

Section B

BITUMEN - ASPHALT

section B

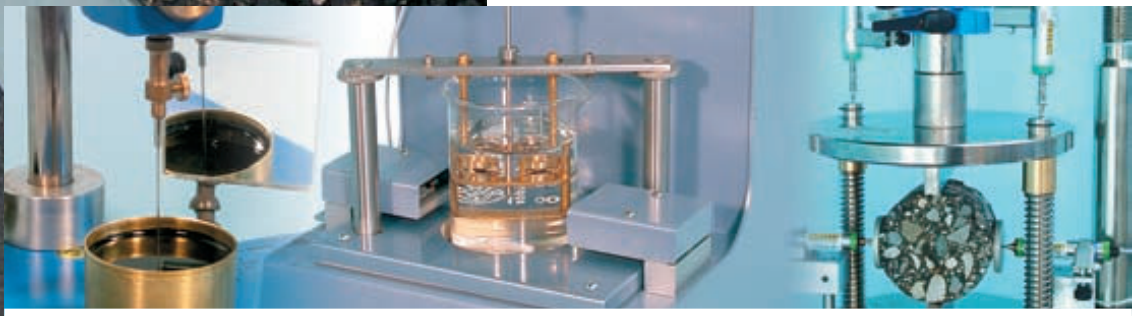


The use of bituminous materials is mainly addressed to roads construction.

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, EN 13108 / ASTM D6307 / AASHTO TP53 / NCAT (National Centre for Asphalt Technology) / BS (DD)

section B



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B005

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 baskets, 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:
 230V 1 F 50 Hz 4800 W 20 A
 Temperature range: 200-650°C
 Weight: 120 kg

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 baskets, 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: 230V 1 F 50 Hz 4800 W 20 A Temperature range: 200-650°C Weight: 120 kg

B005 - accessori



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: 400V 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 (CHCl₃), 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 Stainless stell Beaker dia. 120 mm

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, Viton material, for 200 mm dia. Sieves. Pack of 10 pieces.

B008-10

Cabinet with aspirator

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.



B008-10



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. B011-01)

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:

TRICHLOROETHYLENE 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)

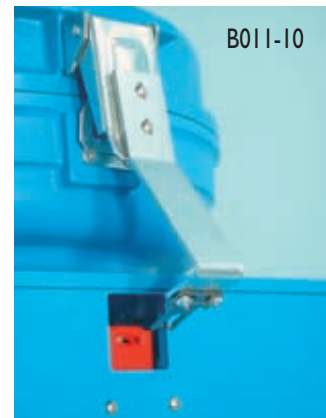
UPGRADING OPTION:

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.



B011-10

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

SPARE:

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

ACCESSORY:

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



B014

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: 230V 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 overheatings

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





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 4000 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 200 mm, isomantle electric heater; stand and clamps.
Power supply:
230V 1ph 50/60Hz 900W
Dimensions:
400x400x1000 ml approx.
Weight: 20 kg approx.

SPARE PART:

B061-03
Filter cartridges for Soxhelet (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:
230V 1ph 50/60 Hz 750 W

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.



B061 KIT

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.



B018

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.

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. 446



V154-01

ACCESSORIES:

V154-01 Penetration probe, 120 mm long

V154-02 Surface probe, 260 mm long

V154

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 KIT

B019 KIT

V200-02

V200





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.



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

V205-01 + V205-10 + V205-12

VACUUM PUMP, PORTABLE TWO STAGES, complete with vacuum regulator and condensed water trap.

Technical details: see Section "V" pag. 453

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

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 270 rpm.
- condenser.
- solvent recovery flask, 1000 ml capacity.
- heated oil bath.

The angle of the rotary/distillation flask is 15° approx.

The instrument is supplied complete with glass tubing with three way valve and transparent flexible hose for solution intake.

The Rotary 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)



B065-12

V205-01+V230-03

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



B022 + B022-11



B022-11

TEST BOTTLE, made of borosilicate glass, 500 ml capacity, diameter 86 mm, height 176 mm, neck with diameter opening 34 mm, as expressly requested by EN Specification.

