01**	**S313-02**	**S313-03**
Top cap with drainage	**S314**	**S314-01**	**S314-02**	**S314-03**
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**
Perspex plain disc (2 pcs)	**S317**	**S317-01**	**S317-02**	**S317-03**
"O" ring for base adapter	**S318**	**S318-01**	**S318-02**	**S318-03**
Filter paper for lateral drainage (50 pcs)	**S319**	**S319-01**	**S319-02**	**S319-03**
Filter paper for base (100 pcs)	**S320**	**S320-01**	**S320-02**	**S320-03**
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 dia. 6x4 (20 mt.)	**S325**	**S325**	**S325**	**S325**
Terminal for connection tube (10 pcs)	**S326**	**S326**	**S326**	**S326**
Flaring tool	**S327**	**S327**	**S327**	**S327**
Vaseline oil (1 kg)	**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**

ACCESSORIES DESCRIPTION:

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.

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.

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. dia. and 50 ml. for specimens up to 100 mm. dia. 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.

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 pag. 464

Models:

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 pag. 462). 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:

S337-31 Load cell 2,5 kN capacity
S337-35 Load cell 5 kN capacity
S337-32 Load cell 10 kN capacity
S337-33 Load cell 25 kN capacity
S337-34 Load cell 50 kN capacity

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 pag. 462).
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:

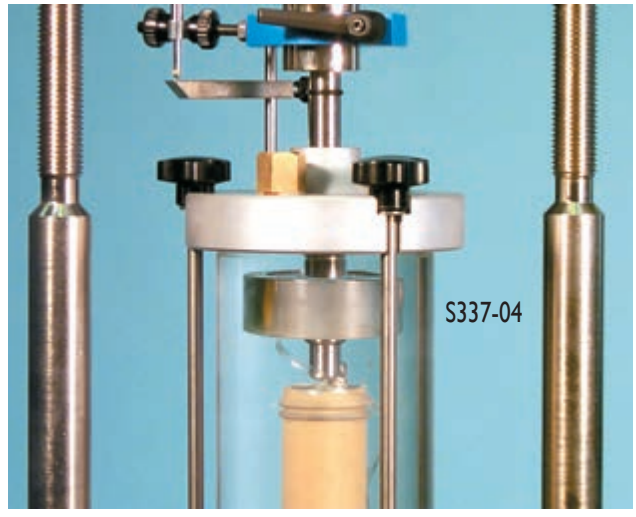
S337-02 Submersible cell 3 kN capacity
S337-03 Submersible cell 5 kN capacity
S337-04 Submersible cell 10 kN capacity
S337-05 Submersible cell 25 kN capacity

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,
- pressure transducer mod. S336-50, S336-51,
- 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)

NOTE: The displacement transducers must be connected to the automatic data acquisition system mod. S334 (see pag. 462) or mod. S301-05 (see pag. 449).

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.

Note: For other requirements, dial and digital gauges with different maximum travel and sensibility are also available: see technical details at pag. 465.

Displacement transducers (automatic readings)

Electrical devices for automatic readings. Calibration certificate is supplied. Cable, connector and signal conditioner are provided.

TYPES OF TRANSDUCERS AVAILABLE:

TYPE "A": Accurate and versatile linear potentiometric displacement transducer,.
Indipendent linearity < 0,3% (0,3x10mm)
Max. displacement speed: up to 10 m/s.

Models: **S336-10** Transducer 5 mm travel
S336-11 Transducer 10 mm travel
S336-12 Transducer 25 mm travel
S336-14 Transducer 50 mm travel
S336-13 Transducer 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** Transducer 5 mm travel
S336-15 Transducer 10 mm travel
S336-16 Transducer 25 mm travel
S336-17 Transducer 50 mm travel

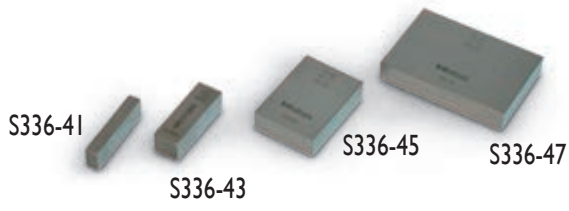
ACCESSORIES FOR DISPLACEMENT TRANSDUCERS:

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 10m 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 dia. 8mm to 20mm).

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 Gauge block, nominal length 5 mm
S336-43 Gauge block, nominal length 10 mm
S336-45 Gauge block, nominal length 25 mm
S336-47 Gauge block, nominal length 50 mm

... follows ...

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 50 Hz
Dimensions: 320x320x410 mm
Weight: 20 kg

A144

S350

Air/Water interface 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. S351 or mod. V207.
The cell set is equipped with an inlet **"high pressure air valve, a high accurate regulator which controls the work pressure and 4 outlet valves for pressurized water, water and air"**.
Dimensions: 270x300x425 mm
Weight: 9 kg

S350

SPARE PARTS for S350:

S350-04
Membrane for air/water cell. Pack of 2 pieces.

S350-05
Pressure regulator, high accuracy model.

S355-01 S350-05 S350-04

S355-01
FILTER UNIT (water trap) composed by filtering device and interchangeable cartridge, used to collect moisture.

S351

Laboratory air compressor

It reaches a maximum pressure of 17 bar and it must be used with the air/water interface cell.
Tubes and couplings for connections to the cell are supplied.
Reservoir capacity: 5 litres
Dimensions:
520x310x400 mm
Power supply:
230 V 1 ph 50 Hz
Weight: 35 kg

S351

As an alternative:

V207

Laboratory air compressor

It can be used when lower cell pressures are required, as an alternative to mod. S351.
Max. pressure: 10 bar
Reservoir capacity: 50 litres
Recommended for continuous working pressure up to 800 kPa
Power supply:
230V 1ph 50Hz
Weight: about 40 kg

V207

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

S355

ACCESSORIES:

V205
VACUUM PUMP
To produce vacuum up to of 0,1 mbar (see pag. 487)

V205-10 - V205-12
VACUUM REGULATOR
It is supplied with vacuum gauge, control valve, suction filter and moisture trap.

V205-10

V230-03
Rubber tube. Suitable for vacuum, 3 m

Note:
other models of vacuum pumps described at pag. 487

V205

MEASURE OF PRESSURE

Dial gauge units to measure pressure (0-1700 kPa)

They are 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.

MODELS:

S340

Dial gauge unit 4 valves

4 inlet/outlet null displacement valves are supplied with the dial gauge.
Dimensions: 410x350x110 mm
Weight: 6 kg

S340

S341

Dial gauge unit 8 valves

8 inlet/outlet null displacement valves are supplied with the dial gauge. It is recommended when more versatility is required.
Dimensions: 410x460x110 mm
Weight: 8 kg

S341

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

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

S350-01 Two-way distribution valve for air or water.

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 pag. 462) or mod. S301-05 (see page 4489).

- 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

S336-50

S336-51

S336-55

EXTENSION CABLE FOR TRANSDUCERS.

Models: **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 10m of extension cable to avoid noise problems that might occur.

S353

Null Indicator

It is used as a balancing device to improve pore pressure readings, avoiding any water flow inwards or outwards the sample.
It is made of one piece only of acrylic material.
It is placed directly on the triaxial cell, without connection tubes since eventual tubing expansions might occur. It is usually connected to pressure unit S340 or S341 and differential mercury manometer S356.

S353

S356

Differential mercury manometer, scale: -100 kPa +100 kPa

It allows negative pore pressure measurements and it is used to measure pore pressure for accurate readings in lower range (from -100kPa up to +100kPa).
It is composed by a "U" mercury-filled manometer, calibrated for readings in kPa. It is mounted on a metallic panel to be fixed to the wall.
A trap on the top collects the overflowing mercury.
No mercury is supplied. Weight: about 3 kg.

S356

ACCESSORY:

MERCURY, pack of 1 kg
(Matest cannot supply for shipping safety problems)

V300-17

... follows ...

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

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: 100ml
Accuracy: better than 0,1 ml.
Dimensions: 180 x 180 x 240 mm
Weight : 4,7 kg
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 100ml metallic air/water interface. A change valve box provides unlimited capacity.
Capacity : unlimited
Accuracy: better than 0,1 ml
Dimensions: 360 x 270 x 210 mm
Weight : 7,6 kg
Easy de-airing of top and bottom chambers. No measuring device and mounting block are included (see accessories).

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 pag. 462) or mod. S301-05 (see page 4489).

S338-01 KIT

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 pag. 453

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).

S338-05 Mounting device of the universal coupling pliers mod. S335-15 to fix the displacement transducer/dial gauge to the volume gauge.

CONSOLIDATION FOR TRIAXIAL SPECIMENS

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

Note: No cells, weights and dial gauges or displacement transducer are included and should be ordered separately.

ACCESSORIES:

S273 KIT Set of slotted weights 50 kg

Note: Different kits and loose slotted weights listed at pag. 436

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

S336-31 Extension cable 5 m

S359 with accessories

S335-10N

Software TriaxLab Connect & Reports - Matest made

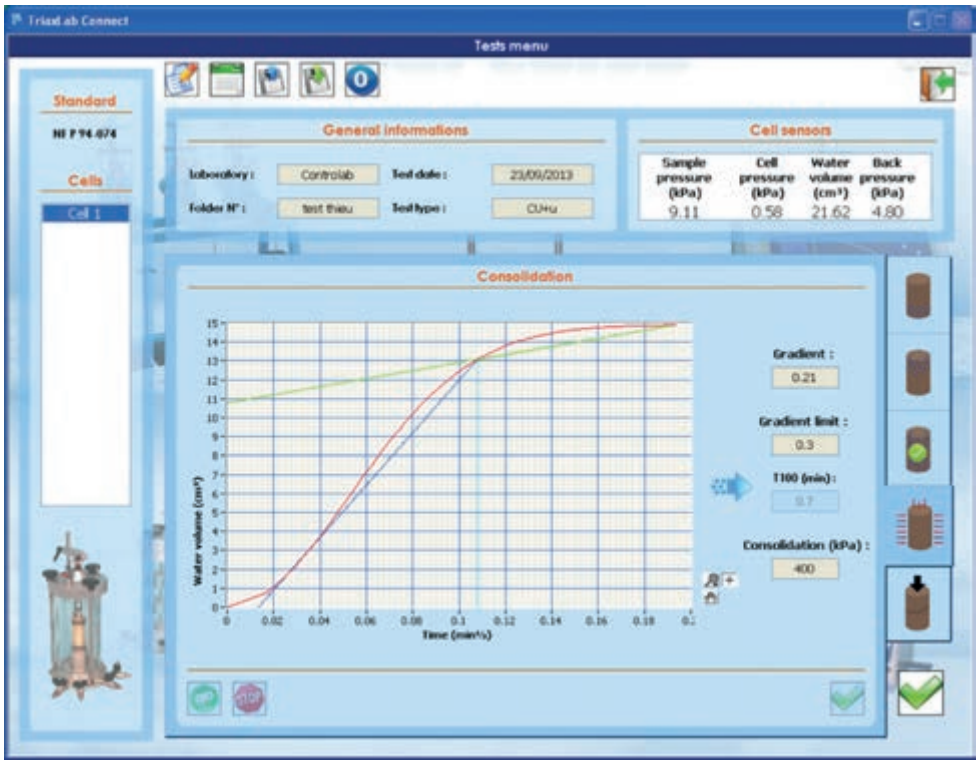
STANDARDS: NF P94-070, P94-074 / ASTM D2850-03a, D4767-95, D7181-11 / BS 1377:8

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).



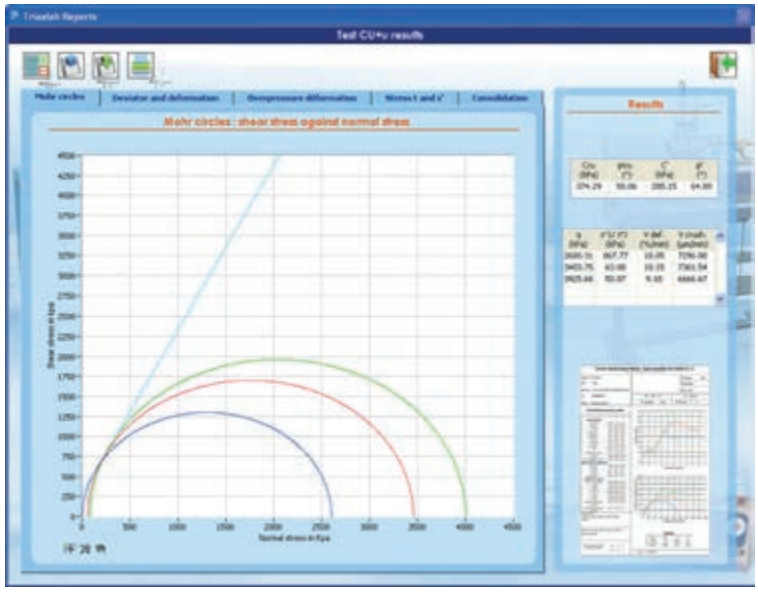
S335-10N Consolidation step in TriaxLab Connect

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

... follows ...

Recommended typical configuration of the triaxial system with one cell in the: manual, automatic and automatic with submersible load cell versions

APPARATUS SECTION	ITEM CODE	ITEM DESCRIPTION	ALTERNATIVE ITEM	MANUAL CELL SET	AUTOMATIC CELL SET	AUTOMATIC 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 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	1	-	-
	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 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	S350	air/water interface pressure system	A144	2	2	2
	S351	laboratory air compressor 17 bar (only if S350 system is chosen)	V207	1	1	1
	S350-04	membrane for air/water cell (spare) (only if S350 system is chosen)		1 (opt)	1 (opt)	1 (opt)
	S350-05	pressure regulator (spare) (only if S350 system is chosen)		1 (opt)	1 (opt)	1 (opt)
	S355-01	filter unit		1	1	1
	S340	dial gauge unit 4 valves (only if S350 system is chosen)	S341	2	2	2
	S345	screw pump		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	-	2	2
	S336-55	de-airing block		-	2	2
	S336-31	extension cable 5 m	S336-30..32	-	2	2
	S356	differential mercury manometer		1 (opt)	-	-
		mercury 1000 g (cannot be supplied)		1 (opt)	-	-
	S353	null indicator		1 (opt)	-	-

...follows...

Measure of Volume change	S358	double burette system	S338N	1	-	-
	S377	dial gauge 25 mm (only if S338 system is chosen)		1	-	-
	S335-15	universal coupling pliers (only if S338 system is chosen)		1	-	-
	S338-05	mounting device for pliers (only if S338 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
	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 dia. 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

(opt) = optional

... follows ...

Recommended typical configuration of the triaxial system with three cells in the: manual, automatic and automatic with submersible load cell versions

APPARATUS SECTION	ITEM CODE	ITEM DESCRIPTION	ALTERNATIVE ITEM	3 MANUAL CELL SET	3 AUTOMATIC CELL SET	3 AUTOMATIC 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
	S301-06	8 channel expansion module		-	1 (opt)	1 (opt)
	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	S350	air/water interface pressure system	A144	6	6	6
	S351	laboratory air compressor 17 bar (only if S350 system is chosen)	V207	1	1	1
	S350-04	membrane for air/water cell (spare) (only if S350 system is chosen)		1 (opt)	1 (opt)	1 (opt)
	S350-05	pressure regulator (spare) (only if S350 system is chosen)		1 (opt)	1 (opt)	1 (opt)
	S355-01	filter unit		1	1	1
	S340	dial gauge unit 4 valves (only if S350 system is chosen)	S341	3	3	3
	S345	screw pump		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	-	6	6
	S336-55	de-airing block		-	6	6
	S336-31	extension cable 5 m	S336-30..32	-	6	6

...follows...

	S356	differential mercury manometer		3 (opt)	-	-
		mercury 1000 g (cannot be supplied)		3 (opt)	-	-
	S353	null indicator		3 (opt)	-	-
Measure of Volume change	S358	double burette system	S338N	3	-	-
	S377	dial gauge 25 mm (only if S338 system is chosen)		3	-	-
	S335-15	universal coupling pliers (only if S338 system is chosen)		3	-	-
	S338-05	mounting device for pliers (only if S338 system is chosen)		3	-	-
	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 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
	S314	top cap with drainage (accordingly to specimen dimensions)	S314-01..03	3	3	3
	S315	base adapter for cell (accordingly to cell model and specimen dimensions)	S315-01..07	3	3	3
	S316	porous disc (2 pcs) for CD/CU/UU tests (accordingly to specimen dimensions)	S316-01..03	3	3	3
	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 dia. 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 (accordingly to cell set)	S332-02..05	1	1	1

(opt) = optional

AUTOMATIC DATA ACQUISITION AND PROCESSING SYSTEM FOR GEOTECHNICAL TESTS

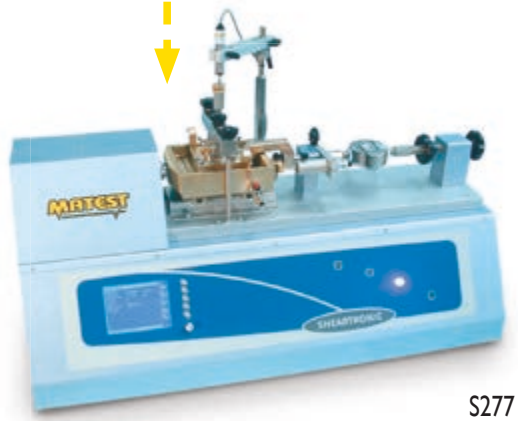
S334 Datatronic 8 channels Cyber-Plus Evolution Touch Screen "Expandable to 16 channels"

MATEST Equipment or of other manufacturers

S334

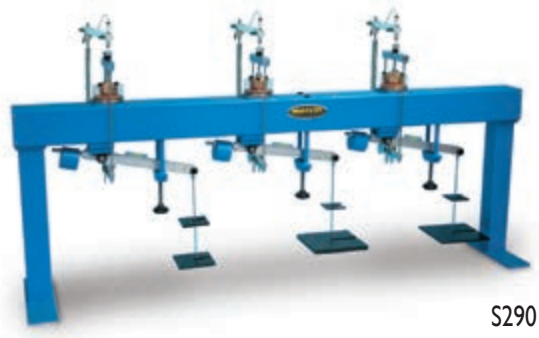
S301N
Triaxial
UU - CU - CD tests

S260
Consolidation test



S277
Direct/Residual shear tests

S359
Consolidation frame
for triaxial specimens



S290
Consolidation frame
for shear boxes and consolidation cells

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 pag. 24.
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.

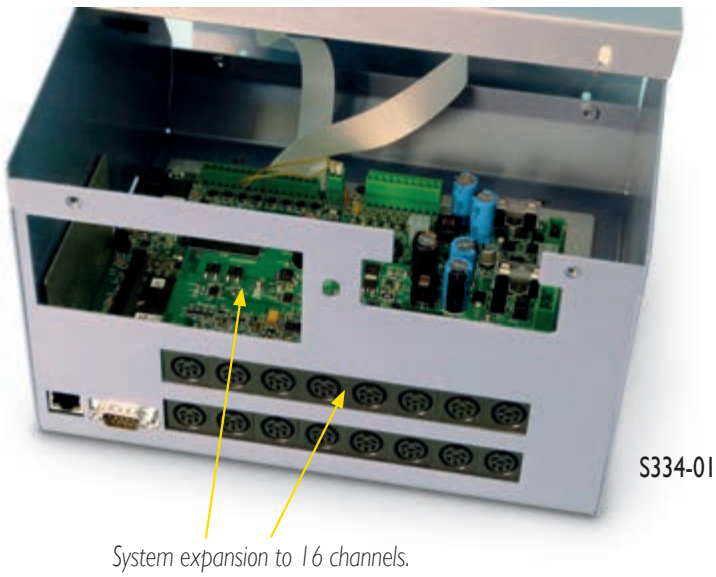
The system can be used for:
- Oedometer (consolidation) tests
- Direct and residual shear tests (cycle test)
- Triaxial UU, CU, CD tests
- Automatic data acquisition and processing systems permit the utilization of different channels that can be independently calibrated, zeroed and set up in order to 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 ÷ ± 5 V
  Different auxiliary transducer supply available: 3 V, 5 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.

ACCESSORY:

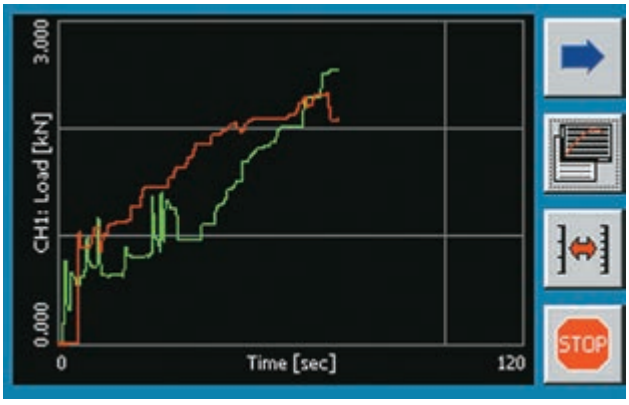
S334-01
8-CHANNEL INTERNAL MODULE, for system expansion to 16 channels.

S334-11 Network connection RJ45 cable.

S334-12 Switch to connect from 2 up to 7 Cyber-Plus (mod. S334) to the Ethernet network.



System expansion to 16 channels.



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 PART:
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, 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

Digital Dial Indicators

Including battery and RS 232 port for PC connection.

Model	Travel mm	Division mm
S382-01	12,5	0,001
S383	25	0,001

ACCESSORY:

S382-13
Software, complete with USB adaptor and cable to connect S382-01 to PC.

NEW

S382-02

Digital Dial Indicator

Travel: 15,3 mm - Division: 0,001 mm
Including battery, but **"without"** RS232 port.

ACCESSORIES:

S380
Magnetic dial holder, comprising a fix rod and an adjustable rod.
Magnetic base force 25 kg

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

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 utilized for general purposes and are suitable to perform properly different measuring procedures of liquids and solids, weighing, temperature, containers, still, pH, chemicals, reagents etc.

MECHANICAL BALANCES ORIGINAL "OHAUS"

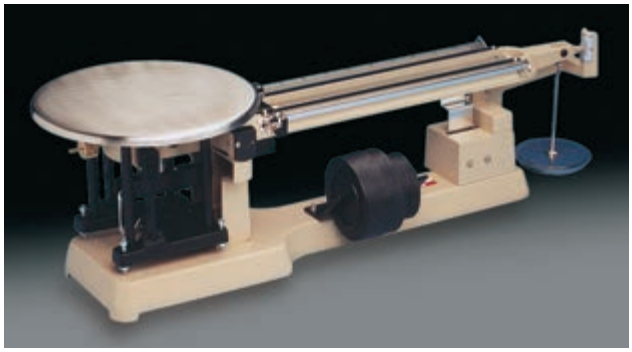
MODELS:

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



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.

V057

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.

V051

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

V031

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

V036

V035-03

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.

Code	Weight	SIT Certificate	Plastic box
V035-01	50 g	no	yes
V035-01CER	50 g	yes	yes
V035-02	100 g	no	yes
V035-02CER	100 g	yes	yes
V035-03	200 g	no	yes
V035-03CER	200 g	yes	yes
V035-04	500 g	no	yes
V035-04CER	500 g	yes	yes
V035-05	1 kg	no	yes
V035-05CER	1 kg	yes	yes
V035-06	2 kg	no	yes
V035-06CER	2 kg	yes	yes
V035-07	5 kg	no	yes
V035-07CER	5 kg	yes	yes
V035-08CER	10 kg	yes	yes

V023-01

Moisture determination balance

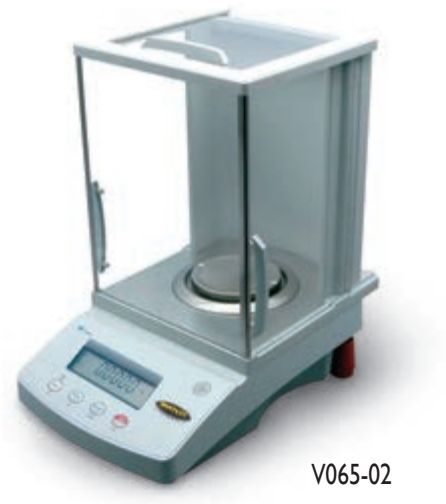
160 g. capacity x 0,001/0,01 g. sensitivity with tare up to 10 g.
Samples are dried by a infrared lamp with adjustable heat control.
A built-in-timer 0-61 min. switches off the heater at the end of the drying cycle which is signaled by a bell.
Moisture loss percentage and residual mass are read directly from the lighted scale.
Power supply: 230 V 1ph 50/60 Hz

V023-01

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 dia. 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: 315 x 225 x 330 mm
Weight : 10 kg approx.



V065-02

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.

V072-05

V072-09

V070-02

V071-07

V075-13

V075-06

V073-06

V072-06

Model	Capacity	Readability	Pan dimensions mm	Standard accessories	Optional accessories
V070-02	210 g	0,001 g	Dia. 110	E + F + G	H
V070-05	310 g	0,001 g	Dia. 80	E + F + G	H
V070-06	500 g	0,001 g	Dia. 110	A + F + G	H
V071-02	1500 g	0,01 g	Dia. 120	E + F + G	H
V071-10	2200 g	0,01 g	Dia. 160	E + F + G	H
V071-07	3100 g	0,01 g	Dia. 160	E + F + G	H
V071-11	4100 g	0,01 g	Dia. 160	A + F + G	H
V072-02	800/5500 g	0,01/0,1 g	Dia. 160	A + F + G	H
V072-05	10 kg	0,1 g	175x200	E + F + G	H
V072-06	12 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 + G	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	Dia. 120	E + G	H
V075-03	600 g	0,01 g	Dia. 120	E + G	H
V075-04	1500 g	0,01 g	Dia. 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:

G = **V074-11** RS232 port with connection cable

H = **V074-12** Printer complete with connection cable

V074-13 Traceable calibration certificate

V085

Specific gravity frame (Bouyancy balance system)

STANDARDS: **EN 12390:7** / BS 812:2, 1881:114 / UNI 6394:2

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

ACCESSORIES:

V085-01 Craddle for holding concrete cube and cylinder specimens
V041 Density Basket, stainless steel, dia. 200 x 200 mm, mesh 3,35 mm

V072-02

V085

V086 KIT

Specific gravity kit

Used for specific gravity determination of solid materials.
Simplified and economical solution.
The kit is composed by:

V086 Support bridge frame with hook rod.
V042 Density tank, plastic, 370x370x330 mm
V041 Density basket, stainless steel, dia. 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

V071-07

V086 KIT

DENSITY BASKETS

Available models:

V041 DENSITY BASKET
STANDARDS: ASTM C127 / AASHTO T85 / BS 812:2
Used for specific gravity tests, stainless steel made, dia. 200x200 mm, mesh size 3,35 mm. Weight 1,5 kg

B017-01 Density Basket, stainless steel made, dia. 130x135 mm, mesh size 0,063 mm. Weight 500 g

B017-02 Density Basket, stainless steel made, dia. 130x135 mm, mesh size 0,400 mm. Weight 600 g

B017-04 Density Basket, stainless steel made, dia. 130x135 mm, dual mesh size 0,063 and 0,400 mm. Weight 700 g

A103 Density Basket, stainless steel made, dia. 120 x 160 mm, mesh size 3,35 mm

A103-01 Density Basket, stainless steel made, dia. 95 x 120mm, mesh size 1,18 mm NEW

A103-02 Density Basket, stainless steel made, dia. 95 x 120mm, mesh size 0,600 mm NEW

A103-03 Density Basket, stainless steel made, dia. 65 x 80mm, mesh size 0,150 mm NEW

V042
Density tank plastic,
dimensions 370x370x330 mm
Weight: 3 kg

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, borosilicate glass.
STANDARD: **EN 1097-6**
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 - 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

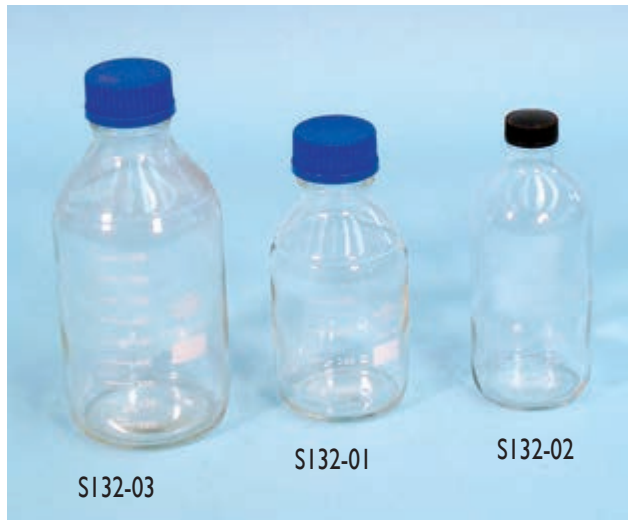
Model	Capacity
V108	25 ml.
V108-01	50 ml.
V108-02	100 ml.
V108-03	250 ml.

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	dia. 50 x h. 30 mm
V110-01	dia. 25 x h. 40 mm
V110-02	dia. 70 x h. 50 mm
V110-03	dia. 40 x h. 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

Capacity: 24 ml.

V111-01
Hubbard-Carmick specific gravity bottle
STANDARD: ASTM D70

Capacity: 25 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

V124 **Dropping bottle**, 100 ml capacity

Graduated pipettes, MOHR type, soda glass

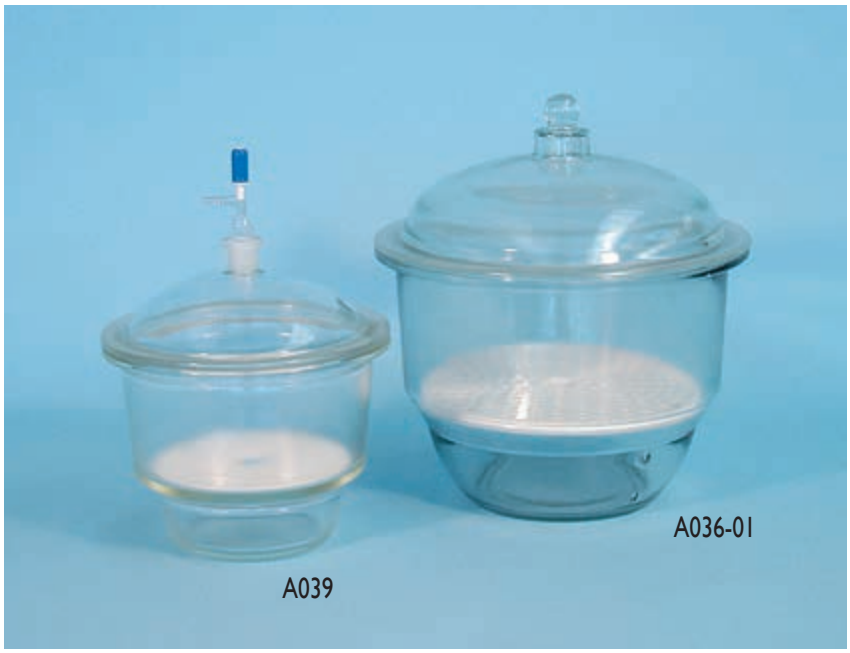
Model	Capacity	Sub-divisions
V142	1 ml	0,01 ml
V142-01	5 ml	0,1 ml
V142-02	10 ml	0,1 ml
V142-03	25 ml	0,1 ml
V142-04	50 ml	0,1 ml
V142-05	100 ml	0,2 ml

Graduated burettes, bended,
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, right,
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



V147
Stirring rod, glass, 8 mm dia. x 250 mm long. Pack of 10

V147-01
Marking pencil, glass, pack of 12

Desiccators, borosilicate glass
Complete with porcelain perforated plate

Model	Diameter
A035	200 mm
A036	250 mm
A036-01	300 mm

V300-15
Silica gel
Pack of 1000 g.

V138
Filter funnel, pyrex glass, dia. 90 mm. for particle analysis tests to BS 1377

Vacuum type desiccators,
borosilicate glass.
Complete with porcelain perforated plate

Model	Diameter
A039	200 mm
A040	250 mm
A040-01	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: **UNI 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

Funnels, long stem, plastic

Model	Diameter
V137	60 mm
V137-01	80 mm
V137-02	100 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	380x280x195 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
STANDARDS: BS 1377:2 / ASTM D421

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 heated pestle

Evaporating dishes, porcelain, with sput

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

V114-10
Silica evaporating dish
130 mm dia. x 30 mm high.
Capacity: 160 ml

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, dia. 35 xh 38 mm, weight 19 g, thickness 0,25 mm
V117-05 Platinum crucible 25 ml capacity, dia. 35 xh 40 mm, weight 30 g, thickness 0,39 mm

V117-05

V140
Buchner funnel, porcelain, 115 mm. dimeter for use with 110 mm. dia. 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: 0,1m/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: 280x150xh250 mm
Weight: 3 kg

V168

SPARE PARTS:
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

V168-01
Thermohygrograph, internal use, same to mod.V168 but with temperature range 0 +40 °C.
Battery operated

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 dia. 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 dia. 3x160 mm

V154

Digital microprocessor thermometer

Rugged, easy to use portable instrument with K type sensor for high temperature measurements, it is equipped with a membrane keyboard and microprocessor with memory fonctions of: hold, min/max temperatures measured in the cycle, readings in °C or °F.
Dual temperature range: -50 to +200 °C resol. 0,1 °C
+200 to +1350 °C resol. 1 °C
Accuracy: ± 0,5% full scale
Power supply: 1x9 V battery with 500 hours use
Supplied **"without"** probe to be selected and ordered separately.

ACCESSORIES:
Stainless steel probes, complete with 1 metre cable and connector

V154-01 Penetration probe dia. 3x120 mm.
Max temperature: 900 °C
V154-02 Surface probe, dia. 16x260 mm.
Max temperature: 650 °
V154-03 Air probe, dia. 3x245 mm. Max temperature: 300 °C
V154-04 General purpose probe, dia. 5x220 mm.
Max temperature: 900 °C
V154-05 K type thermocouple 5 m long
V154-06 Coupling unit

C303N

Digital recording thermometer, two channels, for precast concrete.
Technical data and accessories: see pag. 265

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

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 dia.	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
V160-05	0 +60	1	75 mm	600
V160-06	0 +250	5	75 mm	600

V161-01
Dial thermometer
Range 0+200 °C for surface measurements.

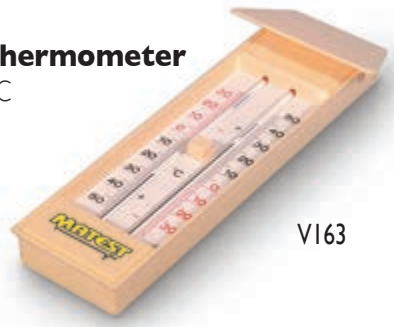
ASTM, IP, NF thermometers, glass stem and mercury system

Model	Range °C	Graduation °C	ASTM	IP
B057-08	23 a 27	0,1		38C
B063-01	-2 a 300	1	7C	5C
B064-03	150 a 175	0,5	13C	47C
B069-11	-2 a 400	1	8C	6C
B072-01	-2 a 80	0,2	15C	60C
B072-02	30 a 200	0,5	16C	61C
B077-02	-38 a 30	0,5		42C
B082-01	18 a 28	0,2	23C	
B082-02	39 a 54	0,2	24C	
B082-03	95 a 105	0,2	25C	
B083-07	0 a 44	0,2		8C
B086-10	-6 a 400	2,0	11C	28C
B089	19 a 27	0,1	17C	
B089-01	34 a 42	0,1	18C	23C
B089-02	49 a 57	0,1	19C	
B089-03	57 a 65	0,1	20C	
B089-04	79 a 87	0,1	21C	
B092-10	-5 a 110	0,5	9C	15C
B092-11	-20 a 50	0,5	57C	
B094-10	90 a 370	2,0	10C	16C
B082-04	0 a 55	0,2	NFT66-020	

Armoured thermometers

Model	Range °C	Graduation °C
V162	0 ÷ 100	1
V162-01	0 ÷ 200	2

V163
Max./Min. Thermometer
range -30°C +50 °C



Thermometers glass stem and mercury system, for general laboratory use.

Model	Range °C	Graduation °C
V164	-5 + 50	0,5
V164-01	-10 + 100	1
V164-02	-10 + 200	1
V164-03	-10 + 300	1

V170
Stop watch, digital, non magnetic, having also watch functions. Precision 0,1 second.

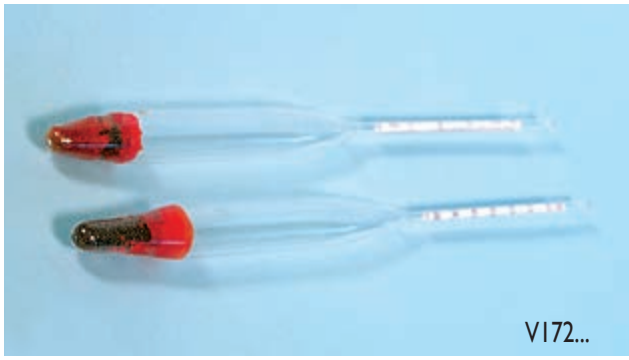
V170-01
Stop watch, mechanical dial type, non magnetic. Precision 0,1 second.

V171
Timing device, 0 to 60 minutes, with alarm.

V166-01
Conductivity meter – thermometer, digital, portable. Used for site and laboratory measurements of the conductivity in soils.
Measuring scale: 0 - 3999 uS/cm - resolution 1 uS/cm - accuracy 1%
Temperature in °C. and °F., range 0 - 60°C., resolution 0,1°C.
Temperature calibration and compensation: automatic.
Use conditions: 0 to 50°C., R.H. 100%
Feeding: battery.
Weight: 100 g

Soil hydrometers

V172 Range 0,995 - 1,038 g/ml, div. 0,001 - 151 H
V172-02 Range -5 + 60 g/litre - 152 H
V172-03 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



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

V173-01 BUNSEN BURNER, universal, with air control.
IT CANNOT BE SOLD IN CE MARKETS.

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 CE markets, but not usable in closed spaces.

V173-02 Tripod dia. 100 x 150 mm
V173-05 Tripod dia. 120 x 220 mm
V173-06 Tripod dia. 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, 0-160 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.

V177 HEAT RESISTANT GLOVES
V177-01 NEOPRENE GLOVES

V178 SOFT BRUSH, for cleaning sieves etc.
V178-01 FINE WIRE BRUSH
V178-03 BOTTLE BRUSH dia. 50 mm

V179 BRISTLE, round, 35 mm. dia. 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, dia. 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	300 mm
V116-02	350 mm

V112-05
Mortar and **Pestle**, stainless steel, dia. 135 mm

Tins, with or without cover

V122 Dia. 55 x 36 mm aluminium, with cover
V122-01 Dia. 55 x 65 mm aluminium, with cover
V122-02 Dia. 75 x 50 mm aluminium, with cover
V122-03 Dia. 57 x 32 mm aluminium, without cover
V122-04 Dia. 45 x 13 mm aluminium, without cover
V122-05 Dia. 55 x 35 mm brass, without cover
V122-06 Dia. 70 x 45 mm brass, without cover
V122-07 Dia. 90 x 20 mm di aluminium, with cover
V122-11 Dia. 55 x 36 mm aluminium, without cover

Plastic containers with airtight lid

Pack of 10 pieces

Model	Capacity	Handle	Quantity
V125-12	1 litres	no	10 pcs
V125-16	5 litres	yes	10 pcs
V125-18	15 litres	yes	10 pcs

SAMPLE CONTAINERS, tinned steel, airtight lid

Model	Capacity
V125	0,5 litre
V125-01	1 litre
V125-03	5 litres

PANS: ALUMINIUM, 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	alluminium
V182-02	330x220x50	alluminium
V182-05	270x180x50	alluminium
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

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 dia. 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

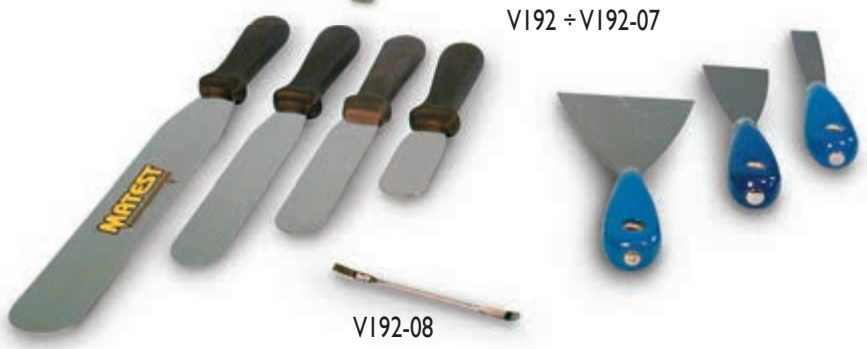
SPATULAS:

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



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

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

V200

Rectangular and square plates

- aluminium alloy plate
- max. temperature: 350°C.
- thermostat range 0-350°C with fluid expansion probe
- insulation class: I
- 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	NEW **MATEST made**
V200-03N	SQUARE HOT PLATE	380x380 mm - 2000 W	NEW **MATEST made**
V200-05N	RECTANGULAR PLATE	400x500 mm - 2000 W	NEW **MATEST made**
V200-06N	RECTANGULAR PLATE	400x600 mm - 2000 W	NEW **MATEST made**

V200-05

V200-01

HOT PLATES:

(They can be used also for the determination of the softening point of bitumen, see page 134)

B074 ROUND PLATE dia. 160 mm - 1000 W

B074

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

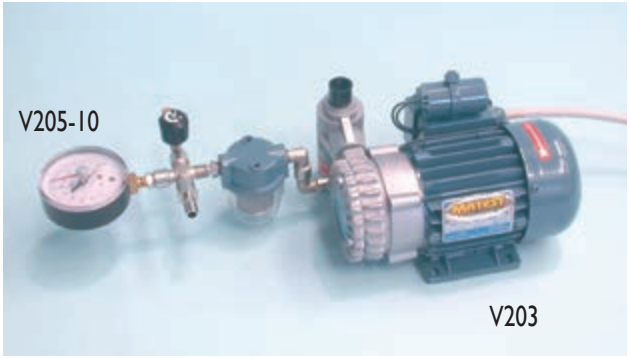
B073-02

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.



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 50 Hz
Dimensions: 220x260x190 mm
Weight: 12 kg

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	litri/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	300x150x240	350x150x275
Weight	kg	8,4	9,8	11

SPARE PART:

V205-11
Special oil for vacuum pumps.
Bottle of 500 cc.

ACCESSORIES:

V205-10 Vacuum regulator, complete with vacuum gauge dia. 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/cm2 to create a moderate vacuum.

V201

Warm air drier, for general laboratory purposes, to dry soil and aggregate samples.

Power supply: 230V 1 ph 50 Hz 1200 W

V201

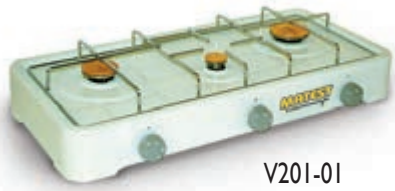
V201-01

Butane three-burner

field heater, to be used with a common butane cylinder.

Dimensions: 600x320x90 mm approx

Weight: 5 kg



V201-01

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

V208-10

S351

Air compressor

Max pressure: 17 bar

Receiver capacity: 5 litres

Power supply: 230V 1ph 50 Hz

Dimensions: 520x310x400 mm

Weight: 35 kg

S351

V207

Laboratory air compressor

Max. pressure: 10 bar

Air delivery: 240 litre/minute at room pressure.

Reservoir capacity: 50 litres

Recommended for continuous working pressure up to 8 bar

Power supply: 230V 1ph 50Hz 1,5 KW

Weight: 40 kg approx.

V207

V206

Air compressor

Receiver capacity is 24 litres and it delivers 70 litres of air per minute at 6 ATM.

Air delivery: 222 litre/minute at room pressure.

Max pressure is 8 kg/sq.cm (800 kPa)

Power supply: 230V 1ph 50 Hz

Weight: 30 kg

V206

V206-01

Air compressor

Same to mod.V206 but with:

Air reservoir: 100 litres capacity

Air delivery : 260 litre/minute

V206-02

Air compressor

Same to mod.V206, but with:

Air reservoir: 200 litres capacity

Air delivery: 320 litres/minute.

WATER STILLS

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.
Power supply: 230V 1ph 50/60Hz

V211

Available models:

V211
Water still 4 litres/h capacity
Power: 3000W
Dimensions: 250x222x542 mm.
Weight: 13 kg

V211-01
Water still 8 litres/h capacity
Power: 6000W
Dimensions: 260x260x610 mm.
Weight: 16,5 kg

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

V215-01
pH / mV / °C meter, portable, waterproof
Range pH: -2,00 to 16,00 - Resolut. 0,01 pH
mV: +/- 699,9 to +/- 1999 - Resolut. 0,1mV - 1mV
Temperature: -20,0 to 120,0°C - Resolut. 0,1°C
Automatic 1 or 2 points calibration with 3 memorised buffers.
Automatic temperature compensation.
Power supply: 9V battery, 100 hours use.
Supplied complete with: electrode, temperature probe, battery, calibration solutions.
Weight. 180 g

V215-01

V215-02
PH / °C meter, laboratory model
Range pH: -2,00 to 16,00 - Resolut. 0,01pH
Temperature: -9,9 to 120,0°C - Resolut. 0,1°C
Automatic 1 or 2 points calibration with 5 memorised buffers.
Automatic temperature compensation.
Rechargeable pH electrode, glass body.
Power supply: 12Vdc (230V adapter included)
Supplied complete with: electrode, temperature probe, electrode-holder, adaptor, calibration solutions.
Dimensions: 240x182x74mm
Weight: 1100 g

V215-02

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 dia. 10x500 mm. Weight: 3 kg
V219-01 Metal stand, base 200x260. Rod dia. 12x800 mm. Weight: 5 kg
V220 Hoffman screw clamp, max opening 25 mm
V220-01 Mohr clamp
V220-02 Double sleeve metal/metal. Dia. 10÷25 mm
V220-03 Double sleeve metal/metal. Dia. 10÷20 mm
V220-04 Simple clamp. Dia. 10÷20 mm
V220-05 Simple clamp. Dia. 20÷30 mm

V220...