B022-12

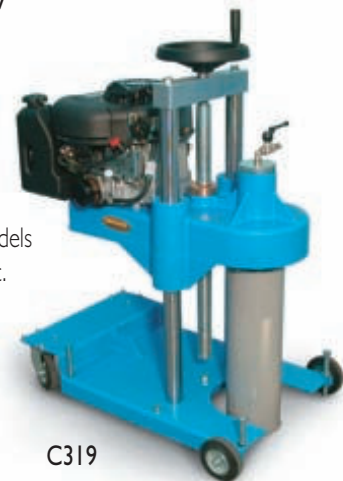
GLASS ROD with a diameter of 6 mm equipped with 35 mm long fitting rubber tube.

SAMPLING OF ASPHALT ROAD CORES FOR THE DETERMINATION OF PHYSICAL 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. 250



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 pavements, for quality control purpose.
Weight: 12 kg



B097



S197

S197-01

B097-03

B097-02

S197

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. 374

ACCESSORIES:

B097-01 Small tamping foot, dia. 102 mm

B097-02 Large tamping foot, dia. 146 mm

B097-03 Shank 300 mm long for tamping foot

S197-01 Supporting frame for vibrating hammer (see pag. 374).



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 indenter 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.

section B



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 cm² 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



B059-10

ACCESSORIES:

B059-15

CUBE MOULD 70,7 mm.

To prepare cube specimens.

Steel manufactured, it is easily detachable.

Weight: 4350 g

B059-16

PENETRATION (ADJUSTABLE) TEST MOULD 69 mm.

Used during the penetration test of the cube specimen.

Made from aluminium alloy.

Weight: 1850 g

B059-17 BASE, steel made, to fix the Marshall specimen into the Penetrometer.

Weight: 1100 b

B059-18 CALIBRATION DEVICE for the Indentation Penetrometer.

Weight: 700 g

B059-21

THERMOSTAT DIGITAL HEATING SYSTEM, complete with immersion heating element.

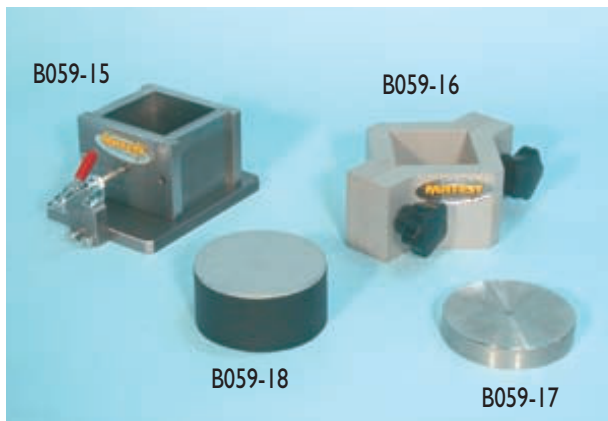
It heats water at the required temperature of 22°C. or of 40°C. with an accuracy within +/- 1°C. as requested by Standards.

Power supply: 230V 1ph 50Hz 1500W

Weight: 3 kg. Approx.



B059-21



B059-15

B059-16

B059-18

B059-17

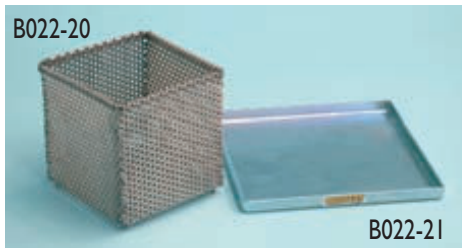
BINDER DRAINAGE, BASKET METHOD

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.



B022-21

Tray, stainless steel made, dimensions 160x160x10 mm.
Weight: 500 g approx.

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. 438



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. 437

A106

WAX MELTING POT

Technical details:
see section "A" pag. 29



V300-19

PARAFFIN WAX, pack of 5000g

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

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

ACCESSORY:

B024-01

WEIGHT KG 5, annular shape, to apply on the base of the permeameter, to improve its adherence to the material under test.