V219...

V222
Tool kit, for general purpose uses and normal maintenance of laboratory equipment.
Weight: 7 kg

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
V224-01 Trolley platform size 910x610 mm. Weight: 17 kg
V225 Trolley at double shelf size 790x480 mm. Weight: 21 kg

V225

V224

V226
Wheel barrow, pneumatic type

V226

Rubber tubing

Model	Inside dia.	Length
V230	5 mm	5 metre
V230-01	6 mm	5 metre
V230-02	8 mm	5 metre

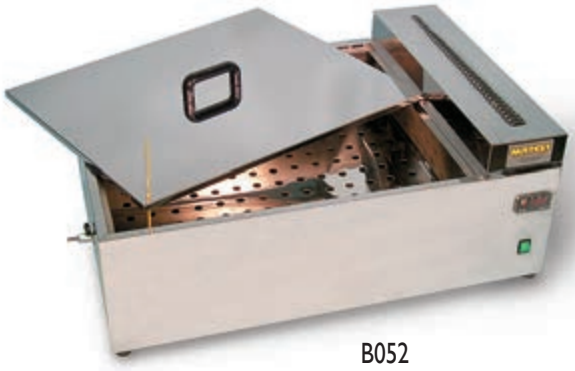
V230-03 Special tubing for vacuum applications
8 mm inside dia. by 3 metre length.

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 kg. 17

V241


B052

Thermostatic water baths

See Sections: Ashpalt/Bitumen pag. 100
Cement/Mortars pag. 304
Soils pag. 359

V218...

Filter paper, pack of 100 pieces

Model	Whatman n°
V218-01	1 x 110 mm dia.
V218-02	1 x 150 mm dia.
S200-14	5 x 150 mm dia.
V218-05	40 x 150 mm dia.
V218-06	44 x 150 mm dia.
V218-07	44 x 110 mm dia.
V218-08	50 x 110 mm dia.
V218-09	54 x 150 mm dia.
V218-10	540 x 150 mm dia.
V218-11	541 x 110 mm dia.
V218-12	54 x 400 mm dia.

CHEMICALS

Model	Description	Q.ty
V300-05	Distilled water	2000 ml
V300-15	Silica gel	1000 g
V300-16	Glycerine	1000 ml
V300-18	Vaseline oil	1000 ml
V300-19	Paraffin wax	4600 g
V300-23	Sodium hexametaphosphate	1000 g
V300-24	Sodium hydroxide	1000 g

Model	Description	Q.ty
V300-25	Sodium sulfate	1000 g
V300-28	Blue of methylene	100 g
V300-29	Kaolinite	500 g
V300-30	Ion exchange resin	500 g
V300-31	Blu Matest painting for retouches	500 g
V300-32	Matest metalling paint for retouches	500 g

NOTE: Several chemicals classified as dangerous, cannot be supplied for shipping safety problems.

V300...

Analytical Index

A	Mod.	Page
AAV - Aggregate abrasion value	A111N	55
Abrams, slump cone	C178 KIT	258
Abrasimeter	A109	59
Abrasimeter for bricks, glazed and concrete tiles, natural stones	A112	55
Abrasion machine, Dorry	A111N	55
Abrasion machine, Los Angeles	A075	**45**,**78**
Abrasion tester Böhme	C129	54,25
Abrasion tester, Planetary	B053-20	126
Abrasive white corundum	A112-01	55
Abson, recovery of binder	B018-10	75
Absorption cone and tamper	S148	51,126,**389**
Accelerated curing of concrete	C307	275
Accelerated polishing machine	A128N	54
Accessories for compression/flexure on cement	E170 / E172-01	352
Accessories for compression/flexure on concrete	C097-01	240 / 247
Accessories for tests on metals	H003-11	359
Accredia hardness certificate	C097-08	240
Acidity test kit of water	S135	386
Adhesion test Vialit apparatus	B053	126
Adhesion tester, plaster	E142	289, **330**
Admixtures for concrete	C199-10	263
Affinity between aggregate and bitumen	B022	77
Ageing Vessel	B091N	142
Aggregate crushing value apparatus, BS 812:110	A082	50
Aggregate density by water displacement	A086	50
Aggregate impact value apparatus	A080 KIT	47
Aggregate shape gauge	A072	44
Air and water permeability of concrete, Figg technique	C375-10 KIT	290
Air bath for bitumen	B016	130
Air compressor, triaxial	S351	**454**, 488
Air compressors	S351 / V206	454, **488**
Air content meters, cement	E027	310
Air content of mortar: measurer	E029	309
Air drier	V201	29, **488**
Air entrainment meters, concrete	C195	262
Air jet sieving machine	A058-05N	37
Air permeability apparatus, Blaine	E009 KIT	308
Air/water permeability of concrete	C375-10 KIT	290
Air/water pressure system, triaxial test	S350	454
AMPT/SPT Asphalt Mixture Performance Tester	B200	105
Analytical balance	V065-02	469
Andreasen pipette	S144	49, **391**
Angle measurer, Gyratory	B041-28	92
Anemometer	V148-01	479
Angularity of aggregates	A073	44
Aquameter, moisture meter	C3474-06	289
Anvil for test hammers, concrete	C390	60, **292**
ARC - Asphalt Roller Compactor	B039	93-95
Armoured thermometers	V162	481
Array meter for concrete, resistivity method	C412-01	300
ASC - Asphalt Shear box Compactor	B039A	96
Ash content	A022	**28**, 70
Asphalt compactibility	B031N1 / B033	84, 85
Asphalt content, furnace by ignition method	B005	70
Asphalt density	B111	147
Asphalt indentation penetrometer	B059-10	79
Asphalt Institute viscometers	B088-34	144
Asphalt mixers	B027	81-83
Asphalt Mixture Performance Tester	B200	105
Asphalt oven with rotating shelf	B064 KIT	131
Asphalt permeability	B024	80
Asphalt shear box compactor	B039A	96
Aspirator pump	V202	389, **487**
Assessment of fines aggregates: methylene set	S157 KIT	**49**, 391
Assessment of flatness	C250-10	270
Augers, hand and power head	S092 KIT / S097	378
Autoclave for soundness, cement	E070	320
Automatic binder extraction unit	B008	71
Automatic data acquisition and processing systems	S334	462
Automatic servo-controlled system for pressure setting	C104N PL	66
Autotec, automatic servo-controlled system two channels	C098N	**155**, 337
Axial strain measurement	S336-10	453

B	Mod.	Page
Bacon sampler	B060	130
Bags, plastic	V145-10	477
Balance mud Baroid	E037-01	312
Balance, electronic analytical	V065-02	469
Balance, moisture determination	V023-01	31,388,**469**
Balances, electronic	V070-02	470
Balances, Ohaus	V014	468
Balances, semi-automatic zero-centering	V031	468
Ball penetration measuring apparatus	E031	311
Balloon density apparatus	S230 KIT	430
Bar container, mortar	E067-05	324
Bar (grid) sieves	A048N KIT	32
Baroid mud balance	E037-01	312
Barton comb	A122	59
Basket, density	V041	51,264,**472**
Batching scales	V051	468
Bath air, bitumen	B016	130
Bath, cooling for resilience tests on steel	H052	370
Bath, Le Chatelier	E064	322
Baths, bitumen	B052	114, **124**
Baths, curing aggregates/cement	E136	51,**334**,389
Baths, Marshall	B051	124
BBR - Bending Beam Rheometer	B085-05	142
Beaker EN 933-9	S157-05	391, **487**
Beakers, pyrex glass	V104	473
Beam apparatus, Benkelman	B100	**148**, 425
Beam device, travelling	B098N	147
Beam moulds, concrete	C254	267,268
Bearing capacity and deflection	B103-05 KIT	149
Bearing plate equipment, soil	S222 KIT / S226 KIT	424
Bearing plate for static deformation of road pavements	B103-10	149
Beckman thermometer	E062-02	319

Bench for testing machines ... C126 ... 244
Bending mabeam Rheometer ... B085-05 ... 142
Bending machine, steel ... H065N ... 372
Bending test, four points ... S205-16 ... 416
Bending test on metal ... H003-12 ... 359
Benkelman beam apparatus ... B100 ... **148**,425
Binder adhesion, Vialit ... B053 ... 126
Binder drainage, basket method ... B022-20 ... 80
Binder recovery apparatus ... B018 ... 75
Binder, automatic extraction unit ... B008 ... 71
Bits, diamond for drilling machines ... C339-01 ... 282
Bitumen Ageing Vessel ... B091N ... 141
Bitumen emulsion: determination of penetration power ... B075-08 ... 138
Bitumen emulsion: determination of settling tendency ... B075-01 ... 138
Bituminous emulsions: mixing stability with cement ... B076-23 ... 136
Bituminous emulsions: residue on sieving ... B076-21 ... 136
Blade, diamond ... C350-12 ... 283
Blaine air permeability apparatus ... E009 KIT ... 308
Blaine automatic air permeability apparatus ... E011-01 ... 308
Blaine, electronic air permeability apparatus ... E011 ... 308
Bleeding determination, concrete ... C199-10 ... 263
Blu Matest painting for retouches ... V300-31 ... 491
Blue of methylene ... V300-28 ... 49,391,**491**
Blue of methylene test set ... S157 KIT ... 49, **391**
Böhme, abrasion tester ... C129 ... 54, **250**
Bond strength tester, Pull-Off ... E142 ... 288, **330**
Bottle dropping ... V124 ... 475
Bottle roller ... B022 ... 49, **78**
Bottle specific gravity ... V108 ... 51,389, **474**
Bottle, Hubbard specific ... V111 ... 140, **475**
Bottles, plastic ... V118 ... 477
Bouyancy balance system ... V085 ... 472
Bowls, mixing ... V116 ... 484
Boxes, plastic ... V127 ... 477
Breaking point, Fraas apparatus ... B077 KIT ... 132
Breaking value of cationic bitumen emulsions. Mineral filler method ... B090 ... 138
Brickworks, test on ... C358-01 ... 386
Briquette mould, cement ... E111 ... 332
Bristles ... V179 ... 483
British gypsum crystacal plaster ... A129-04 ... 63
Broaching machine, steel ... H057 ... 370
BRTA viscometers ... B084-01 KIT ... 139
Brushes ... V178 ... 483
Buchner funnel ... V140 ... 478
Bucket ... V128 ... 477
Bulk cement sampler ... E020 ... 309
Bulk density measures, aggregates ... A069 ... 43
Bulk density of bitumen ... V085 ... 80
Bulk density of cement ... E025 ... 309
Bulk density of lime ... E091 ... 311
Bunsen burner ... V173 KIT ... 483
Burettes, graduated ... V143 ... 476
Burner, butane ... V201-01 ... 488

C

	Mod.	Page

Cabinet with aspirator ... B079N ... 87
Cabinet with aspirator for binder extraction unit ... B008-10 ... 71
Cabinet, freeze and thaw ... C313 ... 57, **276**
Calcimeter, Dietrich-Frühling ... A105 ... **56**, 324
Calibration anvil for concrete test hammers ... C390 ... 60, **292**
Calibration device for Benkelman ... B100-02 ... 148
Calibration equipment for testing machines ... C138N ... 252
Calibration glass beads ... A060-... ... 42
Calibration process ... C138-05, C155-05, S337-51 ... 251,253,287, **452**
Calibration unit for extensometers and dial gauges ... S390 ... 465
California bearing ratio - CBR ... S200-01 ... 402
Calipers, Vernier ... V175 ... 270, **483**
Calorimeter, heat of hydration ... E061N ... 319
Canin, corrosion analysing equipment ... C411 ... 300
Cannon BS-IP-RF viscometers ... B088-80 ... 145
Cannon-Manning vacuum viscometers ... B088-20 ... 144
Cannon-Fenske viscometers ... B088-50 ... 145
Capping compound ... C290-06 ... 278
Capping equipment of concrete, sulphur method ... C290-01 ... 278
Capping pads, concrete ... C107-09 ... 243, 277
Carbide moisture meters ... A025 KIT ... **30**, 289,388
Carbonation test ... C375-02 ... 289
Casagrande liquid limit ... S170 ... 394
CBR in situ apparatus ... S220 KIT ... 406
CBR loading machine, hand operated, field model ... S210 KIT ... 406
CBR testing machines ... S209 KIT / S216 KIT ... 407
CBR, moulding equipment ... S200-01 ... 402
CBR/Marshall testers ... S213N / S214N KIT ... 115, **408**
CBR/Proctor compactor ... S199 ... 400
CDAS - Control and Data Acquisition Systems:
- 8 channels ... B205 ... 104
- 16 channels ... B206 ... 104
Cementometers ... C214 ... 264
Centrifuge extractor, bitumen ... B011 ... 72
Chapman flask ... A029 ... 31
Charpy pendulum impact tester ... H060N ... 371
Charts, colour soil ... S132 ... 56, **386**
Chattaway, spatula ... V192-08 ... 485
Chemical products ... V300-05 ... 491
Chisel ... V198 ... 485
Chloride field test system ... C375-01 ... 290
Chloride ion penetration meter ... C378 ... 291
Chloride permeability of concrete ... C378 ... 291
Chloride test kit of water ... S136 ... 386
Chloride titrator strips ... A019-01 ... **29**, 387
Clamp, Mohr and Hoffman ... V220 / V220-01 ... 490
"Classification test for the constituents of coarse recycled aggregate" ... S156-20 ... 49
Clay block portion, flexure test ... C095-05 ... 248
Cleansing bath, ultrasonic ... A104 ... 36
Cleveland flash and fire point tester ... B086 KIT ... 140
Climatic chamber freeze/thaw tests ... C313 ... 57, **276**
Cohesion tester ... B053-10 ... 126
Cohesionless relative density, soil ... S238 KIT ... 405
Cold bend testing machine, steel ... H065N ... 372
Colour standard charts ... S132N ... 56, **386**
Combined two frames group concrete ... C092 ... 238
Combined two frames group mortar ... C092-05 ... 239, **353**
Combined ultrasonic and rebound hammer data acquisition and processing ... C372N ... 59, **296**
Compacting factor apparatus ... C185 ... 259
Compaction apparatus, filler ... A124 ... 50
Compaction hammer vibrating ... S197N ... 78, 404

Compaction moulds and rammers, Proctor ..... S185 / S187 398,399
Compaction permeameters, soil S252 433
Compactor, CBR/Proctor S199 400
Compactor, gyratory, asphalt B041 88
Compactor, roller, asphalt B039 93-95
Compactor, shear box, asphalt B039A 93-95
Compactors, Marshall automatic models ..... B031N1 / B033 84,85,86
Compactors, Marshall hand operated ..... B032 KIT / B032-01 86
Compression device for rock cores A147 67
Compression frames, Marshall ..... B042 KIT 112
Compression machine 56 kN, portable C094 249
Compression test on metals, accessories H003-13 359
Compression tester, unconfined, soil ..... S131 KIT 406
Compression testing machines concrete ..... C020 / C086 167-197
Compression testing machines concrete, "high stability" C089 199-219
Compression testing machines, cement ..... E151 / E183N 342-350
Compression/flexural machines: accessories for concrete C097-01 240-247
Compression/flexural testing machine, cement ..... E152 / E183N 346-350
Compression/flexure devices cement, mortar ..... E170 / E172-01. 242,**352**,417
Compressometer-Extensometer ..... C133, c134 ..... 65,**222**,223
Compressometers, elasticity modulus on concrete C130N 223
Compressors, air ..... S351 / V206 ..... 454, **488**
Concrete compaction C278 272
Concrete pipe testing machine 1000 kN C093-05n 236
Concrete specimen curing: equipment C309-10 275
Concrete test hammers C380 292,293
Concrete workability meter C189 260
Conductivity meter V166-01 482
Cone and tamper, sand absorption ..... S148 ..... 51,126,**389**
Cone penetrometers, liquid limit, soil ..... S165 KIT / S166 KIT 396
Conical sieve EN 15366 ..... B024-05 80
Configuration of advanced parameters C104-09 162
Confined flow ability "L-Shape Box" C172 256
Conical penetration needle, Vicat apparatus E044-40N 313,317
Consistometer Vebé C183 257
Consistometer, Walz C188 260
Consolidation apparatus, oedometer ..... S260 / S262N 434-440
Consolidation cells, fixed ring S268 435
Consolidation frame S290 444
Consolidation load frame, three places S359 456
Constant head permeameters, soil S245-01 432
Containers, metallic V116 484
Containers, plastic with airtight lid V125-12 484
Continuous flow filterless centrifuge B014 73
Conversion frame, CBR S221 406
Cooling bath for resilience test, metals H052 370
Core drilling barrel, triaxial test A137-04 67
Core drilling machine, rocks A140-01 67
Core drilling machines, concrete, bitumen C318N 280-282
Core face preparation device ..... C300-08 ..... 61, **279**
Cor Map, corrosion meter C414 300
Core trimmer cut-off machine A127 63
Coring equipment, micro C377 62,284
Corn emery ungraded A128-04 54
Corrosion instruments C411 300
Cover meter and rebar detector, concrete C403-01 299
Cover to reinforcement, concrete ..... C396N / C397N 299
Crack detection microscope C399 285
Crack opening, concrete C090-16 232
Crack width gauges C408 303
Craking test mould, NF P15-434 ..... E067 324
Cross-Hole test system C373-10N 294
Crucibles, porcelain and platinum ..... V117 / V117-04 478
Crusher, laboratory A092 52
Crushing coefficient machine A108 56
Crushing resistance determination, aggregates A081-01 44
Crushing value apparatus, BS 812:110 ..... A082 50
Cube centering device C107 243
Cube moulds, cement E110 332,333
Cube moulds, concrete C223 266-269
Curing bath with cooling device ..... B052-02 ..... 114,**125**,334
Curing baths and cabinets, cement ..... E136 / E139 334
Curing cabinet, large capacity E138 335
Curing room vaporiser C311-01 277
Curing tank, accelerated C307 275
Curing tanks, concrete ..... C302 KIT 274
Curing, control panel C309-10 275
Cut-back asphalts, distillation ..... B069 KIT 136
Cutting machine, metals ..... C351 ..... 283, **370**
Cutting machine, rocks and concrete ..... C348N 57, **283**
Cutting machines for concrete specimens C350N 283
Cutting-off machine, aggregates, rocks A127 63
Cyber-Plus 8 Evolution, touch screen ..... S334 ..... 434, **462**
Cyber-Plus 8 Evolution, touch screen ..... B044N-SET **122**, 412
Cyber-Plus 8 Evolution, touch screen ..... C405-15N **287**,302,428
Cyber-Plus Evolution, touch screen ..... C109N **158**, 338
Cyber-Plus Evolution applicataions 24,122
Cylinder moulds, concrete C228 267
Cylinders capping equipment C290-01 278
Cylinders, graduated V098 473

D **Mod.** **Page**

Datatronic 8 channels, automatic data acquisition/processing system S334 462
Deaerator, vibro ..... A059-02 KIT 38,**76**
De-airing tank, triaxial ..... S355 ..... 432, **454**
Dean-Stark B076 136
Decanters, plastic V102-01 477
Deflection measurement device, concrete C090-15N 232
Deflection measurement, concrete beams C109-15N 165
Deflection on fibre reinforced concrete ..... C090-07N 165, **232**
Deflectometer, telescopic C405-10 302
Deflectometers, concrete C405N 303
Deformometers, concrete ..... C360 KIT 285
Degrassing Oven, Vacuum B091-01 142
Demoulding oil C265 269
Density baskets ..... V041 ..... 51,264,**472**
Density chisel V198 485
Density gauge, asphalt B111 147
Density of fresh concrete C199 263
Density of hardened concrete V085 264
Density of soil in place ..... S230 KIT/S237 KIT ..430,431
Density pick V199 485
Desiccators ..... A035 ..... **31**,389,476
Deval testing machine A079 47
Device with central screw C105 240
Dewar flask E062-01 319
Dial indicators and holder S375 465
Diamond bits for drilling machines C339-01 282
Diamond blades for cutting machines C350-12 283
Dibber tool S240-02 430

Die cutting soil sampler ... S118 ... 385
Dietrich-Fruhling calcimeter ... A105 ... 56,324
Differential mercury manometer ... S356 ... 455
Digital shear machine for soil, fully automatic ... S277-02N ... 446
Digitec, two channels semi-automatic control unit ... C108N ... **155**, 337
Direct/residual shear machines ... S277N KIT / S277-01N.442
Direct shear, Leutner ... B047-10.113,119,121,419,421
Dish, Petri ... V123 ... 475
Dishes, evaporating ... V114-01 ... 478
Displacement transducers ... S336-10 ... 453
Distance pieces for compression machines ... C111 ... 247
Distillation of cut-back asphalts ... B069 KIT ... 136
Distilled water ... V300-05 ... 491
Distribution unit water/air for triaxial test ... S348 ... 455
Door safety switch ... C121-51 ... 255
Dorry, abrasion machine ... A111N ... 55
Drainage basket, binder ... B022-20 ... 80
Drainage burette, triaxial ... S321 ... 450
Drier, warm air ... V201 ... 29,488
Drill bits ... C339-01 ... 282
Drilling machines, bitumen ... C319 ... 78, **281**
Drilling machines, concrete ... C318N ... 280,282
Drilling muds, sand content ... E037-10 ... 312
Dropping ball apparatus, cement ... E031 ... 311
Dropping bottle ... V124 ... 475
Drop-weight tester ... S229N ... 405
Dry-ice maker, metals ... H050 ... 370
Drying ovens ... A005-01 KIT ... 26
Drying shrinkage determination EN 1367-4 ... A107 ... 58
DSR - Dynamic Shear Rheometer ... B085-07 ... 141
DTS-16, 16 kN Servo Pneumatic Dynamic Testing Systems ... B220-01 KIT ... 107
DTS-30, 30 kN Servo-Hydraulic Dynamic Testing System ... B230 ... 108
Dual low capacity range ... C097-01 ... 240
Ductility of fibre reinforced, concrete ... C090-16 ... 232
Ductilometers ... B054 ... 132
Ductilometers with data acquisition system ... B055-10/B055-20N ... 133
Duriez test set ... B095-01 ... 121, **146**,419
Dynamic cone penetrometer (DCP) ... S051 ... 376
Dynamic plate load test ... S229N ... 405
Dynamic shear Rheometer ... B085-07 ... 141
Dynamic Testing Systems, 16 kN Servo-Pneumatic ... B220-01 KIT ... 107
Dynamic Testing System, 30 kN Servo-Hydraulic ... B230 ... 108
Dynamometers, Pull-Off bond strength ... E142 ... 288, **330**
Dynamic viscosity viscometer ... B085-20 ... 143,144

E

	Mod.	Page
Earth resistivity meter	S077	383
Edotronic, automatic oedometer	S262N	440
Efflux index apparatus	A073	44
Efflux viscometers	B084-01 KIT	139
Elastic modulus on concrete	C125N	**220**, 222
Elastic modulus on mortar	E190N	354
Elastic modulus on rocks	A150N	64
Elasticity modulus on concrete, compressometers	C130N	223
Electric generator, portable	C332	280
Electro-Hydraulic loading and control system	C109-09N	236
Electromagnetic density gauge, non nuclear	B111	147
Electromagnetic sieve shakers	A059-01 KIT	38
Electromagnetic vibro-deaerator	A059-02 KIT	38,**76**
Electronic precision top loading and platform balances	V070-02	471
Electro-welded wire nets test, accessory	H003-14	359
Elongation index of aggregates	A071	44
Emery corn and flour	A128-02	54
Emulsified asphalt distillation apparatus	B063 KIT	137
End-Over-End shaker, BS 1377:2	A117	**56**,388,391
Energy absorption test on sprayed concrete specimens	C090-07N	167,233
Engler viscometers	B080	139
Equivalent test, sand	S158-20 KIT	48, **391**
Erlenmeyer flasks	V106	473
Evaporating dishes, porcelain	V114-01	478
Evaporation, rotary apparatus	B065	76, 138
Expansion of concrete or mortar specimens	E114	271
Explosion proof centrifuge	B011-01	72
Extensibility of mould apparatus	E066-03	322
Extensometer/Compressometer, concrete, cement	C134	65,221,222
Extensometers single use, concrete	C125-10	221
Extensometer wire strands	H003-18	365
Extensometer, electronic for metals	H014	365,369
Extensometer, plaster	E080	324
Extraction of binder, automatic	B008	71
Extraction of binder, centrifuge	B014	73
Extraction of bitumen	B016-10	74
Extruder for rocks	A141	67
Extruder, Marshall-CBR-Proctor specimens	S114	87, **384**
Extruders, soil	S111 / S114	384

F

	Mod.	Page
Falling head permeameter, soil	S246-01	432
Feeler strips	C250-12	270
Fibre reinforced concrete tests	C090-15	232
Field CBR apparatus	S220 KIT	406
Field density	S230 KIT	430
Figg technique, air and water permeability of concrete	C375-10 KIT	290
Filler compaction apparatus	A124	50
Filter discs for centrifuge	B010-15	72
Filter flasks, glass	V107	474
Filter funnel	V138	476
Filter paper	V218-01	491
Filter press for muds	E037-05	312
Filterless centrifuge	B014	73
Filtration behaviour of drilling muds	E037-05	312
Fineness of cement, Blaine apparatus	E009 KIT	308
Fineness of fly ash by wet sieving	E017	309
First crack strength, concrete	C090-16	232
Flakiness index grids	A048N KIT	32
Flakiness sieves BS 812	A049 KIT	32
Flakiness/thickness gauge	A070	44
Flash and fire tester, Cleveland	B086 KIT	140
Flash point, TAG viscometer	B092 KIT	141
Flask, Chapman	A029	31
Flasks, Erlenmeyer	V106	473
Flasks, glassware	V106 / V109-09	473
Flat jack method	C358-01	286
Flatness verification of specimens	C250-10	270
Flexural and transverse machine, concrete	C093-02N	234
Flexural device, concrete	C106	242
Flexural device with centre point	S205-18	248

Flexural device, tests on clay blocks ... C093-11 ... 249
Flexural devices, cement ... E172-01 ... 352
Flexural testing machine, tiles and clay blocks ... C095 ... 249
Flexural testing machines, concrete ... C090/C091-03A ... 224,236
Flexural testing machines, concrete "high stiffness" ... C090-06N ... 230,233
Flexural/compression machines, cement ... E152 / E183N ... 346,35
Flexural tests on clay block portion ... C095-05 ... 248
Flexure test on concrete beams, accessory ... H003-22 ... 359
Flexure test on metals, accessory ... H003-11 ... 359
Flour Emery ... A128-03 ... 54
Flow cone apparatus, cement ... E038 ... 312
Flow meter, Marshall ... B047 ... 112
Flow table, concrete ... C192 KIT ... 259
Flow tables, cement ... E086 KIT/E090-01 KIT ... 325
Flow tables, concrete ... C208 ... 264
Flow test apparatus, grouts ... E059 ... 318
Flow time determination ... C171 ... 256
Flowing water sieves device, cement ... E016 ... 309
Fly ash fineness by wet sieving ... E017 ... 309
Footmeter stability verification tester ... C155N ... 251
Four Point Bending System:
- Stand-Alone, Servo-Pneumatic ... B210 ... 106
- Servo Pneumatic ... B210-01 ... 106
Four point bending test ... S205-16 ... 416
Four Point Jig ... B212 ... 106
Fraass apparatus ... B077 KIT ... 132
Free expansion in plastic period, cement ... E060 ... 318
Free flow and time flow of concrete ... C181 ... 256
Freeze and thaw chambers ... C313 ... 57, **276**
Fresh concrete testing ... C178 KIT ... 258
Friction tester (Skid) ... A113 ... **53**,127,250
Front loading oedometer ... S260 ... 434
Fume exhaust cupboard ... B079N ... 87
Funnel groove, UNI 8997 ... E059 ... 318
Funnel viscometer Marsh, cement ... E037 ... 312
Funnel, Buchner ... V140 ... 478
Funnels, glass ... V119 ... 475
Funnels, plastic ... V135 ... 477
Furnace, ignition method for asphalt ... B005 ... 70

G

GAM - Gyratory Angle Measurer ... B041-28 ... 92
Gas jar ... A116-11 ... **56**,388
Gasometer, Dietrich-Frühling ... A105 ... 56,324
Gauge crack width ... C408 ... 303
Gauge dial indicators ... S375 ... 465
Gauge for aggregate flatness index ... A048-15 ... 32
Gauges for compression machines ... C118 ... 246
Gauge go-not go ... C250-16 ... 270
Gauges, flakiness, length, shape ... A070 ... 44
Gauze, iron wire ... V173-03 ... 483
Gay-Lussac bottles ... V108 ... 51,389,**474**
Generator, electric ... C332 ... 280
Geogauge, non nuclear density ... S059 ... 382
Geological hammers ... A132 ... 59
Geometrical properties of aggregates ... S156-20 ... 49
Gillmore apparatus ... E058 ... 313
Glass microspheres ... A057-31, A060-50 ... 42
Glassware ... V098 ... 473
Gloves, heat resistant ... V177 ... 483
Glycerine ... V300-16 ... 491
Granulator, asphalt ... B007 ... 77
Go-not go gauge ... C250-16 ... 270
Grid (bar) sieves ... A048N KIT ... 32
Grinder - Polisher ... A095 ... 60
Grinding machine, concrete, rocks, natural stones ... C298 ... 61, **279**
Grinding mill, hammer ... A096 ... 52
Grooving tools ... S173-03 ... 394
Group combined frames ... C092 ... 238
Grouts tests ... E036 KIT ... 311
Guards, safety for compression machines ... C121 ... 244
Gypsum tests ... E055N ... 313
Gyratory compactor, asphalt ... B041 ... 88
Gyrotronic compactor, asphalt ... B041 ... 88

H

Hamburg Smartracker ... B038A ... 100
Hammer digital, test on concrete ... C386N ... 293
Hammer, grinding mill ... A096 ... 52
Hammer, geological ... A132 ... 59
Hammer, rocks classification ... C381 ... **60**,292
Hammers, steel and rubber ... V193 ... 485
Hammers, test on concrete ... C380 ... 292,293
Hardness test kit of water ... S137 ... 386
Heat of hydration calorimeter ... E061N ... 319
Heater isomantle, asphalt ... B028-01 ... 81
Heater, immersion asphalt ... B051-01 ... 124
Heater, immersion concrete ... C302-01 ... 274
Heater, immersion soil ... S155-09 ... 390,391
Hoek cells, rocks ... A137 ... 67
Hoffman screw clamp ... V220 ... 490
Hollow punches and tampers, direct/residual shear ... S122-08 ... 444
Hollow punches and tampers, soil ... S122 ... 385,444
Hopper, feed, cement ... E106 ... 332
Hot extraction apparatus, bitumen ... B017 KIT ... 74
Hot extractor set ... B016-10 ... 74
Hot plate with magnetic stirrer ... B073-01 ... 29,**134**,387,486
Hot plates ... B074, V200 ... 29,134,**487**
Hubbard-Carmik bottles ... V111 ... 140 ,**475**
Humidity and temperature: control panel ... C309-10 ... 275
Humidity and temperature: cabinet ... C313 ... 276
Hydration calorimeter, cement ... E061N ... 319
Hydraulic constant isotropic cell pressure system ... A142N ... 68
Hydraulic shrinkage determination of concrete ... C365 ... 271
Hydraulic shrinkage of cement ... E077 KIT ... 321
Hydrometer jar ... S155-01 ... 390
Hydrometers, soil ... V172 ... 482
Hydro-Plus Evolution ... C109-03N ... 245
Hygrometer, hair ... V169 ... 479

I

Ignition method, furnace for asphalt ... B005 ... 70
Immersion vibrators ... C270N ... 273
Impact compactors, Marshall ... B031N1 / B033 ... 84,85
Impact failure test on tiles ... C096 ... 249
Impact pendulum tester, metals ... H060N ... 371
Impact testing machine, aggregates ... A080 KIT ... 47
Impermeability tester, concrete ... C435 ... 305
Impurities test bottle ... S132-01 ... 56,**386**,475
Index of velocity of rocks ... C372N ... 59

In situ CBR test set S220 KIT 406
Indentation test on asphalt B059-10 79
Indirect tensile, bitumen B047-02 112,113
Indirect tensile, concrete C100 241
Infrared thermometer C303N **265**, 480
Ion exchange device S140 387
Ion exchange resin V300-30 387,491
IP thermometers B057-08 481
Isomantle heater B028-01 81
Isotropic rocks pressure system A142N 68

J	Mod.	Page

Jacks, flat for tests on brickworks C358-01 286
Jar mill A091-10 52
Jaws crusher A092 52
Jig core face preparation C300-08 61, **279**
John Figg method C375-10 KIT 290
Joisel apparatus C211 261
Jolting apparatus, cement E130 333
J-Ring, confined flowability C174N 257

K	Mod.	Page

Kaolinite V300-29 491
Kelly ball apparatus C186 260
Kerbs and slabs device C091-13 242
Knife, trimming S125 385
K-slump tester C187 260
K-type thermometers C303N **265**, 480
Kumagawa (Soxhelet) extractor B061 KIT 74

L	Mod.	Page

Ladle V186-01 485
Langavant calorimeter E062-10 319
Lathe, soil S120 385
Le Chatelier flask E014 309
Le Chatelier, mould E066 322
Le Chatelier, water bath E064 322
Length comparator, cement E077 KIT 58,271,**321**
Length gauge, aggregates A071 44
Leutner direct shear, bitumen B047-10 113,119,121,419,421
Light drop-weight tester S229N 405
Lightweight aggregates.
Crushing resistance determination A081-01 44
Lightweight dynamic penetrometer S050 376
Lime testing E034/E064 310,322
Lime testing reactivity apparatus E034 310
Limits of solis S165 KIT/S166 KIT 396
Linear displacement transducers S336-10 453
Linear shrinkage mould, soil S176 395
Linear shrinkage of specimens, mortar E077 KIT 321
Liquid limit devices, plastic limit S170 / S178 394,395
Load calibration apparatus C138N 252
Load cells, standard C140 253
Load frames, Marshall B042 KIT 112
Load proving rings S370-01/S370-01S452, **464**
Los Angeles abrasion machine A075 **45**, 78
Loss of ignition of cement A024 318
Loss on heating oven, asphalt B064 KIT 131
L-Shape box test, confined flowability C172 256

M	Mod.	Page

Machine for static tensile test on steel
600 kN capacity H002N 358
Machine, Los Angeles A075 **45**, 78
Machines for compression tests, cement E151/E161-02N 342,344
Machines for compression tests, concrete C020 168,219
Machines for flexure tests, concrete C090/C091-03A 224,236
Machines servo-controlled, steel H004 / H008 362
Mackintosh prospecting kit S051-01 377
Macrotexture depth, Sand patch B099-10 146
Magnesium sulphate test A103 57
Magnetic holder for dial gauges S380 465
Magnetic stirrer B073-01 29,**134**,387,486
Mallet, rubber V195 485
Mallets, steel V194 485
Manometer differential mercury, triaxial S356 455
Manometers for compression machines C118 246
Marking pencil V147-01 476
Marking-off machine, metals H020 370
Marsh funnel viscometer cement E037 312
Marshall load frames B042 KIT 112,121
Marshall moulding equipment B029 KIT 84,87
Marshall test software B043-01N 15,**113**,412
Marshall, automatic compactors B031N1 / B033 84,85
Marshall, manual compactors B032 KIT / B032-01 86
Marshall, water baths B051 124
Masses, standard calibration V035-01 469
Max. min thermometer V163 481
Maximum specific gravity of asphalt B067N 76
Measurers, unit weight, concrete C199 263
Measures, unit weight C200 263
Measuring graduated cylinders V098 473
Measuring tester digital, concrete C138N,C155N 251,252
Mechanical strain gauges, concrete C360 KIT 285
Melting pot A106 **29**,80,278,380
Metal detectors C396N / C397N 299,301
Methylene blue test set S157 KIT 49, **391**
Methylene Blue tester, automatic S157-20 391
Micro Deval machine A077 46
Micro-coring equipment C377 62,284
Microlance moisture-temperature tester A021 31
Microscope, crack detection C399 285
Microspheres, glass A057-31 / A060-50 42
Microwave oven A009 29
Mill, hammer A096 52
Mill jar A091-10 52
Miscellaneous V 467,491
Mixer, dry A093 52
Mixers, asphalt/bitumen B027 81,82
Mixers, concrete C164 254
Mixers, mortar E092 KIT / E095 326,328
Mixers, soil E095 379
Mixing bowls V116 484
Mobile laboratories / 306
Modified Proctor test S185 398
Modulus of elasticity, mortars E190N 15, **354**
Mohr clamp V220-01 490
Mohr, pipettes V142 476

Mohs stone hardness kit ... A115 ... 59
Moist curing room ... C309-10 ... 275
Moisture balance ... V023-01 ... 388, **469**
Moisture condition value (MCV) ... S088-10 ... 381
Moisture density (Proctor test) ... S185 / S187 ... 398,399
Moisture density gauge, nuclear ... S060 / S060-01 ... 382,383
Moisture meter, Aquameter ... C374-06 ... 289
Moisture meter, Microlance ... A021 ... 31
Moisture meter, microwave ... A021-10 ... 31
Moisture meter, Surveymaster ... C374 ... 289
Moisture testers, aggregates/soil ... A028 ... **30**,289,388
Mortar bar container ... E067-05 ... 324
Mortar and pestle, porcelain ... V112 ... 385, **478**
Mortar and pestle, stainless steel ... V112-05 ... 484
MOT straight edge ... B099 KIT ... 148
Mould Le Chatelier ... E066 ... 322
Mould, craking test ... E067 ... 324
Mould, Duriez test ... B095-01 ... 146
Mould, P.R.D. ... B097 ... 78
Moulds CBR ... S200-01 ... 403
Moulds ductility ... B054-01 ... 132
Moulds, gyratory compactor ... B041-05 ... 90
Moulds Marshall, EN Spec. ... B029N KIT ... 84
Moulds Marshall, ASTM Spec ... B030 KIT ... 87
Moulds Proctor ... S185 ... 398
Moulds, cement, prisms ... E102 / E112 ... 332
Moulds, cement, shrinkage and expansion tests ... E072 / E113 ... 320
Moulds, concrete ... C233 ... 266-269
Moulds, soil ... S195-01 ... 404
Mud Baroid balance ... E037-01 ... 312
Muds tests ... E038 ... 312
Muffle furnaces ... A022 ... **28**,58,70
Multispeed testers ... S212N/S216 KIT .. 115,408,410
Multi-tester 50 kN ... S205 ... 118,248, **414**
Multi-tester 200 kN ... S206N .. 120,146,248,341,367,**420**

N

NDT concrete ... C380 ... 292
Needle vibrators poker, concrete ... C270N ... 273
Neoprene gloves ... V177-01 ... 483
Neoprene pads ... C107-18 ... 243,277
Noise cabinet for sieve shakers ... A058 ... 39
Null indicator, triaxial ... S353 ... 455
Nuclear moisture density gauge ... S060 ... 382,383

O

Oedometer ... S260 ... 434
Oedometer, automatic ... S262N ... 440
Official Accredia hardness certificate ... C097-08 ... 240
Ohaus, balances ... V014 ... 468
Oil, demoulding moulds ... C265 ... 269
Oil hydraulic for compression machines ... C114-10 ... 245
Oil/water pressure system ... A144 ... **68**,454
Organic matter test set ... S138 ... 386
Oven, loss on heating TFOT method ... B064 KIT ... 131
Ovens, laboratory ... A005-01 KIT ... 26
Oven, rolling thin-film ... B066 KIT ... 131

P

Pachometers (cover meters) ... C396N / C397N ... 299
Packaged cement tube sampler ... E021 ... 309
Packing set for compression machines ... C122 ... 246
Packing strips, hard wood made ... C100-01 ... 241
Pads, neoprene ... C107-18 ... 243,277
Pan type mixers ... C164 ... 254
Pans, metallic ... V182 ... 484
Paraffin wax ... V300-19 .. 29,8079,319,**491**
Particle charge tester ... B063-10 ... 137
Particle density and water absorption ... V085 ... 51
Particle density of filler ... V108-01 ... 51
Particle loss, asphalt ... A075 ... 78
Particle shape of aggregates ... A048N KIT ... 32
Particle size analysis of soils ... S155 KIT ... 390
Particle size sedimentation/distribution ... S143KIT/S155KIT ... 390,391
Pat test ... E082 ... 322
PaveTracker, wheet tracking ... B038 ... 98
Pav, Pressure Ageing Vessel ... B091N ... 141
Pavement core drilling machines ... C319 ... 77, **281**
Pavement surface, irregularity measurement ... B099 KIT ... 148
PaveMix, bitumen mixer ... B026N ... 83
Pavetest Products ... B200/B293-02 ... 104-111
Pencil, marking ... V147-01 ... 476
Pendulum impact resilience tester, metals ... H060N ... 371
Pendulum Skid Tester ... A113 ... **53**,127,250
Penetration depth of water ... C435 ... **305**
Penetrometer Proctor ... S088 ... 381
Penetrometer proving ring, soil ... S086 ... 381
Penetrometer, asphalt indentation ... B059-10 ... 79
Penetrometer, automatic and digital for bitumen ... B059 KIT ... 130
Penetrometer, concrete ... C213 ... 261
Penetrometer, consistency of cement ... E083 ... 323
Penetrometer, dynamic cone (DCP) ... S051 ... 376
Penetrometer, Kelly ball ... C186 ... 260
Penetrometer, lightweight ... S050 ... 376
Penetrometer, setting time Italcementi model ... E050 ... 318
Penetrometers, bitumen ... B056 KIT / B057 KIT ... 128
Penetrometers, liquid limit soil ... S165 KIT / S166 KIT ... 396
Penetrometers, pocket for concrete ... C194 ... 261
Penetrometers, pocket soil ... S065 / S071 ... 380
Pensky-Martens tester ... B094 KIT ... 141
Percentage refusal, P.R.D. ... B097 ... 78
Permeability air, Blaine apparatus ... E009 KIT ... 308
Permeability apparatus, Blaine automatic model ... E011-01 ... 308
Permeability apparatus, Blaine electronic model .. E011N ... 308
Permeability apparatus, concrete ... C430 ... 304
Permeability attachment for oedometers ... S275 ... 68,**435**
Permeability of rocks ... A144 ... 68
Permeability set, air and water ... C375-10 KIT ... 290
Permeameter for bitumen pavements ... B024 ... 80
Permeameter stand, soil ... S248 ... 433
Permeameter, radial-flow falling head ... B024-10 ... 80
Permeameters, soil ... S246-01 / S253 ... 432,433
Personal computer for testing machines ... H009-01 ... **157**,163,240
Pestle, rubber heated ... V113 ... 385,**478**
Petri dish ... V123 ... 475
PH metres ... V215 ... 387,**489**
Pick ... V197 ... 485
Pinhole test equipment ... S244 ... 433
Pipe testing machine ... C093-05N ... 236
Pipette, Andreasen ... S144 ... 49,**391**

Pipettes, graduated V142 476
Planetary abrasion tester B053-20 126
Plaster adhesion tester ..... E142 ..... 288,**330**
Plaster extensometer E080 324
Plastic cube, cylinder and beam moulds C223 266,267
Plastic limit set, soil S178 395
Plastic products V102-01 477
Plasticity meter, concrete C190 260
Plate bearing test, bitumen ..... B103-05 KIT 149
Plate bearing test, soil ..... S222 KIT / S226 KIT 424
Platens for compression machines C110 247
Plates, hot ..... B074,V200 ..... 29,134, **486**
Platform balances V070-02 471
Platinum crucible V117-04 478
Plunger S156-20 49
Plunger penetration apparatus, cement E083 323
Pocket penetrometers and shear vanes ..... S065 / S076-01 380
Pocket penetrometers for concrete C194 261
Point load tester A125N 60
Poker vibrators C270N 273
Polarity of bitumen emulsion B063-10 137
Polished stone value A128N 54
Polisher - Grinder A095 60
Polishing/Grin ding machine, concrete ..... C298 ..... 61, **279**
Polishing machine accelerated A128N 54
Polystyrene cube mouls, concrete C231N 267
Porcelain products V112 478
Pore pressure measurement S353 455
Porosimeters, concrete C195 262
Portable rock shear box assembly A129 63
Pot for melting wax ..... A106 ..... **29**,80,278,380
Potential alkali reactivity in cement ..... A101 ..... **58**
Potential alkali reactivity of cement-aggregate, container E067-05 324
Potential reactivity of aggregates, container A030 31
Potentiometric transducers S336-10 453
PRD mould B097 78
Pressure Ageing Vessel B091N 142
Pressure maintainer ..... A129-02 ..... **63**, 68
Pressure measuring units, triaxial S340 455
Pressure transducers C116-01N 246
Pressure transducers, pore S336-50 455
Printer, laser, bench C128 240
Prism moulds, cement ..... E102 / E112 332
Prism moulds, concrete C254 268
Probe, Windsor C410 301
Proctor penetrometer S088 381
Proctor test: moisture/density ..... S185 / S187 398,399
Proctor/CBR compactor S199 400
Profilometers (Barton comb) A122 59
Profometers, metal detector ..... C396N / C397N 299
Profoscope C403-01 299
Prospecting kit, soil ..... S052 KIT 377
Proving rings, load ..... S370-01/S370-01S 452,**464**
Pull-Off, bond strength tester ..... E142 ..... 288, **330**
Pull-Out tester C376N 288
Pumping units ..... C113 / C114 245
Pulse velocity tester, ultrasonic C369N 295
Punching test on clay blocks C093-11 248,417
Punching test on sprayed concrete C109-15N 165
Pyknometer, 10 litres vacuum, bitumen B067N 76
Pyknometer, soil ..... S147 ..... 51, **389**
Pyknometers, pyrex glass ..... V105 ..... 51, **473**