B024



B024



B027

Mixer 20 litres capacity STANDARD: EN 12697-35

This large capacity mixer has 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 20 litres capacity, but "without" whisk beater, "without" coupling and "without" electric heater that must be ordered separately (see accessories).

Power supply: 400V 3ph 50Hz 1,1kW
(230V 1ph on request)

Dimensions: 489x693xh 944 mm

Weight: 110 kg approx.



B027

B027-01

B027-06

B027-03

B027-02

B027-05

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. Double speed selection (140 or 285 rpm). The mixer is supplied complete with stainless steel bowl, but "without" whisk to be ordered separately (see accessories). It cannot be sold in CE markets without security guards (see mod. E095).

Power supply: 230V 1 ph 50 Hz 800 W

Dimensions: 450x400x480 mm

Weight: 50 kg



E095 + 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



E095-03

B028-03

B028-01

ACCESSORIES for B027:

- B027-03** WHISK THIN wire beater, EN Specifications
- B027-06** WHISK THICK wire beater, EN Specifications
- B025-08** COUPLING beater/shaft for B027-03, B027-06, B027-04
- B027-01** ELECTRIC HEATER, complete with thermoregulator:
Power supply: 230V 1ph 50-60Hz 1000W

OTHER MODELS OF BEATERS, NOT CONFORMING TO STANDARDS:

- B027-02** Beater
- B027-04** Spiral beater.
- B027-05** Hook beater
- B025-09** COUPLING beater/shaft for B027-05, B027-02

SPARE: **B027-11** BOWL, stainless steel, 20 litres capacity

ACCESSORIES FOR E094 and E095:

- B028-03** WHISK BEATER, thin wire, stainless steel, conforming 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.



HOT MIX ASPHALT COMPACTABILITY DETERMINATION

B031N

Marshall Automatic EN (impact) Compactor

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

This ruggedly constructed apparatus automatically compacts the bituminous sample and stops off the motor after the preset number of blows has been completed on the automatic digital display counter.

The trip mechanism is structured so that the sliding hammer falls at the same height at every blow.

The mould is held in position by a fast clamping device.

The compactor includes a vibrated concrete base where a laminate hardwood block is mounted.

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

ACCESSORIES:

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.

S/PARE PART:

B033-11

Compaction Hammer complete

STANDARD COMPACTION MOULD,

EN 12697-10 / EN 12697-30 Specifications.

Plated against corrosion.

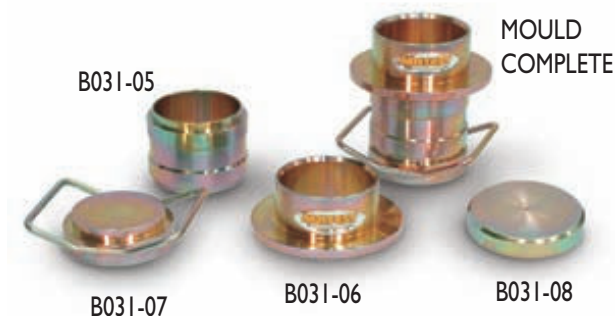
Comprising:

B031-05 Mould body.Weight 1,7 kg

B031-06 Filling collar.Weight 1,5 kg

B031-07 Base plate with handles.Weight 3,1 kg

B031-08 Distance piece (to be added to the B031N Compactor when using the ASTM Marshall mould mod. B029)



B031-11

Compressibility apparatus

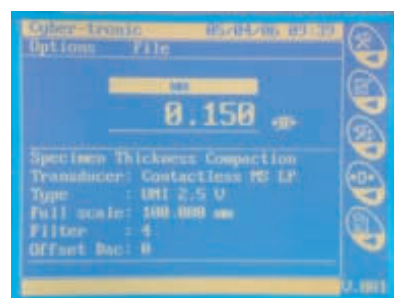
This electronic device, fixed to the B031 Compactor, measures the specimen thickness during compaction.