Q

	Mod.	Page
Quantab, chloride strips	A019-01	**29**,387
Quartering canvas	A085	50
Quick triaxial test, Unitronic	S205	418

R

	Mod.	Page
Radial-Flow permeameter, bitumen	B024-10	80
Rain gauges	V167	479
RAM - rapid analysis machine	C215	265
Rammers, soil compaction	S187	399, 403
Rate indicator, CBR	S210-02	407
Rate of spread device	B053-05	126
Reaction container	A030	31
Reactivity apparatus, lime EN 459-2	E034	310
Reagent bottles	V108-10	474
Reagent for moisture testers	A028-11	**30**, 289,388
Reagent products	V300-05	491
Rebar corrosion meters	C411	300
Rebar detector and cover meter, concrete	C403-01	299
Rebound concrete hammers	C380	292
Recovery of binder	B018	75
Recovery solvent, still	B021	73
Redwood, viscometers	B084-01 KIT	139
Reference cement	E010-02	308
Reflux extractor	B019 KIT	75
Refrigerator, water	E141	275, **335**
Refusal percentage density test	B097	78
Relative density cohesionless, soil	S238 KIT	405
Relative density of aggregates	S147	51
Residue on sieving, bituminous emulsions	B076-21	136
Resilience test, pendulum impact tester for steel	H060N	371
Resistance, friction skid tester	A113	53,127,250
Resistance of hardening, bituminous binders	B065	138
Resistance to fragmentation, aggregates	A075	45
Resistance to fuel	A075	78
Resistance to freezing and thawing determination, aggregates	A103-10	57
Resistance to thermal shock	A023-01	58
Resistance to wear, aggregates	A077	46
Resistivity method, array meter for concrete	C412-01	300
Resistivity of soils	S077	383
Resonance frequency meter	C393	298
Restrained expansion, mortar and concrete	E114	271
Retainers, capping, concrete	C107-09	243,277
Retention water apparatus, cement	E039N	311
Rheometer, bending and shear	B085-05	142
Rice-Test	B067N	76
Riffle Boxes	A062	43
Ring and Ball apparatus	B072	134
Ring and Ball apparatus, automatic	B070N	135
Ring load measuring	S370-01/S370-01S	452,**464**
Road surface irregularity	B098N	147
Rock and masonry saw	C348N	**57**, 283
Rock classification hammer	C381	**60**, 292
Rock compression device	A147	**67**
Rock cradle	A121	60
Rock elastic modulus	A150N	15,**64**
Rock index of velocity	C372N	59
Rock shear box apparataus	A129	63
Rock strength index	A125N	60

Rock triaxial Hoek cells ... A137 ... 67
Roller, bottle ... B022 ... 49
Roller Compactor, asphalt ... B039 ... 93/95
Rolling Thin-Film oven ... B066 KIT ... 131
Rotary automatic scales ... V057 ... 468
Rotary evaporation apparatus ... B065 ... **76**,**138**
Rotational viscometers ... B085-20 ... 143
RTFOT method, oven ... B066 KIT ... 131
Rubber heated pestle ... V113 ... 355, **478**
Rules ... V176-01 ... 473
Rules, folding ... V176 ... 473

S	Mod.	Page

Safety guards, concrete ... C121 ... 244
Sample containers, tinned steel, airtight lid ... V125 ... 484
Sample splitter large capacity ... A068 ... 43
Sample splitters, aggregates ... A062 ... 43
Sampler, Bacon ... B060 ... 130
Sampler, die cutting ... S118 ... 385
Sampler, surface soil ... S084 KIT ... 379
Samplers for soil ... S053, S084 KIT ... 379
Samplers, bulk and packaged cement ... E020 ... 309
Sampling of soil ... S052 KIT ... 377
Sand absorption cone and tamper ... S148 ... 51,126, **389**
Sand bath ... V241 ... 491
Sand content of drilling muds ... E037-10 ... 312
Sand density cone apparatus ... S234 KIT / S237 KIT ... 431
Sand equivalent shakers, motorized ... S160N ... 48, **393**
Sand equivalent test set ... S158 KIT ... 48, **392**
Sand for density test, soil ... S235 ... 431
Sand for mortar mixers ... E097-01N ... 328
Sand patch equipment ... B099-10 ... 146
Sand replacement apparatus ... S236 KIT ... 431
Saw, concrete specimens ... C350N ... 283
Saw, rock and masonry ... C348N ... 57,283
Saw, wire for trimming soil specimens ... S124 ... 385
Saybolt, viscometers ... B087 ... 140
Scales ... V057 ... 468
SCC self compacting concrete ... C171 ... 256
Schmidt test hammers ... C382 ... 292
Scoop stainless steel, EN 12350/1 ... V185-03 ... 259
Scoops, aluminium models ... V183 / V184 ... 485
Scoops, stainless steel models ... V185 ... 485
Scraper ... S240-01 ... 430
Scratch hardness test ... A087 ... 47
Screw pump, triaxial ... S345 ... 455
Seismograph ... S079 ... 383
Servo-Plus Evolution, automatic control unit touch screen ... C104N ... **158**, 338
Servo-Strain, load/displacement/strain ... C104-10N ... 15, 164
Setting time and consistency of cement ... E055N / E044N ... 313,314
Setting time and consistency of cement ... E050 ... 318
Setting time of concrete ... C213 ... 261
Settling and swelling ratio apparatus, mortar ... E036 KIT ... 311
Settling of bitumen emulsions ... B075-01 ... 138
Shaker, End-Over-End ... A117 ... **56**, 358
Shakers for sieves, electromagnetic ... A059-01 KIT ... 38,42
Shaker for sieves, high capacity ... A061N ... 40
Shakers, sand equivalent ... S160N ... 48, **393**
Shape gauge, aggregates ... A072 ... 44
Shear apparatus direct/residual, soil ... S277N KIT/S277-02N ... 442,447
Shearlab ... S277N-KIT ... 442
Sheartronic, high perfornamce ... S277-02N ... 446
Shear box assembly, rocks ... A129 ... 63
Shear boxes ... S282 ... 444
Shear box compactor, asphalt ... B039A ... 96
Shear rheometer, asphalt ... B085-07 ... 142
Shear vane devices, pocket for soil ... S057 / S075 ... 376,38
Shovel ... V196 ... 485
Shrinkage limit set, soil ... S175 ... 395
Shrinkage mould BS, soil ... S176 ... 395
Shrinkage of cement/mortar ... E075 ... 320
Shrinkage of concrete ... C365 ... 271
Sieve flakiness ... A049 KIT ... 32
Sieve grids (bar), flakiness ... A048N KIT ... 32
Sieve shakers ... A060-01 ... 38,42
Sieve shaker, high capacity ... A061N ... 40
Siever, air jet ... A058-05N ... 37
Sieves ... A052 ... 33
Sieve conical EN 15366 ... B024-05 ... 80
Sieves, wet washing ... A045 ... 36
Sieve trays 450x660 mm ... A071-07 ... 41
Silica evaporating dish ... V114-10 ... 70, **478**
Silica gel ... V300-15 ... 31, **491**
Siphon can apparatus ... A084 ... 50
Skid tester ... A113 ... **53**, 127,250
Slabs and kerbs device ... C091-13 ... **242**
Slake durability apparatus ... A130 ... 61
Slaking vessel, lime EN 459-2 ... E035 ... 310
Sleeves, metal ... V220-02 ... 490
Slump cone, Abrams ... C178 KIT ... 258
Slump flow table, concrete ... C192 KIT ... 259
Slurry, cohesion test ... B053-10 ... 126
Soaking tank ... S201-05 ... 402
Smartracker ... B038A ... 100
Sodium hexametaphosphate ... V300-23 ... 390, **491**
Sodium hydroxide ... V300-24 ... 56,386, **491**
Sodium sulfate ... V300-25 ... 491
Softening point apparatus Wilhelmi ... B072-20 ... 137
Softening point, bitumen ... B072 ... 134
Softmatic ... B070N1 ... 135
Software CBR test ... S218/S218N ... 15,23,123, **410**
Software elastic modulus on concrete ... C125N ... 15,19, **221**
Software elastic modulus on mortar ... E190N ... 15,19, **354**
Software elastic modulus on rocks ... A150N ... 15,19,**64**,221
Software for calibration process of compression machines ... C155-10N ... 251,253
Software for compression test, concrete ... C109-10/C109-10N ... 15,17,157,**163**
Software for compression test, mortar ... E163/E163N ... 15,17,163,**345**
Software for compression tests with H011-01N machine ... C123-01N ... 15, **369**
Software for energy absorption, concrete ... C109-15N ... 15,20,**165**
Software for flexural test, mortar ... E164/E164N ... 15,17,163,**349**
Software for flexure test, concrete ... C109-11/C109-11N ... 15,17,**157**,163,248
Software for flexure test, clay blocks UNI9730-3 ... C109-16N ... 15,227,229,231
Software for indirect tensile test, bitumen ... B043-02/B043-02N ... 15,16,114,**123**,410
Software for Marshall and Leutner tests ... B043-03/B043-03N ... 15,16,**113**
Software for Marshall compression test, bitumen ... B043-01 / B043-01N ... 15,16,**113**,123,410,413

Software for plate bearing test S224-21N 426
Software for rock shear box ..... S224-21N 15, **63**
Software for servostrain ..... C109-10N 15,29,**165**
Software for splitting test, concrete ..... C109-12 / C109-12N 15,18,**157**,163
Software for tensile test on mortar briquettes ..... S205-08N 15,23, **340**
Software for tensile test on steel ..... H009N 15,22, **366**
Software for unconfined test, soil ..... S218-01 / S218-01N 15,23,123,**410**
Software OedoLab connect S262-12N 441
Software OedoLab report S260-05N 437
Software ShearLab connect S277-41N 447
Software ShearLab report S277-40N 445
Software TestLab ..... / 104
Software TriaxLab connect & reports S335-10N 457
Software Servonet C123/C123N. 15,19,**157**,163
Software UTM2 ..... A150N / S224-21N 15
Soil colour chart S133N 386
Soil hydrometers ..... V172 ..... 390, **482**
Soil prospecting kit ..... S052 KIT 377
Soil samplers ..... S053, S084 KIT 379
Soil: moulds S195-01 404
Solubility of bituminous binders B075-05 138
Solution for sand equivalent test ..... S158-09 ..... 48, **392**
Solvent recovery still B021 73
Soundness of building lime E081-10 323
Soundness of cement: autoclave E070 320
Soundness: Le Chatelier E066 322
Soundness of hydrated lime E082 322
Soxhelet, extractor ..... B061 KIT 74
Soxhelet, extractor modified method ..... B016-20 KIT 74
Spacer discs S200-03 403
Spatulas V192 485
Specific gravity frame ..... V085 ..... 51,80,264, **472**
Specific gravity Gay-Lussac bottles ..... V108 ..... 51,389, **474**
Specific gravity, cement E014 309
Speedy moisture testers ..... A025 KIT 30
Splitter, asphalt B007 77
Splitters for aggregates, sand A062 43
Splitting tensile test devices, concrete C100 241
Splitting tensile test, asphalt B047-02 112,114,119,121,418
Splitting tensile test, rock S205 419
Spoon V186 485
Sprayed concrete, test on C090-14 165,233
Spray-Test, free and time flow determination C181 256
Stability mould Marshall B046N 112
Stability verification ..... C155N 24, **251**
Stabilized soil strength S195-01 404
Stands, metal V219 490
Static elastic modulus, concrete C130N 223
Steam bath E081-10 323
Steel, test on H003N 358
Stiffening time of cement E083-10 324
Still water V211 489
Stirrer for blue methylene test ..... S157-01 ..... 49, **391**
Stirrer for particle size analysis of soils ..... S156-01 KIT 390
Stirrer/heater, magnetic ..... B073-01 ..... 29,**134**,387,486
Stirring rods V147 476
Stock solution ..... S158-09 ..... 48, **392**
Stop watch V170 482
Storage stability of asphalt emulsions B063-05 137
Straight edge, MOT ..... B099 KIT 148
Strain, ductility, concrete C104-10N 165
Strain gauge load cells S337-31 452
Strain gauges, concrete ..... C360 KIT **285**, 287
Strain gauges, single use, concrete C125-10 221
Strain transducers S336-15 453
Strength index, rocks A125N 60
Submersible load cells S337-02 452
Sulphate test strips ..... A019-03 ..... **29**, 387
Sulphur capping method C290-01 278
Survey, resisitivity measuring instrument S077 383
Surveymaster, moisture meter C374 289
Swelling and settling ratio ..... E036 KIT 311

T

	Mod.	Page

Table vibrators, concrete C278 272
Table, flow of concrete C208 264
Table, flow of mortar ..... E086 KIT/E090-01 KIT 325
Tag closed/open viscometers ..... B092 KIT 141
Tamping bar C261 269
Tanks curing, concrete ..... C302 KIT 274
Tar (Redwood) viscometers ..... B084-01 KIT 139
Telescopic tubolar sensor C405-10 302
Temperature/humidity cabinet C313 276
Temperature/humidity equipment C309-10 275
Temperature measurement V150 489
Temperature monitoring ..... C303N **265**, 480
Tensile machine for steel, 600 kN capacity servo-controlled H003N 358
Tensile splitting device, asphalts B047-02 112,114,119
Tensile splitting software ..... B043-02/B043-02N 15,**114**
Tensile splitting, concrete C100 241
Tensile steel testing machines H002N 360
Tensile test on mortar briquettes S205-05 340,419
Tensile/compression machines H010 368
TestLab software ..... / 104
Texture surface apparatus B099-10 146
TFOT oven ..... B064 KIT 131
Thermal properties of aggregates A103-10 57
Thermal shock resistance A023-01 58
Thermohygrograph V168 479
Thermo-hygrometer V165 482
Thermometer, infrared V155 480
Thermometer, recording concrete temperature ..... C303N **265**, 480
Thermometers ..... V150 ..... 79, **480**
Thermometers, armoured V162 481
Thermostats, concrete curing C302-01 274
Thickness gauge A070 44
Thin-Film and loss on heating determination, asphalt ..... B064 KIT 131
Thin-Film ovens ..... B066 KIT 131
Tiles, test on C095 249
Tilt Test ..... A122-10 ..... **59**, 136
Timing device V171 472
Tins, metallic V122 484
Tongs, crucible V174 485
Tool kit V222 490
Tools for tests on soil S240-01 430
Top loading digital balances V070-02 470
Toughness determination, concrete C090-16 232
Transducers, linear vertical displacement for geotechnical test S336-11 453

Transducers, pressure for tests on concrete and cement ... C116-01N ... 246
Transducers, pressure, for geotechnical test ... S336-50 ... 455
Transfer dish ... B057-03 ... 128
Transverse/deformation test ... S205-13 ... 416
Travelling beam device ... B098N ... 147
Trays, mixing ... V182 ... 484
Trays, screen ... A061-07 ... 41
Triaxial cells ... S305 ... 450
Triaxial equipment ... S301N ... 449,459
Triaxial tests on rock, Hoeck cells ... A137 ... 67
Triaxial: test ... / ... 448
Tribometer-Abrasimeter ... A112 ... 55
Trimmer, soil lathe ... S120 ... 385
Trimming knife ... S125 ... 385
Trimming/cut off machine for concrete cores ... C377-05 ... 62, 284
Triple beam balance ... V016 ... 468
TRL dynamic cone penetrometer ... S051 ... 376
Trolley ... V224 ... 490
Trowels ... V187 ... 485
Tubing, rubber ... V230 ... 490
Two-Three frames, combined ... C092 ... 238
Two-way hydraulic valve ... C115-01 ... 245

U

Ultrasonic "cross-hole" test system ... C373-10N ... 294
Ultrasonic cleansing bath ... A104N ... 36
Ultrasonic pulse velocity testers, concrete ... C369N ... 59,**295**,296
Unbonded capping pads and retainers ... C107-09 ... 243,277
Unconfined compression tester, soil ... S131 KIT ... 406,418
Unconfined test program ... S218-01/S218-01N ... 15, 413
Uniaxial splitting, rock ... S205 ... 419
Unit weight measurers, concrete ... C199 ... 263
Unit weight measures ... C200 ... 263
Unitracker wheel tracking ... B038 ... 98
Unitronic 50 kN universal multipurpose frame ... S205 ... 63,118,248,340367,**414**
Unitronic 200 kN universal multipurpose frame ... S206N ... 120,146,248,341,367,**419**
Universal digital tester for load cells ... C138N ... 252
Universal flexural and transverse machine, concrete ... C093-02N ... 234
Universal multispeed load frames, soil/bitumen ... S212N/S216 KIT ... 115,**408**,410
Universal servo-controlled testing machines, steel ... H003N ... 358
Universal tensile/compression machine steel/concrete ... H010 ... 368
Universal testing machines, servo-controlled electromechanical, steel ... H004 / H008 ... 362
U-shape box, confined flowability ... C173 ... 256

V

Vacuum degrassing Oven ... B091-01 ... 142
Vacuum pumps ... V203 ... 75,454, **487**
Vacuum pyknometer 10 litres, bitumen ... B067N ... 76
Vane shear, pocket for soil ... S057 ... 376
Vaporiser, curing rooms ... C311-01 ... 277
Verification of force transfer ... C155N ... 251
Vaseline oil ... V300-18 ... 491
Vebé consistometer ... C183 ... 257
Vernier calipers ... V175 ... 270, **483**
V-Funnel flow time ... C171 ... 256
Vialit, binder adhesion tester ... B053 ... 126
Vibrating compaction hammer, soil, bitumen ... S197N ... 78,404
Vibrating machine mortar cubes 70,7 mm ... E132 ... 333
Vibrating table, Vebé ... C184 ... 257
Vibrating tables, concrete ... C278 ... 272
Vibrating tables, portable ... C281N ... 272
Vibrators, poker ... C270N ... 273
Vibro-deaerator ... A059-02 KIT ... 38,**76**
Vicat apparatus, manual ... E055N ... 313
Vicatronic, automatic Vicat apparatus ... E044N ... 314
Viscometer bath ... B088 ... 144
Viscometer, Marsh funnel for cement ... E037 ... 312
Viscometers Asphalt Institute ... B088-34 ... 144
Viscometers, BS-IP-RF flow reverse ... B088-80 ... 145
Viscometers, Cannon Fenske ... B088-50 ... 145
Viscometers, Cannon Manning ... B088-20 ... 144
Viscometers, Zeitfuchs cross-arm ... B088-70 ... 145
Viscometers, Engler ... B080 ... 139
Viscometers, Pensky-Martens ... B094 KIT ... 141
Viscometers, Redwood /TAR/BRTA ... B084-01 KIT ... 139
Viscometers, Saybolt ... B087 ... 140
Viscometers, Tag closed/open ... B092 KIT ... 141
Voids content of dry filler ... A124 ... 50
Voids of aggregates ... A069 ... 43
Voltage stabilizer ... V208-10 ... 488
Volume change apparatus, burette (triaxial test) ... S358 ... 456
Volume gauge instrument (triaxial) ... S338N ... 456
Volumeter for aggregates ... A086 ... 50
Volumetric flasks, glass ... V109 ... 474

Z

Zeitfhchs cross-arm viscometers ... B088-70 ... 145

W

Walz consistometer ... C188 ... 260
Warm air dryer ... V201 ... 29, **489**
Wash bottles ... V120 ... 477
Washing sieves ... A045 ... 36
Watch glass ... V115 ... 475
Watch, stop ... V170 ... 482
Water absorption/impermeability, concrete ... C435 ... 305
Water bath, aggregates ... E136 / E139 ... 51
Water bath for penetrometer, bitumen ... B058 ... 130
Water bath with cooling device, digital ... B052-02 ... 114,**125**,334
Water bath, soil ... E136 / E139 ... 389
Water bath: Le Chatelier ... E064 ... 322
Water baths, curing of cement ... E136 / E139 ... 334
Water baths, Marshall ... B051 ... 124
Water flowing sieves device, cement ... E016 ... 309
Water impermeability tester, concrete ... C435 ... 305
Water in bituminous materials ... B076 ... 136
Water level indicator, soil ... S061 ... 379
Water permeability testers, concrete ... C430 ... 304
Water refrigerator ... E141 ... 275, **335**
Water retention apparatus, cement ... E039N ... 311,323

Water sensitivity, bitumen ... B052-02 ... 114
Water stills ... V211 ... 489
Water test set for concrete ... C220 ... 261
Wax paraffin ... V300-19 ... 29,80,319, **491**
Wax, melting pot ... A106 ... **29**,80,278,380
Weather station ... V148 ... 479
Weighting bottles ... V110 ... 475
Weights for balances ... V036 ... 469
Weights, slotted for oedometer and shear test machines ... S273 KIT ... 436, **444**
Welded wire nets test ... H003-14 ... 359
Wet sieving pan+lid, stainless steel ... A046 ... 36
Wet washing sieves ... A045 ... 36
Whatman paper ... V218-01 ... 491
Wheeltracker, Hamburg ... B038A ... 100
Wheel tracking apparatus, asphalt ... B038 ... 98
Wheelbarrow ... V226 ... 490
Wilhelmi, softening point apparatus ... B072-20 ... 137
Windsor pin penetrometer ... C410-10 ... 301
Windsor probe ... C410 ... 301
Wire strands extensometer ... H003-18 ... 365
Workability apparatus, cement ... E081 ... 323
Workability apparatus, concrete ... C189 ... 260
Workable life and correction time of fresh mortar ... E083-10 ... 324

Y	Mod.	Page

Yield of lime ... E035 ... 310

Standards Index

AASHTO **Page**

AASHTO R28 142
AASHTO T100 ..... 51, 389
AASHTO T107 320
AASHTO T119 258
AASHTO T120 264
AASHTO T126 ..... 268, 273, 278
AASHTO T127 309
AASHTO T129 314
AASHTO T131 ..... 313, 314
AASHTO T132 ..... 23, 332, 340, 419
AASHTO T133 309
AASHTO T134 398
AASHTO T137 309
AASHTO T142 31
AASHTO T149 131
AASHTO T152 262
AASHTO T153 308
AASHTO T154 313
AASHTO T162 ..... 326, 328
AASHTO T164A 72
AASHTO T164B 75
AASHTO T166-93 80
AASHTO T176 ..... 48, 392, 393
AASHTO T179 131
AASHTO T180 ..... 398, 400
AASHTO T19 263
AASHTO T191 431
AASHTO T193 ..... 400, 402, 406, 407, 416, 421
AASHTO T197 261
AASHTO T201 145
AASHTO T202 378
AASHTO T205 430
AASHTO T208 ..... 406, 418
AASHTO T209 76
AASHTO T21 ..... 56, 386
AASHTO T215 432
AASHTO T216 434
AASHTO T217 ..... 30, 388
AASHTO T22 ..... 168-196, 200-216, 368
AASHTO T23 ..... 268, 273, 274, 278
AASHTO T235 442
AASHTO T240 131
AASHTO T245 ..... 85-87, 112, 119, 121, 124, 418, 421
AASHTO T256 ..... 148, 427
AASHTO T260 290
AASHTO T27 ..... 33, 43
AASHTO T277 291
AASHTO T283 76
AASHTO T307 111
AASHTO T310 ..... 382, 383
AASHTO T312 88
AASHTO T313 142
AASHTO T315 141
AASHTO T316 143
AASHTO T321 106,110
AASHTO T322 110
AASHTO T324 100
AASHTO T342 111
AASHTO T344 92
AASHTO T40 130
AASHTO T47 131
AASHTO T48 140
AASHTO T49 ..... 128, 130
AASHTO T51 132
AASHTO T53 ..... 134, 135
AASHTO T54 139
AASHTO T55 136
AASHTO T59 ..... 136, 137
AASHTO T72 140
AASHTO T73 141
AASHTO T78 136
AASHTO T84 51
AASHTO T85 472
AASHTO T86 378
AASHTO T87 43
AASHTO T88 390
AASHTO T89 394
AASHTO T90 395
AASHTO T92 395
AASHTO T96 45
AASHTO T97 ..... 226-234, 242, 359
AASHTO T99 ..... 398, 400
AASHTO TP31 70,83,110
AASHTO TP53 ..... 70, 83
AASHTO TP79-09 105

ACI **Page**

ACI 347 301

ALP **Page**

ALP A StB T.4 ..... 113, 121, 419, 421

API **Page**

API (American Petroleum Institute),
recommended practice 13B-1 and 2 312
API 509 141

AS **Page**

AS 1289 (Australian Standard) 400
AS/NZS 2891.12.1 111
AS/NZS 2891.13.1 110

ASTM **Page**

ASTM 03 ..... 106, 110
ASTM 7C / 57C 481
ASTM A370 ..... 22, 358, 360, 362, 366
ASTM A615 372
ASTM A615M 372
ASTM C1040 383
ASTM C109 ..... 17, 19, 23, 242, 334, 340, 342-352, 417
ASTM C110 311
ASTM C114 290

ASTM C117 49
ASTM C1170-92 257
ASTM C1202 291
ASTM C1231 ..... 243, 277
ASTM C124 264
ASTM C1252 44
ASTM C127 ..... 27, 51, 472
ASTM C128 51
ASTM C131 45
ASTM C136 ..... 27, 43
ASTM C1362 260
ASTM C138 263
ASTM C141 313
ASTM C143 258
ASTM C151 ..... 320, 321
ASTM C1609 232
ASTM C1609M 232
ASTM C1621 257
ASTM C1760 291
ASTM C183 309
ASTM C185-85 309
ASTM C186 319
ASTM C187 ..... 313, 314
ASTM C188 309
ASTM C190 ..... 332, 334, 340, 419
ASTM C191 ..... 313, 314, 334
ASTM C192 ..... 268, 273, 274, 278
ASTM C204 308
ASTM C215 298
ASTM C227 324
ASTM C230 325
ASTM C231 type A 262
ASTM C231 type B 262
ASTM C235 47
ASTM C266 313
ASTM C289 31
ASTM C29 263
ASTM C293 ..... 17, 19, 226-234, 242, 248, 359, 417, 422
ASTM C29-97 43
ASTM C301 236
ASTM C305 ..... 326, 328
ASTM C307 ..... 23, 332, 340, 419
ASTM C31 ..... 273, 274, 278
ASTM C348 ..... 17, 19, 321, 332, 340, 346-350, 417
ASTM C349 ..... 242, 340, 342-352, 417
ASTM C360 260
ASTM C39 ..... 17, 19, 168-188, 200-218, 268, 369
ASTM C40-11 ..... 56, 386
ASTM C403 261
ASTM C426 ..... 271, 285
ASTM C438 320
ASTM C469 ..... 18, 19, 65, 220, 222, 223
ASTM C490 ..... 320, 321
ASTM C496 241
ASTM C497 236
ASTM C511 ..... 274, 334
ASTM C597 ..... 295, 296
ASTM C617 278
ASTM C666 298
ASTM C671 57
ASTM C682 57
ASTM C684 275
ASTM C70 31
ASTM C702 method B 43, 50
ASTM C78 ..... 17, 19, 226-234, 242, 248, 359, 417
ASTM C803 301
ASTM C805 ..... 60, 292, 293
ASTM C87 ..... 334, 335
ASTM C876 300
ASTM C88 57
ASTM C900 288
ASTM C91 ..... 311, 313
ASTM D1040 382
ASTM D1067 ..... 387, 489
ASTM D113 132
ASTM D1186 80
ASTM D1194 424
ASTM D1195 ..... 149, 424
ASTM D1196 ..... 149, 424
ASTM D1310 141
ASTM D140 130
ASTM D1452 378
ASTM D1556 431
ASTM D1557 ..... 27, 398, 400
ASTM D1558 381
ASTM D1559 ..... 16, 27, 112, 121, 123, 124, 418, 421
ASTM D1587 384
ASTM D1665 139
ASTM D1754 131
ASTM D1856 ..... 73, 74
ASTM D1883 ..... 23, 123, 384, 400, 402, 406, 407, 416, 421
ASTM D2041 76
ASTM D2042 138
ASTM D2166 ..... 23, 406, 410, 415, 418
ASTM D2167 430
ASTM D2170 145
ASTM D2171 144
ASTM D2172 ..... 71, 72, 75,
ASTM D2196 143
ASTM D2264 221
ASTM D2-33 47
ASTM D2419 ..... 48, 392, 393
ASTM D2434 432
ASTM D2435-80 ..... 437, 440
ASTM D244 ..... 136, 137
ASTM D2573 376
ASTM D2573-94 380
ASTM D2726 80
ASTM D2850-032 ..... 418, 448, 457
ASTM D2872 131
ASTM D2937 379
ASTM D2938 ..... 19, 67, 221
ASTM D2950 ..... 382, 383
ASTM D3080-72 442
ASTM D3143 141
ASTM D3148 221
ASTM D36 ..... 134, 135
ASTM D3877 434
ASTM D3910 126
ASTM D3967 ..... 63, 419
ASTM D402 136
ASTM D4123 ..... 16, 110, 121, 123, 418, 421
ASTM D420 378
ASTM D421 ..... 385, 478
ASTM D422 390
ASTM D4253 405

ASTM D4254 405
ASTM D427 395
ASTM D430 309
ASTM D4318 ..... 394, 395
ASTM D4402 143
ASTM D4429 406
ASTM D4543 ..... 61, 279
ASTM D4546 434
ASTM D4644 61
ASTM D4647 433
ASTM D4767-95 ..... 448, 457
ASTM D4944 388
ASTM D5 ..... 128, 130
ASTM D5407 121
ASTM D558 ..... 27, 398
ASTM D5581 ..... 86, 124
ASTM D5581-96 87
ASTM D559 ..... 27, 401
ASTM D56 141
ASTM D560 27
ASTM D5607 63
ASTM D5731 60
ASTM D5873 60
ASTM D6 131
ASTM D6084 132
ASTM D6307 ..... 70, 83
ASTM D652 142
ASTM D6648 142
ASTM D6758 382
ASTM D6760 294
ASTM D6925 88
ASTM D6926 85-87
ASTM D6927-06 112
ASTM D6938 ..... 382, 383
ASTM D6951-03 376
ASTM D698 ..... 27, 384, 398, 400
ASTM D70 ..... 140, 475
ASTM D7012 ..... 64, 66
ASTM D7115 92
ASTM D7145 141
ASTM D7181-11 ..... 448, 457
ASTM D7405 141
ASTM D7460 106,110
ASTM D7369 110
ASTM D854 ..... 51, 389, 474
ASTM D88 140
ASTM D92 140
ASTM D93 141
ASTM D940 139
ASTM D95 136
ASTM E11 ..... 33, 34, 36, 41
ASTM E23 371
ASTM E290 359
ASTM E303 ..... 53, 127
ASTM E4 368
ASTM E447 ..... 184, 186, 192, 194, 204, 206, 212, 214
ASTM E74 252
ASTM E74 Class A 253
ASTM E74 Class AA 253
ASTM E965 146
ASTM G57 383

BS **Page**

BS (DD) 70
BS 1191 ..... 322, 324
BS 131 371
BS 1370 319
BS 1377 ..... 123, 386, 418
BS 1377:1 27
BS 1377:2 ..... 43, 51, 56, 385, 388, 389, 391, 394, 395, 396, 478
BS 1377:3 ..... 29, 383, 387
BS 1377:4 ..... 23, 381, 384, 398, 400, 402, 404, 406, 407, 416, 421
BS 1377:5 ..... 432, 433, 437, 440
BS 1377:7 ..... 406, 418, 442
BS 1377:8 448
BS 1377:9 ..... 149, 379, 424, 431
BS 1610 ..... 168-196, 252, 368
BS 1881 ..... 17, 19, 241, 263, 320, 321
BS 1881 part 207 288
BS 1881:101 ..... 259, 485
BS 1881:102 258
BS 1881:103 259
BS 1881:104 257
BS 1881:105 259
BS 1881:106 262
BS 1881:107 263
BS 1881:108 ..... 268, 272, 273
BS 1881:111 274
BS 1881:112 275
BS 1881:114 ..... 264, 472
BS 1881:115 ..... 200-218, 251
BS 1881:117 241
BS 1881:118 ..... 226-234, 242, 248, 359, 417
BS 1881:121 222
BS 1881:128 265
BS 1881:14 51
BS 1881:201 300
BS 1881:202 ..... 292, 293
BS 1881:203 ..... 295, 296
BS 1881:204 299
BS 1881:206 285
BS 1881:207 ..... 288, 301, 330
BS 1881:209 298
BS 1881:5 321
BS 1924:1 ..... 27, 43, 385
BS 1924:2 ..... 384, 398, 402, 404, 406, 431
BS 1990 400
BS 1994 400
BS 2000 ..... 128-131, 134, 135, 139
BS 3892 ..... 333, 340, 342-352, 417
BS 410 ..... 33-35, 41
BS 4359:2 308
BS 4550 ..... 242, 313, 314, 319, 333, 346-352
BS 4551 346-352
BS 4551-1 ..... 311, 325
BS 5075 259
BS 5911 236
BS 598:10 ..... 78, 98
BS 598:102 ..... 74, 75
BS 598:107 ..... 81, 84, 112, 121, 123, 384, 410, 412, 418, 421
BS 598:108 126
BS 598:110 98
BS 6073 ..... 184, 186, 192, 194, 212, 214, 320, 321
BS 6073:1 app. C 249

BS 6073-1 ..... 228, 230, 234
BS 6463 322
BS 6463-4 311
BS 6576 ..... 30, 388
BS 6717:2001 55
BS 7263 ..... 228, 230, 234
BS 812 ..... 32, 43, 44, 47, 49-51, 263, 264, 389
BS 812:1 43
BS 812:102 58
BS 812:110 50
BS 812:113 55
BS 812:114 ..... 53, 54
BS 812:117 ..... 29, 387
BS 812:124 57
BS 812:2 ..... 51, 472
BS 812:3 55
BS 890 322
BS ISO 1042 474

CEN **Page**

CEN ISO-TC 178 55
CEN ISO-TS 17892-10 442
CEN ISO-TS 17892-11 ..... 432, 433
CEN ISO-TS 17892-12 394-397
CEN ISO-TS 17892-5 ..... 437, 440
CEN ISO-TS 17892-6 ..... 396, 397
CEN ISO-TS 17892-8 448
CEN ISO-TS 17892-9 448

CNR **Page**

CNR aVI N.25 378
CNR aVII N.38 71,74,
CNR N.100 137
CNR N.101 136
CNR N.102 139
CNR N.105 54
CNR N.109 46
CNR N.113 44
CNR N.133 ..... 75, 112, 116, 410
CNR N.134 ..... 16, 114, 121, 123, 418, 421
CNR N.141 148
CNR N.146 424
CNR N.146 method A 149
CNR N.146 method B 149
CNR N.22 ..... 379, 430, 431
CNR N.23 50
CNR N.24 ..... 128, 130
CNR N.27 ..... 48, 392, 393
CNR N.29 400
CNR N.30 ..... 16, 84, 112, 121, 123, 418, 421
CNR N.34 45
CNR N.35 135
CNR N.38 ..... 73, 74
CNR N.4 56
CNR N.40 80
CNR N.44 132
CNR N.50 131
CNR N.62, 63, 64 43
CNR N.69 ..... 398, 400
CNR N.80 57
CNR N.81 130
CNR N.92 ..... 121, 424, 427
CNR N.94 146
CNR N.95 44
CNR N.98 130
CNR N.99 137
CNR UNI 10009 ..... 23, 122, 123, 400, 402, 406, 407, 412, 416, 421
CNR UNI 1009 ..... 400, 402

D.M. **Page**

D.M. 14/1/2008 372
D.M. 3-6-68 309

DIN **Page**

DIN 1045 299
DIN 1048 ..... 19, 65, 220, 259, 260, 262, 292, 293, 305
DIN 1048:1 222
DIN 1060 ..... 311, 332
DIN 1164 ..... 308, 314, 319, 321, 332, 340, 342-352, 417
DIN 1164-5 ..... 326, 328
DIN 1164-7 326
DIN 1168 ..... 313, 314, 317
DIN 1196 ..... 313, 314
DIN 12039 51
DIN 18127 ..... 398, 400
DIN 1996 ..... 71, 73, 74
DIN 1996-15 137
DIN 4030 261
DIN 4035 236
DIN 4094 376
DIN 4187-1 33-35
DIN 4211 323
DIN 4226 44
DIN 4227 311
DIN 51220 ..... 17, 19, 200-218, 252, 368
DIN 51223 218
DIN 51227 226-234
DIN 51229 269
DIN 51302 ..... 200-218, 251
DIN 52011 ..... 134, 135
DIN 52108 ..... 54, 250

DUTCH RAW **Page**

DUTCH RAW 400

EN **Page**

EN 10002 ..... 22, 358, 360, 362, 368
EN 10002-1 366
EN 10002-3 252
EN 10002-3, Class 1 253
EN 10002-3, Class 2 253
EN 10045-1 371
EN 1008 261
EN 101 59
EN 1015-11 352
EN 1015-12 ..... 288, 330
EN 1015-19 323
EN 1015-3 325
EN 1015-4 323
EN 1015-7 310

EN 1015-9 324
EN 102 55
EN 10834 ..... 15, 20, 164, 165, 223, 233
EN 1097-1 46
EN 1097-2 45
EN 1097-3 ..... 43, 263
EN 1097-4 50
EN 1097-5 27
EN 1097-6 ..... 51, 126, 389, 473
EN 1097-7 51
EN 1097-8 ..... 53-55, 127
EN 11039-2 232
EN 11039-3 ..... 20, 164, 165
EN 1170-4 416
EN 12002 416
EN 12272-1 126
EN 12272-3 126
EN 12274-3 126
EN 12274-4 126
EN 12274-5 126
EN 12350-1 ..... 259, 485
EN 12350-10 256
EN 12350-12 257
EN 12350-2 258
EN 12350-3 257
EN 12350-4 260
EN 12350-5 259
EN 12350-6 263
EN 12350-7 262
EN 12350-8 ..... 256, 258
EN 12350-9 256
EN 12390-1 ..... 268, 270
EN 12390-2 ..... 254, 272, 274, 276, 279
EN 12390-3 ..... 17, 19, 61, 278
EN 12390-4 ..... 200-218, 251, 404
EN 12390-5 ..... 17, 19, 226-234, 242, 248, 359, 417
EN 12390-6 ..... 18, 241
EN 12390-7 ..... 51, 264, 472
EN 12390-8 305
EN 12390-9 276
EN 12390-13 220
EN 12504 part 2 ..... 292, 293
EN 12504 part 4 ..... 295, 296
EN 12504-2 ..... 60, 293
EN 12504-3 288
EN 12592 138
EN 12593 132
EN 12595 ..... 144, 145
EN 12607-1 131
EN 12607-2 131
EN 12607-3 138
EN 12617-4 ..... 320, 321
EN 12697-1 ..... 71, 76
EN 12697-1 clause B.1.1 74
EN 12697-1 clause B.1.2 74
EN 12697-1 clause B.1.3 74
EN 12697-1 clause B.1.5 72
EN 12697-1 clause B.2.1 73
EN 12697-1 clause B.3.1 75
EN 12697-1 clause C 28, 70
EN 12697-9 78
EN 12697-10 ..... 78, 84, 88
EN 12697-11 78
EN 12697-12 ..... 113, 114, 122, 412
EN 12697-13 79
EN 12697-14 74
EN 12697-17 ..... 45, 78
EN 12697-18 80
EN 12697-20 79
EN 12697-22 98-103
EN 12697-23 ..... 16, 112-114, 121, 123, 418, 421
EN 12697-24 annex A 110
EN12697-24 annex D 106,110
EN 12697-24 annex E 110
EN 12697-25 110,111
EN 12697-26 annex A 110
EN 12697-26 annex B 106,110
EN 12697-26 annex C 110
EN 12697-27 78
EN 12697-3 76
EN 12697-30 84
EN 12697-31 ..... 88, 92
EN 12697-32 78
EN 12697-33 93-95
EN 12697-34 ..... 16, 112, 121-124, 410, 412, 418, 421
EN 12697-35 81-83
EN 12697-39 70
EN 12697-40 80
EN 12697-43 ..... 45, 78
EN 12697-44 111
EN 12697-5 76
EN 12697-6 80
EN 12697-7 80
EN 12697-9 78
EN 12808-2 55
EN 12808-4 ..... 320, 321
EN 12808-5 332
EN 12846 139
EN 12847 ..... 136, 138
EN 12848 136
EN 12849 138
EN 13036-1 146
EN 13036-4 ..... 53, 127
EN 13036-7 148
EN 13055-1 method 1 and 2 ..... 44, 165
EN 13075-1 138
EN 13108 ..... 28, 70-76, 78-80, 112, 114, 124
EN 13279-2 ..... 313, 314, 317
EN 13286-2 ..... 398, 399
EN 13286-4 ..... 402, 404
EN 13286-41 404
EN 13286-46 381
EN 13286-47 ..... 23, 122, 123, 400, 402, 407, 410, 412, 416, 421
EN 13286-47:2006 416
EN 13286-5 405
EN 13286-53 404
EN 13294 324
EN 13295 289
EN 13302 143
EN 13303 131
EN 13357 139
EN 1338 ..... 18, 53, 55, 241, 250
EN 1338:2004 ..... 54, 250
EN 1339 ..... 18, 53, 54, 127, 242, 250
EN 13395-2 318
EN 13398 132

EN 1340 ..... 54, 250
EN 1340:2004 242
EN 1340:4 ..... 17, 228, 230, 234
EN 1341 ..... 53-55, 127, 250
EN 13412 ..... 19, 354
EN 1342 ..... 53-55, 127, 250
EN 1343 ..... 54, 55
EN 13450 46
EN 1348 ..... 288, 330
EN 13589 133
EN 1367-1 ..... 57, 276
EN 1367-2 ..... 57, 482
EN 1367-4 ..... 58, 321
EN 1367-5 58
EN 13687-2 ..... 288, 300
EN 13703 133
EN 13892-3 ..... 54, 250
EN 13963 ..... 288, 330
EN 14157 ..... 54, 55, 250
EN 1426 ..... 128, 130
EN 1427 ..... 134, 135
EN 1428 136
EN 1429 136
EN 1430 137
EN 1431 137
EN 1436 53
EN 14487-1 ..... 20, 165
EN 14488-1 ..... 20, 165
EN 14488-3 ..... 20, 165, 233
EN 14488-5 ..... 20, 165, 233
EN 14496 ..... 288, 330
EN 14580 66
EN 14651 225
EN 14651-05 ..... 20, 165
EN 14769 142
EN 15366:2010 80
EN 154 59
EN 1542 ..... 288, 330
EN 1871 137
EN 1916 236
EN 1926 64
EN 196 .....
EN 196-1 ..... 17, 19, 242, 276, 326, 328, 332, 334, 340, 342-352, 417
EN 196-2 ..... 28, 318
EN 196-21 ..... 28, 318
EN 196-3 ..... 317, 322
EN 196-3:2005 ..... 313, 314, 317, 326, 328
EN 196-6 ..... 308, 309
EN 196-7 309
EN 196-8 ..... 319, 334
EN 196-9 319
EN 1997-2 56
EN 206 261
EN 22592 140
EN 22719 141
EN 413-2 ..... 310, 323, 326, 328
EN 445 ..... 311, 312
EN 451-2 309
EN 459-1 322
EN 459-2 ..... 310, 311, 318, 323, 325, 326
EN 480-1 ..... 326, 328
EN 480-2 ..... 313, 314
EN 480-4 263
EN 491 ..... 248, 249, 417
EN 538 ..... 248, 249, 417
EN 58 130
EN 679 17,19
EN 772-1 ..... 184, 186, 192, 194, 206, 212, 214
EN 932-5 ..... 27, 38, 57
EN 933-1 ..... 33, 34, 41
EN 933-10 37
EN 933-2 ..... 33-35, 41
EN 933-3 ..... 32, 43, 52
EN 933-4 44
EN 933-5 44
EN 933-6 ..... 44, 52
EN 933-7 44
EN 933-8 ..... 48, 392, 393
EN 933-9 ..... 49, 391
EN 933-11 49
EN 933-11:2009 49
EN 9724-8 19
EN 12350-8:2011 258

EN ISO **Page**

EN ISO 10545-7 59
EN ISO 15630-1 372
EN ISO 376:2002 252
EN ISO 3838 140
EN ISO 679 ..... 199, 201, 205, 326, 328, 332, 334, 340, 342-352, 417
EN ISO 6892 ..... 358, 360, 362, 368
EN ISO 7438 372
EN ISO 7500-1 ..... 358, 360, 362, 368
EN ISO 9597 322

ERMCO-EFNARC **Page**

ERMCO-EFNARC 256

EURONORM **Page**

EURONORM 7-55 371

GOST **Page**

GOST 26798.1 352

IP **Page**

IP 15C 481
IP 16C 481
IP 184 139
IP 23C 481
IP 28C 140, 481
IP 34 141
IP 35 141
IP 36 / 67 140
IP 38C 128, 129, 481
IP 42C 132, 481
IP 47 138
IP 47C 481
IP 485 138
IP 487 138

IP 494 138
IP 5C 481
IP 60C 481
IP 61C 481
IP 67 140
IP 6C 481
IP 74-77 136
IP 8C 139, 481

ISO **Page**

ISO 10113 ..... 22, 366
ISO 10545-6 55
ISO 1101 270
ISO 12275 ..... 22, 366
ISO 178 ..... 22, 336
ISO 1920-10:2010 220
ISO 2592 140
ISO 2719 141
ISO 3310 35
ISO 3310-1 ..... 33, 34, 38, 41
ISO 3310-2 ..... 33, 41
ISO 3506-1 336
ISO 4624 ..... 288, 330
ISO 527 ..... 22, 366
ISO 565 33
ISO 604 ..... 22, 366
ISO 6784 ..... 19, 65, 222
ISO 6872 43
ISO 7031 305
ISO 898-1 366
ISO TC-7 371

ISRM **Page**

ISRM 60, 63, 64, 66, 221

ITALIAN HIGHWAY SYSTEM **Page**

ITALIAN HIGHWAY SYSTEM 80

LCPC **Page**

LCPC 74, 261

MPW BELGIUM **Page**

MPW BELGIUM 80

NCAT **Page**

NCAT (National Centre for Asphalt Tec 70

NF **Page**

NF P15-314 ..... 326, 328
NF P15-412 333
NF P15-413 332
NF P15-414 ..... 313, 314
NF P15-431 ..... 313, 314
NF P15-432 322
NF P15-433 ..... 320, 321
NF P15-434 ..... 321, 324
NF P15-442 308
NF P15-451 ..... 242, 340, 346-352, 417
NF P18-054 389
NF P18-305 258
NF P18-353 262
NF P18-358 312
NF P18-400 268
NF P18-401 332
NF P18-404 274
NF P18-407 ..... 17, 19, 124, 226-234, 242, 248, 359, 417
NF P18-408 241
NF P18-411 ..... 168-196, 200-218, 252, 340, 342-352, 368, 417
NF P18-414 298
NF P18-416 278
NF P18-417 ..... 292, 293
NF P18-418 ..... 295, 296
NF P18-427 321
NF P18-452 ..... 260, 323
NF P18-507 312
NF P18-553 43
NF P18-558 51
NF P18-561 32
NF P18-564 44
NF P18-572 46
NF P18-573 45
NF P18-574 47
NF P18-575 54
NF P18-576 46
NF P18-577 47
NF P18-858 ..... 288, 330
NF P94 090-1 434
NF P94-048 31
NF P94-051 ..... 394, 395
NF P94-052-1 ..... 396, 397
NF P94-054 389
NF P94-057 390
NF P94-061-2 430
NF P94-061-3 431
NF P94-066 400
NF P94-068 ..... 49, 391
NF P94-070 ..... 448, 457
NF P94-071-1 442
NF P94-071-2 442
NF P94-074 ..... 448, 457
NF P94-078 ..... 123, 402, 406, 407, 410, 412, 416, 421
NF P94-091 434
NF P94-093 ..... 398, 400, 402, 403
NF P94-117-1 ..... 149, 427
NF P97-078 23
NF P98-102 310
NF P98-200-2 ..... 148, 427
NF P98-216-1 146
NF P98-230-2 404
NF P98-231-1 ..... 398, 402
NF P98-251 410
NF P98-251-2 ..... 16, 82, 84, 112, 121, 123, 418, 421
NF P98-251- 1/4 ..... 121, 146, 421
NF P98-274-1 126
NF P98-302 ..... 228, 230, 234
NF T60-118 140

NFT66-003 136
NFT66-004 128, 130
NFT66-005 139
NFT66-006 132
NFT66-007 140
NFT66-008 134, 135
NFT66-011 131
NFT66-020 139
NFT66-022 137
NFT66-023 136
NFT66-113 136
NF XP18-598 48, 392, 393
NF XP94-060-1 395
NF XP94-090-1 437, 440

NLT **Page**

NLT 108-91 398
NLT 123 136
NLT 124 128, 130
NLT 126 132
NLT 154 51
NLT 177 50
NLT 325 45
NLT 354 32, 44

RILEM **Page**

RILEM repor t N. 23 256

SCC **Page**

SCC 256

SHRP **Page**

SHRP M-002 88

TP BF **Page**

TP BF-StB part B 8.3 405

UNE **Page**

UNE 103 103-94 394
UNE 103.102 390
UNE 103-104 395
UNE 103-108 395
UNE 103300 27
UNE 103-500 398
UNE 103-501 398
UNE 103-501-94 400
UNE 103-502 402, 416
UNE 103-601 434
UNE 103-602 434
UNE 146507-1 31
UNE 22950-3 64
UNE 51021 140
UNE 7013 128, 130
UNE 7050 33, 34
UNE 7066 140
UNE 7072 136
UNE 7075 140
UNE 7093 132
UNE 7102 264
UNE 7103 258
UNE 7105 319
UNE 7110 131
UNE 7111 134, 135
UNE 7112 136
UNE 7136 57
UNE 7141 262
UNE 7240 268, 278
UNE 7255 400
UNE 7286 263
UNE 7365 400
UNE 7371 431
UNE 7391 424
UNE 7804 30, 388
UNE 80101 333, 340, 342-352, 417
UNE 80102 313, 314, 319, 322, 335
UNE 80106 308
UNE 80801 328
UNE 83109 431
UNE 83115 46
UNE 83116 45
UNE 83120 43, 52
UNE 83131 48, 392, 393
UNE 83180 49, 391
UNE 83303 278
UNE 83304 17, 19, 168-196, 200-216
UNE 83305 226-234, 242, 248, 417
UNE 83307 292, 293
UNE 83308 295, 296
UNE 83453 309

UNI **Page**

UNI 10009 122, 412
UNI 10014 394, 395
UNI 10157 288
UNI 10532 55
UNI 10766 62, 284
UNI 11041 256
UNI 11042 256
UNI 11043 256
UNI 11044 256
UNI 11045 257
UNI 11307:2008 271
UNI 14651 232
UNI 2107 249
UNI 2331 33, 34
UNI 2333 33, 34
UNI 2334 33, 35
UNI 4161 134, 135
UNI 4162 128, 130
UNI 4431 371
UNI 4714 371
UNI 556 370
UNI 558 359
UNI 559 359
UNI 564 359
UNI 6127 269, 272, 274
UNI 6128 274

UNI 6129 274
UNI 6130 268
UNI 6132 ..... 17, 19, 61, 278, 279
UNI 6133 ..... 17, 124, 226-234, 242, 248, 359, 417
UNI 6135 ..... 18, 241
UNI 6137 273
UNI 6326 252
UNI 6394 ..... 263, 264
UNI 6394-2 ..... 51, 472
UNI 6395 262
UNI 6555 271
UNI 6556 ..... 19, 220
UNI 6686 17,19
UNI 6686 part 1 and 2 168-196
UNI 6686 part 3 200-218
UNI 6687 321
UNI 6782 324
UNI 7123 261
UNI 7208 319
UNI 7374 308
UNI 7676 365
UNI 7997 296
UNI 8020 259
UNI 8020-14 ..... 56, 386, 475
UNI 8020-A 264
UNI 8147 271
UNI 8148 271
UNI 8520 ..... 43, 321
UNI 8520 part 18 32
UNI 8520-10 57
UNI 8520-15 ..... 48, 49, 391-393
UNI 8520-18 32
UNI 8520-19 45
UNI 8520-20 57
UNI 8520-22 ..... 31, 58
UNI 8520-6 43
UNI 8942-3 248
UNI 8996 ..... 311, 318
UNI 8997 318
UNI 8998 ..... 311, 318
UNI 9189 ..... 292, 293, 296
UNI 9416 ..... 259, 485
UNI 9418 258
UNI 9419 257
UNI 9420 260
UNI 9524 ..... 295, 296
UNI 9533 305
UNI 9535 300
UNI 9536 288
UNI 9724-8 ..... 64, 66, 221
UNI 9730-3 ..... 15, 248, 249
UNI 9771 298

UNI EN **Page**

UNI EN 10080 372
UNI EN 933-9 477

Product Code Index

A	Page
A005-01 KIT / A005-08 KIT	26
A006-01	26
A006-08	26, 27
A007	26
A007-01 KIT	26
A007-04 KIT	26
A007-08 KIT	26
A007-51 / A007-53	26
A008-01 KIT	27
A008-03 KIT	27
A008-05 KIT	27
A008-07 KIT	27
A008-51 / A008-54	27
A009	29
A019-01 / A019-03	29, 387
A021	31
A021-01	31
A021-10	31
A022	28, 70
A023	28
A023-01	28,58
A023-11	28
A024	28
A025 KIT	30
A026 KIT	30
A027-01	30
A027-11	30
A028	30,289,388
A028 SP	30
A028-01	30
A028-02	30
A028-11	30, 289, 388
A029	31
A030	31
A031-01 / A031-32	35
A032-01 / A032-32	35
A033-… / A034-…	33
A035 / A036-01	31, 389, 476
A037-01 / A037-35	33, 35
A038-01 / A038-35	33, 35
A039 / A040-01	31, 389, 476
A041	33
A043-… / A044-…	33
A045 / A045-06	36
A046, A046-11	36
A047, A047-12	36
A048N KIT	32
A048-01 / A048-17	32
A048-14	32, 46
A048-15	32
A048-20 / A048-22	32
A049 KIT	32
A049-01 / A049-07	32, 54
A050-… / A051-…	33
A052-…	33, 34
A052-37	48, 392
A052-44	48, 392
A053-… / A055-…	33
A056 / A056-07	36
A057 / A057-07	36
A057-31 / A057-46	42
A058	39
A058-01	42
A058-05N	37
A058-14	37
A058-15	37
A058-20 / A058-96	37
A059-01 KIT	38
A059-02 KIT	38, 76
A059-03 KIT	38
A059-04 KIT	38
A059-21	39
A060-31 / A060-50	42
A060-01	42
A061-07 / A062-48	41
A061-03	40
A061-05	40
A061-06	40
A061-96	41
A061-97	40
A061-98	40
A061N	40
A062 / A069	43
A062-11 / A062-48	41
A062-02 / A067-02	43
A068 / A068-11	43
A069 / A069-04	43
A070 / A073	44
A075	45, 78
A075-11, A075-12	45
A076-01, A076-02	45
A076-11	45
A077, A077-01	46
A078-11 / A078-16	46
A079, A079-02	47
A080 KIT	47
A080-01 KIT	47
A080-02 / A080-04	47
A081-01	44
A081-02	44
A082 / A086	50
A091-02	52
A091-10 / A091-12	52
A092	52
A093	52
A093-11, A093-12	52
A095, A095-01	60
A096	52
A101, A101-11	58
A103 / A103-03	57, 472
A103-10, A103-11	57
A104N, / A104-03	36
A105	56, 324
A106	29, 80, 278
A107, A107-23	58
A108	56
A109	59
A110-01 / A110-20	53, 127
A111N	55
A111-11, A111-12	55
A112, A112-10	55
A112-01, A112-05	55
A113	53, 127
A115	59
A116-11, A116-12	56, 388
A117	56, 388, 391
A121	60
A122, A122-01	59
A122-10	59, 136
A124, A124-01	50

A125N 60
A125-01, A125-02 ..... 60, 249
A127 63
A128-02 / A128-12 54
A128N 54
A129 / A129-04 63
A129-02 68
A130, A130-11 61
A131, A131-01 63
A132, A132-01 59
A136-01 67
A137 / A139 67
A137-02 / A137-04 67
A137-05 68
A138-02 / A138-04 67
A138-05 68
A139-02 / A139-04 67
A139-05 68
A140-01 67
A141 67
A141-02 / A141-04 67
A142N 68
A144 ..... 68, 454
A147 67
A150-01N 65
A150N 15, 19, 64

B **Page**

B005, B005-10 70
B007, B007-11 77
B008 / B008-11 71
B010-11 / B010-16 72
B011 / B011-10 72
B014, B014-01 73
B016 130
B016-10, B016-15 74
B016-20 KIT, B016-23 74
B017 KIT 74
B017-01 / B017-05 ..... 74, 472
B018, B018-10 75
B019 KIT 75
B019-01 / B019-04 75
B020 KIT 75
B020-01 / B020-05 75
B021 73
B022, B022SP 49, 78
B022-11, B022-12 78
B022-20, B022-21 80
B024 / B024-10 80
B025-08 / B025-09L 82
B026N 83
B027 / B027-11L 82, 379
B027-03 379
B028-01, B028-03 81
B028-03 379
B029N KIT 84
B029-01 87
B030N / B030-02N 84, 87
B030 KIT 87
B030-03 / B030-06 ..... 84, 87
B030-08 87
B031-01 84
B031-08 84
B031-11N 84
B031N1 84
B032-01 86
B032-05 86
B032-11 86
B032-KIT 86
B033 / B033-11 85
B033-11N 84
B034 86
B035-01 / B035-03 86
B035-11 / B035-12 86
B036, B037 86
B038 96
B038A / B038A-14 100-103
B038-09 / B038-20 ..... 95, 99
B039A 96
B039A-01 / B039A-04 96
B039 93-95
B039-02 / B039-23 95
B039-04R / B039-07R 95
B041 / B041-33 ..... 88, 91
B041-28 92
B041-50 / B041-55 92
B042 KIT 112
B043 KIT 113
B043-01 119
B043-01(N) 15, 16, 113, 116, 121, 123, 413, 421
B043-02(N) 15, 16, 114, 116, 119, 121, 123, 413, 421
B043-03(N) 15, 16, 91, 113, 119, 121, 419, 421
B044-03 114
B044N 122, 413
B044N SET 122, 412
B046-02 ..... 115, 116
B046N 112, 113, 115, 116, 119, 121, 408, 421
B047, B047-01 ..... 112, 115, 408
B047-02 ..... 112, 114, 119, 121, 421
B047-03 112
B047-04 ..... 114, 119, 121, 421
B047-10, B047-11 ..... 113, 119, 121, 419, 421
B051 124
B051-01, B051-02 124
B052, B052-01 125
B052-02 ..... 114, 125, 334
B052-10 125
B053, B053-01 126
B053-05 126
B053-10 126
B053-12 / B053-17 126
B053-20 126
B054 132
B054-01 / B054-04 132
B055 132
B055-10 / B055-26 133
B056 KIT 128
B056-01 KIT 129
B056-02 KIT 129
B057 KIT 128
B057-01 ..... 128, 129
B057-02 ..... 128, 129, 396, 397
B057-03 / B057-07 ..... 128, 129
B057-08 ..... 128, 129, 481
B058, B058-01 130
B059 KIT 130
B059-10 / B059-21 79
B060 130
B061 KIT 74
B061-01 KIT 74
B061-02, B061-03 74
B063 KIT, B063-01 137
B063-01 481
B063-05 137
B063-10, B063-11 137
B064 KIT 131
B064-01 KIT 131
B064-02 / B064-04 131
B064-03 481

B065 ..... 76, 138
B065-12 / B065-15 76
B066 KIT / B066-01 KIT 131
B066-02 131
B067N, B067-11 76
B069 KIT 136
B069G KIT 136
B069-11 ..... 136, 481
B070-11 / B070-17 135
B070N1 135
B072 134
B072-01 / B072-07 ..... 134, 135, 137, 481
B072-20 137
B073-01 ..... 29, 134, 387, 486
B073-02 ..... 134, 137
B074 ..... 29, 134, 486
B074-01 134
B075 136
B075-01 / B075-08 138
B076 136
B076-21 / B076-24 136
B077 KIT 132
B077-01 132
B077-02 ..... 132, 481
B079N, B079-01 87
B080, B081 139
B082-01 / B082-07 ..... 139, 481
B083-01 / B083-10 ..... 139, 481
B084-01 KIT, B084-02 KIT 139
B085-05 142
B085-07 141
B085-20 / B085-32 143
B086 KIT 140
B086-02, B086-10 ..... 140, 481
B087, B087-01 140
B087-11, B087-12 140
B088 / B088-90 ..... 144, 145
B089 / B089-08 ..... 128, 129, 140, 481
B090 138
B090-10 / B090-21 138
B091N, B091-01 142
B092 KIT 141
B092-10, B092-11 ..... 141, 481
B093 KIT 141
B094 KIT, B094-01 KIT 141
B094-10 ..... 141, 481
B095-01 / B095-07 ..... 121, 146, 421
B096-01 / B096-07 ..... 121, 146, 421
B097 78
B097-11, B097-12 ..... 78, 404
B098N 147
B098-01N, B098-03N 147
B098-05 / B098-13 147
B099 KIT 148
B099N, B099-01N 148
B099-10 146
B099-15 / B099-17 146
B099N 148
B100, B100-02 ..... 148, 149
B102 ..... 148, 149
B103-05 KIT 149
B103-10 ..... 149, 425
B111 147
B200 / B293-02 104-111

C

Page

C020 / C025A 168
C024N, C025N 170
C036 / C041A 172
C040N, C041N 174
C041-11 171-175
C051 / C056A 176
C055N, C056N 178
C056-11 179
C058 / C058-05A 180
C058-04N, C058-05N 182
C066 / C071A 188
C070N, C071N 190
C073 / C078A 184
C077N, C078N 186
C079-01 / C079-06A 192
C079-05N, C079-06N 194
C086-02N, C086-03N 196
C086-10, C086-11 ..... 197, 217
C087N, C087-01N 218
C087-11, C087-12 219
C088N, C088-01N 218
C088-10N, C088-11N 216
C089 / C089-04A 200
C089-02N, C089-04N 202
C089-06, C089-07 208
C089-08D 208
C089-08N, C089-10N 210
C089-10A 208
C089-15, C089-16 212
C089-17D 212
C089-17N 214
C089-19A 212
C089-19N 214
C089-21D, C089-22A 204
C089-21N, C089-22N 206
C089B, C089-01B 204
C090 / C090-03N 226
C090-06D / C090-07N 230, 232
C090-12, C090-13 231
C090-14 ..... 231, 233
C090-15 232
C090-16 232
C090-18 232
C090-19 233
C090-20 232
C091-01 / C091-03N 228, 232
C091-10 / C091-12 229
C091-13 242
C091-14 229
C092, C092-01 238
C092-05, C092-06 ..... 239, 353
C092-11 238
C092-15 239
C093-02D / C093-03N 234
C093-05N 236
C093-11 ..... 248, 249, 417, 422
C094N 249
C095 249
C095-05 248
C096 249
C097-01 240
C097-02 240
C097-05 240
C097-08 240
C098-01N 157
C098N 155, 157, 337
C100 / C100-03 241
C101, C101-01 241
C102 241
C103 / C103-02 241
C104-01N, C104-02N 162
C104-04 162

C104-05 163
C104-09 162
C104-10N 15, 20, 165
C104-31, C104-31SP 165
C104N 158
C104NLP, C104-51LP 66
C105 240
C106 242
C106-10 343-349
C107, C107-01 243
C107-09 / C107-29 ..... 243, 277
C108N 155
C109-03N, C109-04N 245
C109-09N 236
C109-10 ..... 17, 157
C109-10(N) 15, 17, 163
C109-11 ..... 17, 157
C109-11(N) 15, 17, 163
C109-12 ..... 17, 157
C109-12(N) 15, 18, 163
C109N 158
C109-15(N) 15, 20, 165, 232
C109-16(N) 15
C110 / C110-14 247
C110-20 183
C110-30 243
C111 / C111-50 247
C112-05 / C112-11 247
C113 245
C114, C114-01 245
C114-10 245
C115-01 245
C116-01N / C116-13N 246
C116-09S 426, 427
C117 ..... 205, 207, 213, 215
C118-01 / C118-14 246
C119 / C119-05 244
C121 / C121-10 244
C121-51 244
C122 / C122-07 246
C123 ..... 15, 19, 157
C123(N) 15, 19, 163
C123-01N 15, 369
C125-01N 221
C125-09 / C125-15 ..... 65, 221, 335
C125N 15, 19, 220
C126 244
C127-11 ..... 157, 163
C127N 157, 163
C128 240
C129 ..... 54, 163, 250
C129-01, C129-02 250
C130N, C131N, C132N 223
C130-05 223
C133 223
C134, C134-10 ..... 65, 221, 222, 355
C134-05 222
C138-05 253
C138-11 / C138-14 253
C138N 252
C140 / C140-10 253
C140-12 253
C142 / C142-08 253
C154, C154-01 251
C155-05 251
C155-10N 251, 253
C155N 251
C161 255
C162 / C162-02 255
C163 / C165 254
C170 227
C170-01 ..... 256, 257
C171, C171-11 256
C172 256
C173 256
C174N, C174-01N 257
C178 KIT 258
C179 KIT 258
C179-01, C179-02 258
C180 KIT 258
C180-01 / C180-07 ..... 258, 259
C180-03P 259
C181 ..... 256, 258, 259
C181P 259
C182 KIT 258
C182P KIT 259
C183 / C184-10 257
C185 259
C186 / C190 260
C192 KIT 259
C192-01, C192-02 259
C194, C194-01 261
C195 / C198 262
C199 / C199-11 263
C200 / C205-01 263
C208, C208-01 264
C211 261
C213 261
C214, C214-01 264
C215 265
C220 261
C223 266
C223-01, C223-05 267
C224 266
C228, C229 261
C230, C230N 266
C230-01 / C230-05 ..... 267, 268
C231 267
C232-01 267
C232N 266
C232 266
C234-02, C234-03 267
C235 / C238 267
C235-01 267
C247 / C249-01 268
C250-10 / C250-17CER 270
C253 / C253-03 269
C254 / C254-05 268
C254-01 271
C258 / C258-06, C258-04CO 268
C259, C259-01 269
C261 269
C262 ..... 256, 269
C265 269
C270N / C274 273
C278 / C279 272
C279-01 273
C279-02 ..... 56, 273, 388
C279-04 273
C281-01 / C281-04 272
C281-05 273
C281N 272
C282 272
C290-01 / C296 278
C298, C299 ..... 61, 279
C299-10 279
C300-01 / C300-08 ..... 61, 279
C302 KIT / C302-10 KIT 274
C302-11 275
C303N 265, 480

C303-01 / C303-06N 265
C304 / C304-02 247
C305-01 275
C306-01 , C306-02 275
C306-03 ..... 124, 275, 390, 391
C306-04, C306-05 275
C307 275
C309-10 / C309-14 275
C311-01 ..... 275, 277
C312-02 / C312-11 277
C313, C313-15 ..... 57, 276
C318N 280
C318-10 280
C319 ..... 78, 281
C319-02 281
C321-10 282
C322 KIT 282
C322-01 282
C324N 280
C330 282
C331, C331-02 281
C332 280
C339-01 / C339-05 282
C344 / C346-04 282
C348N 57, 283
C349N 283
C350N, C350-01N 283
C350-10 / C350-16 ..... 57, 283
C351 ..... 283, 370
C351-11 370
C352, C353 ..... 57, 283
C358-01 / C358-16 286
C358-21 287
C358-23N 287
C359 KIT / C359-02 KIT 285, 287
C360 KIT 285, 287
C360-01 KIT 285, 287
C361 KIT 285, 287
C362-01, C362-02 285
C363 KIT / C363-02 KIT 285, 287
C364 / C366-12 271
C369N 59, 295
C370-02 / C370-10 ..... 295, 297
C372-10, C372-11 ..... 295, 297
C372N 59, 296
C373-10N / C373-13 294
C374, C374-06 289
C375-01 290
C375-02 289
C375-10 KIT 290
C375-11 290
C376-01 / C376-15 288
C376N 288
C377 / C377-16 ..... 62, 284
C378, C378-01 291
C380, C380-01 292
C381 ..... 60, 292
C382 / C383-10 292
C386N 293
C390 ..... 60, 292
C393 298
C396N, C397N 299
C399 285
C403-01, C403-02 299
C403-10 301
C405-10 302
C405-15N 24, 63, 287, 302, 426, 427, 428
C405-24 / C405-30 302
C405N, C406N 303
C407-02 303
C408 / C408-03 303
C410 / C410-10 301
C411 / C411-07 300
C412-01, C412-11 300
C414, C414-01 300
C430 304
C432-01 / C432-06 304
C433 304
C435 / C435-11 305

E Page

E009 KIT 308
E010-01 / E010-08 308
E011N, E011-01 308
E014 309
E016 / E016-02 309
E017 309
E020, E021 309
E025 309
E027, E027-01 310
E028 / E028-02 310
E029 309
E031, E031-01 311
E034 / E034-12 310
E035 310
E036 KIT 311
E036-10 / E036-13 311
E037 / E037-10 312
E038 / E038-02 312
E039N 311
E042-01N, E042-02N 313, 317
E042-06N 317
E042N 313, 317
E043 317
E044-03N 316
E044-11 / E044-13 316
E044-20 / E044-30 317
E044-40N, E044-41N 313, 317
E044-45 317
E044-48N 313, 317
E044N 314
E046N, E046-01N 313, 317
E050 318
E055-04 / E055-06 ..... 313, 317
E055-07 ..... 309, 313, 317
E055-08 ..... 308, 313
E055-10 / E055-13 ..... 313, 317
E055-15 313
E055N 283
E058 313
E059 318
E060 / E060-03 318
E061N / E061-12 319
E062-01 / E062-04N 319
E062-10 319
E064 322
E065 322
E066, E066-01 ..... 322, 323
E066-02 ..... 322, 323, 436, 469
E066-03, E066-04 ..... 322, 323
E067, E067-05 324
E070 320
E072, E072-01 320
E073 / E075-11 320
E077 KIT, E077-01 KIT 58, 271, 321
E078 KIT 58, 271, 321
E078-01 ..... 58, 321
E078-03, E078-04 321
E078-05 271

E078-06 ..... 58, 321
E080 324
E081, E081-10 323
E082 322
E082-01, E082-11 323
E083 323
E083-10, E083-11 324
E085-05 / E085-07 325
E086 KIT, E087 KIT 325
E087-01, E087-05 325
E087-06 ..... 58, 309, 325
E090 KIT, E090-01 KIT 325
E090-08 325
E091 311
E092N KIT 326
E092-05 / E092-10 327
E093 328
E094 ..... 81, 328
E095 ..... 81, 328, 379
E095-01, E095-03 ..... 81, 328
E095-04 ..... 327, 328
E095-05 328
E096-01 328
E097-01N 327, 328
E102 / E106 332
E107, E107-01 321
E110 332
E111 ..... 332, 340, 419
E112 332
E113 321
E114 / E115-02 271
E130 / E133 333
E134-11 335
E136 ..... 51, 334, 389
E136-01 334
E136-10 334
E138 335
E138-11 ..... 305, 335
E139 334
E141 ..... 275, 335
E142 ..... 298, 330
E142-01 330
E142-10 331
E143 / E143-13 331
E151 342
E152 346
E155 342
E156 346
E159-01D 342
E159-01N 344
E159D 342
E159N 344
E160-01D 346
E160-01N 348
E160D 346
E160N 348
E161-01A 346
E161-01N 348
E161-02A 342
E161-02N 344
E161-03A 346
E161-03N 348
E161-05 343-351
E161-06 343-351
E161-11, E161-12 ..... 246, 343-351
E161-15 246
E161A 342
E161N 344
E163 ..... 15, 17, 157
E163(N) 15, 17, 163
E164 ..... 15, 17, 157
E164(N) 15, 17, 163
E170 352
E170-01 352
E170-01GO 352
E170-11 352
E171 352
E171-01 352
E172-01 352
E172-01GO 352
E172-02 352
E181N 350
E183-10 351
E183-11 246
E183-12 246
E183N 350
E190N 15, 19, 354

H

Page

H002-03 / H002-05 360
H002N 360
H003-03 / H003-08 359
H003-11 / H003-14 359
H003-18 365
H003-21 359
H003-22 359
H003-99 358
H003N 358
H004, H005 363
H005-11 ..... 364, 367, 419
H005-21 ..... 364, 367, 419, 423
H005-31 ..... 364, 367, 419
H005-40 / H005-44 364
H005-51 364
H006, H007 363
H007-11 364
H007-21 364
H007-22 364
H007-31 / H007-33 364
H007-40 364
H007-41 364
H007-44 364
H008 363
H008-11 364
H008-21 / H008-23 364
H008-31 / H008-34 364
H008-41 364
H008-44 364
H009-01 ..... 99, 116, 123, 157, 163, 240
H009N 15, 22, 366, 367, 369
H010 368
H011-01N 368
H011-11N 369
H011-12N 369
H011N 368
H012-01 / H013-02 369
H014 ..... 365, 367, 369
H014-06 / H014-08 ..... 365, 367, 369, 419
H014-09 365
H014-10 ..... 365, 369, 419
H020, H021 370
H050 370
H052, H054 370
H057 / H057-11 370
H060N 371
H060-03 371
H062, H062-03 371
H065-01 372

H065N 372
H066-01 / H066-64 373
H067-01 / H067-04 373
H068-01 / H068-23 373

S Page

S050 376
S051 /S051-12 376
S051-01 377
S052 KIT 377
S052-01 / S052-05 377
S053 ..... 377, 379
S053-04 ..... 377, 379
S054 ..... 377, 379
S057, S057-01 376
S059 / S059-02 382
S060 382
S060-01 383
S060-10 382
S061 / S061-02 379
S065 / S076-01 380
S077 383
S078-01 383
S079 383
S083 KIT 379
S083-01 / S083-03 379
S084 KIT 379
S084-01 379
S086 381
S088 381
S088-10 381
S092-01 377
S092 KIT / S094 KIT 378
S093-01 377
S094-01 377
S095 / S097 ..... 377, 378
S097-01 / S097-05 378
S111 384
S112 384
S113-10 / S113-17 384
S114 ..... 87, 384, 399, 403
S118 385
S120, S120-01 385
S122 / S122-19 ..... 385, 435
S123 / S123-16 ..... 385, 435
S124, S125 385
S131 KIT 406
S131-11 406
S132N 56, 386, 410
S132-01 / S132-03 ..... 49, 56, 386, 475
S133N 386
S135 / S138 386
S140 387
S143 KIT 391
S144 ..... 49, 391
S144-01 ..... 49, 391
S144-02 / S144-04 391
S144-10 391
S147 ..... 51, 389
S148 ..... 51, 126, 389
S155 KIT 390
S155-01 / S155-03 390
S155-04 / S155-10 ..... 390, 391
S156 390
S156-01 KIT 390
S156-03 390
S156-11 / S156-13 390
S156-20 49
S157 KIT 49, 391
S157-01 / S157-08 ..... 49, 138, 391
S157-10 ..... 49, 391
S157-20 ..... 49, 391
S158 KIT 48, 392
S158-01 / S158-13 ..... 48, 392, 393
S158-01G 393
S158-20 KIT 48, 392
S159 KIT 48, 392
S159-01 KIT 48, 392
S159-11 ..... 48, 392
S160-01N 48, 393
S160N 48, 393
S161 393
S165 KIT 396
S165-01 KIT 397
S165-02 KIT 397
S166 KIT 396
S166-01 / S166-06 ..... 396, 397
S170 / S170-05 394
S172, S172-01 394
S173-01 / S173-04 394
S173-04P 394
S173-05, S173-06 394
S173-06P 394
S173-07 / S173-09 394
S175 / S175-04 395
S176 395
S178 / S178-06 395
S179 395
S185 398
S185-01 ..... 399, 433
S186 / S187-01 398
S187, S187-01 399
S188, S188-01 ..... 399, 403
S188-02 399
S189 / S194-04 KIT 398
S194-09 / S194-11 399
S194-14 / S194-26 403
S195-01 / S195-28 404
S197N 78, 404
S197-01N 78, 404
S198-22, S198-23 401
S199 400
S199-06 / S199-14 401
S200-01 / S200-08 403
S200-09 ..... 399 , 403, 433
S200-10 403
S200-11 ..... 256, 332, 403
S200-12, S200-13 403
S200-14 ..... 403, 491
S201 KIT 403
S201-01 KIT 403
S201-02 / S201-12 403
S201-04 / S201-06 403
S201-05 402
S202 KIT 403
S202-03 403
S202-07 / S202-10 403
S203 KIT 403
S203-01 KIT 403
S205 ..... 118, 248, 340, 414
S205-05 ..... 340, 367, 414, 419
S205-07 ..... 340, 419
S205-08(N) 15, 23, 340, 419
S205-09 ..... 367, 419
S205-11 418
S205-13, S205-14 416
S205-15 248
S205-16 416
S205-18 ..... 248, 417

S206N 120, 146, 248, 341, 367, 420
S206-21N 121, 421
S206-31 ..... 121, 421
S206-32 341
S209 KIT 407
S209-01 407
S210 KIT 406
S210-02 407
S211 KIT 407
S211-10 407
S212A 410
S212N 115, 408
S212-01 406-408
S212-03 406-408
S212-05 ..... 115, 116, 119, 121, 340, 408, 419, 421
S212-08N 408, 410, 418
S213N, S213-01N 115, 408
S214N KIT 116, 409
S214-01 KIT 409
S215A 116, 410
S216 KIT 409
S218(N) 15, 23, 123, 413, 421
S218-01(N) 15, 23, 123, 413
S220 KIT 406
S220-01 406
S221, S221-01 406
S222 KIT 424
S222-01 ..... 424, 426
S222-02 424
S222-03 424-427
S223 KIT 424
S223-01 424
S223-02 425
S223-03 421
S224 KIT 426
S224-01 KIT 426
S224-02 KIT 427
S224-21N 15, 426, 427
S225 KIT 425
S225-01, S225-02 ..... 149, 425, 426
S225-02 425
S226 KIT 425
S226-01 / S226-03 427
S226-05 424-427
S226-06 424-427
S226-09 427
S226-12 424
S226-13 ..... 149, 424, 425, 426
S226-16 424-427
S227-02 ..... 425, 427
S227-03 425
S229N 405
S229-05 / S229-15 405
S230 KIT 430
S230-01 430
S231 KIT 431
S231-01 431
S231-05, S231-06 431
S231-11 431
S232 KIT 430
S232-01 430
S233 KIT 430
S233-01 430
S234 KIT 431
S234-01 431
S234-05, S234-06 431
S235, S235-01 431
S236 KIT 431
S236-01 KIT 431
S236-05 / S236-07 431
S236-10 / S236-12 431
S237 KIT 431
S237-05 / S237-07 431
S238 KIT 405
S238-01 KIT 405
S238-10 / S238-16 405
S240-01 / S240-05 430
S244 433
S245-01 / S245-03 432
S245-04 ..... 432, 433
S246-01 432
S248 433
S252, S252-02 ..... 432, 433
S253, S253-02 ..... 432, 433
S260 434
S260-05N 437
S260-13 436
S262N 440
S262-11 ..... 440, 446
S262-12N 441
S265, S265-01 436
S268 / S268-05 435
S272 / S272-05 435
S273 KIT 436, 443, 456
S273-01 / S273-08 ..... 436, 444
S273-01 KIT 436
S273-02 KIT 436
S274 KIT 435
S274-01 KIT / S274-10 KIT 435
S275 ..... 68, 435
S277-01N 443
S277-02N 446
S277-10N 443
S277-11N 446
S277-20 ..... 443, 446
S277-31 ..... 443, 446
S277-32 443
S277-40N 445
S277-41N 447
S277N KIT 443
S280-15, S280-16 ..... 443, 446
S281 / S285 444
S286 KIT / S286-04 KIT 444
S290 444
S291, S291-01 444
S301N 449
S305 450
S305-05 ..... 410, 453
S306 450
S310 / S322 450
S325 ..... 68, 432, 450
S326 / S331 450
S334 ..... 434, 463
S334-01 / S334-12 463
S335-10N 457
S335-15 ..... 410, 426, 436, 443, 446, 453, 456
S336-10 453
S336-11 ..... 165, 223, 232, 434, 440, 443, 446, 453
S336-12 ..... 443, 446, 453, 456
S336-13 453
S336-14 ..... 123, 165, 233, 410, 413, 426, 453, 456
S336-15 453
S336-16 ..... 453, 456
S336-17 453
S336-18 453
S336-30 434-455
S336-31 ..... 426, 434, 453, 455, 456
S336-32 ..... 434, 453, 455
S336-41 ..... 436, 440, 446, 453
S336-43 ..... 114, 428, 436, 440, 446, 453

S336-45 ..... 428, 446, 453
S336-47 ..... 114, 428, 446, 453
S336-50 455
S336-51 455
S336-55 455
S337-02 / S337-05 452
S337-21 452
S337-31 452
S337-32 ..... 248, 340, 419, 452
S337-33 452
S337-34 ..... 119, 121, 123, 248, 340, 410, 413, 419, 421, 452
S337-35 452
S337-36 ..... 367, 419
S337-51 ..... 222, 223, 287, 428, 434, 440, 452
S338N 456
S338-01 KIT 456
S338-05 456
S340 455
S341 455
S345 455
S348 455
S350 454
S350-01 455
S350-04 454
S350-05 454
S351 454
S353 455
S355 ..... 432, 454
S355-01 ..... 432, 454
S356 455
S358 456
S359 456
S370 464
S370 Serie 464
S370-01S 452
S370-02 ..... 406, 464
S370-02S 408
S370-03S 443, 452
S370-03 / S370-08 464
S370-04S 452
S370-05S 452
S370-07S 452
S370-08S 115, 408
S370-09 ..... 406, 464
S370-10 ..... 406, 407, 464
S370-10S 115, 408, 452
S370-11 464
S370-12 464
S371 464
S371 Serie 464
S371-01 / S371-12 464
S371-01S 452
S371-03S / S371-05S 452
S371-07S 452
S371-10S 452
S372 464
S372 Serie 464
S372-01 / S372-12 464
S373-05 464
S374 ..... 115, 407, 408, 452
S374-01 407
S374-02 464
S375 ..... 223, 271, 465
S375-01 ..... 434, 465
S376 ..... 271, 303, 403, 406, 407, 408, 434, 443, 465
S377 ..... 303, 403, 406, 424, 443, 453, 456, 465
S378 ..... 303, 465
S379 ..... 303, 453, 456, 465
S380 465
S380-01 465
S382-01 ..... 272, 465
S382-02 ..... 271, 465
S382-13 ..... 58, 271, 321, 465
S383 465
S390 465

V Page

V014 / V017 468
V023-01 ..... 31, 388, 469
V031 468
V034 468
V035-01 / V035-08 469
V035-01CER / V035-08CER 469
V036 469
V036-02 469
V037 / V040 469
V040-01 469
V041 ..... 51, 80, 264, 472
V042 472
V051 468
V057 468
V059 468
V065-02 469
V070-02 471
V070-05 471
V070-06 471
V071-02 471
V071-07 471
V071-10 471
V071-11 471
V072-02 471
V072-05 471
V072-06 471
V072-09 471
V073-01 471
V073-04 471
V073-06 471
V074-11 471
V074-12 471
V075-02 / V075-04 471
V075-06 471
V075-11 ..... 80, 471
V075-12 471
V075-12SP 324
V075-13 471
V075-20 / V075-22 471
V085 ..... 51, 80, 264, 472
V085-01 ..... 264, 472
V086 472
V086 KIT 472
V098 473
V098-01 / V098-07 473
V099 473
V099-01 / V099-07 473
V100 473
V100-01 473
V100-02 / V100-07 473
V101 473
V101-01 473
V101-02 473
V101-03 ..... 139, 473
V101-04 473
V101-05 473
V101-06 473
V101-07 ..... 49, 473
V102-01 477
V102-02 ..... 311, 477
V102-03 477
V102-04 477

V103 / V103-02 ..... 51, 473
V104 473
V104-01 473
V104-02 473
V104-03 ..... 390, 473
V104-04 / V104-07 473
V105 / V105-08 ..... 51, 473
V106 473
V106-01 / V106-04 473
V107 474
V107-01 / V107-03 474
V107-11 / V107-14 474
V108 / V108-12 ..... 51, 389, 474
V109 474
V109-01 / V109-09 474
V110 475
V110-01 / V110-03 475
V111, V111-01 ..... 140, 475
V112 478
V112-01 ..... 385, 478
V112-02 / V112-04 478
V112-05 484
V113 ..... 385, 478
V114-01 478
V114-02 478
V114-03 478
V114-04 / V114-06 478
V114-10 ..... 70, 478
V115 475
V115-01 475
V116 484
V116-01 / V116-03 484
V117 478
V117-01 / V117-05 478
V118 477
V118-01 / V118-03 477
V119 475
V119-01 / V119-03 475
V120 477
V120-01 / V120-03 477
V121 ..... 392, 431, 477
V121-01 477
V122 484
V122-01 484
V122-02 484
V122-03 484
V122-04 484
V122-05, V122-06 ..... 128, 129, 131, 396, 397, 484
V122-07 484
V122-11 484
V123 475
V123-01 475
V124 475
V125 484
V125-01 484
V125-03 ..... 57, 430, 484
V125-12 484
V125-16 484
V125-18 484
V127 ..... 256, 477
V127-01 477
V127-02 477
V128 477
V135 477
V135-01 477
V135-02 477
V136 477
V136-01 ..... 392, 477
V136-02 477
V137 477
V137-01 477
V137-02 477
V138 476
V140 478
V142 476
V142-01 / V142-05 476
V143 476
V143-01 / V143-03 476
V143-05 / V143-08 476
V145-10 477
V145-11 477
V147 476
V147-01 476
V148 479
V148-01 479
V150 / V153 480
V154 / V154-06 ..... 79, 480
V155 480
V160 481
V160-01 / V160-06 481
V161-01 481
V162 481
V162-01 481
V163 481
V164-01 / V164-03 481
V165 ..... 334, 482
V166-01 482
V167 479
V167-01 479
V168 479
V168-01 / V168-04 479
V169 479
V170 ..... 392, 482
V170-01 482
V171 482
V172 ..... 390, 482
V172-02 ..... 390, 482
V172-03 ..... 390, 391, 482
V172-04 482
V172-05 ..... 57, 482
V173 KIT 483
V173-01 483
V173-02 483
V173-03 ..... 74, 483
V173-04 ..... 75, 483
V173-05 483
V174 483
V175 ..... 311, 483
V175-01 483
V175-02, V175-02CER 270, 483
V175-03, V175-03CER 50, 270, 483
V175-04 483
V176 483
V176-01 ..... 258, 483
V176-02 ..... 392, 483
V177 483
V177-01 483
V178 483
V178-01 ..... 258, 259, 269, 483
V178-03 483
V179 483
V179-01 483
V179-02 483
V179-03 483
V179-04 483
V179-05 483
V179-06 483
V182 ..... 269, 484
V182-01 / V182-08 484
V182-10 / V182-13 484

V183 ..... 430, 485
V184 ..... 258, 259, 485
V184-01 ..... 269, 485
V184-02 / V184-07 485
V185 485
V185-01 485
V185-02 485
V185-03 ..... 259, 485
V186 ..... 430, 485
V186-01 485
V187 ..... 269, 485
V188 ..... 430, 485
V189 485
V192 ..... 365, 485
V192-01 / V192-07 485
V192-08 ..... 309, 485
V193 ..... 430, 485
V194 ..... 430, 485
V194-01 485
V195 ..... 269, 430, 485
V196 485
V197 485
V198 ..... 430, 485
V199 ..... 430, 485
V200 ..... 29, 74, 75, 486
V200-01N 29, 486
V200-02 ..... 29, 74, 75, 486
V200-03N 29, 486
V200-05N 29, 486
V200-06N 29, 486
V201 ..... 29, 488
V201-01 488
V202 ..... 389, 487
V203 ..... 75, 432, 487
V204 487
V205 ..... 311, 454, 487
V205-01 ..... 76, 487
V205-02 487
V205-10 ..... 75, 76, 311, 454, 487
V205-11 ..... 454, 487
V205-12 ..... 76, 454, 487
V206 ..... 126, 305,488
V206-01, V206-02 ..... 335, 488
V207 ..... 360, 440, 446, 454, 488
V208-10 488
V211 489
V211-01 489
V215, V215-02 ..... 387, 489
V215-11 / V215-14 489
V218-01 491
V218-05 / V218-12 491
V219 490
V219-01 490
V220 490
V220-01 / V220-05 490
V222 490
V224 / 226 490
V230 490
V230-01 490
V230-02 ..... 433, 490
V230-03 ..... 76, 311, 432, 454, 490
V241 491
V300-05 491
V300-15 ..... 31, 389, 491
V300-16 491
V300-18 491
V300-19 ..... 29, 80, 319, 491
V300-23 ..... 390, 491
V300-24 ..... 56, 491
V300-25 491
V300-28 ..... 49, 391, 491
V300-29 ..... 49, 391, 491
V300-30 ..... 387, 491
V300-31 491
V300-32 491

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