The unit includes a 50 mm travel transducer having 0,1 mm resolution, and it is connected

to a digital readout having large LCD display. The transducer is magneto contactless type, which has no mechanical

vibration stress and therefore very longterm reliable and accurate.

The readout unit has PC interface for unloading, management and file of test data.



B031-11
Screen example



MARSHALL STABILITY ASTM - SPECIMEN COMPACTION

B033

Automatic Marshall compactor for 4" Ø moulds

STANDARDS: ASTM D 1559, D6926 / CNR N° 30 / AASHTOT 245 / NF P98-251-2

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: 230V 1 ph 50Hz 300 W

Dimensions: 540x400x1600 mm

Weight: 95 kg



B033



B033-01



B033-11

B033-04



B033 + B033-03

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, B031N Compactors.



B032-KIT

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

STANDARDS: ASTM D1559, 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.



B035-01

Automatic Marshall compactor for 6" and 4" Ø moulds

STANDARDS: ASTM D1559, D6926, D5581 / 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: 110 kg approx.

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.

B032-05

B034



B035-11

B035-12

B035-01



B032-01

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

STANDARDS: ASTM D1559, D6926, D5581
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

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.





B029 KIT

Marshall compaction mould, 4" Ø

STANDARDS: ASTM D1559, D6926 / AASHTO T245 / CNR N°30
 Inside diameter 101,6 mm (4")
 Steel manufactured, plated against corrosion.
 Weight: 3 kg

Consisting of:

- B030** MOULD BODY only, Weight: 1200 g
- B030-01** FILLING COLLAR only (ASTM, AASHTO, CNR).
Weight: 800 g
- B030-02** BASEPLATE only, Weight: 1000 g

Note:

French NF P98-251-12 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: 800 g

B030-06 BASE PLATE with handles
 (alternative to mod. B030-02)

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.

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



B079

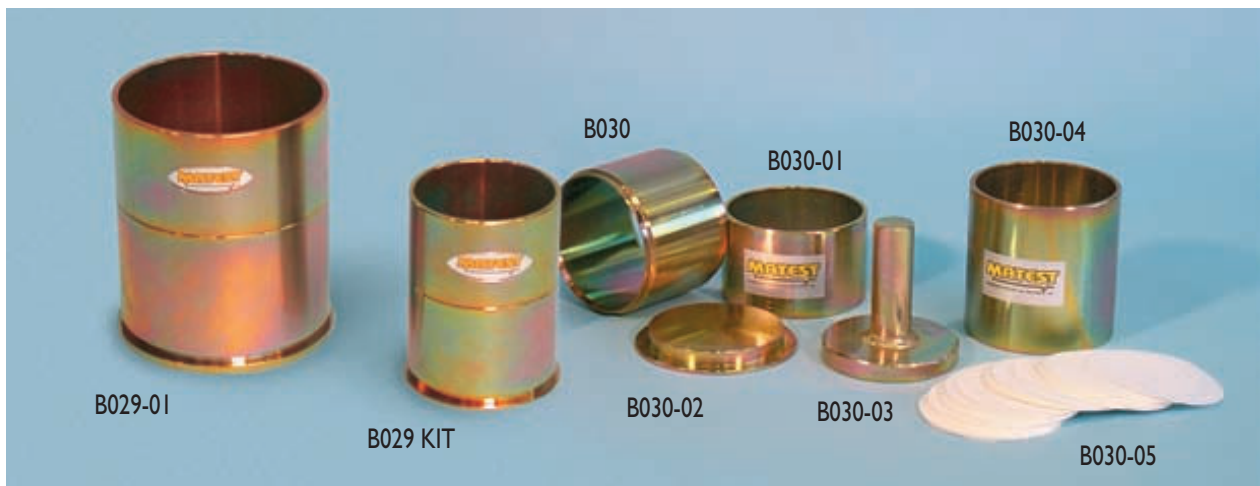
Cabinet with aspirator

Utilized to exhaust vapours and toxic gas caused by Centrifuge Extractors, Hot Extractors, Concrete capping, etc. by avoiding they are diffused in the laboratory. Complete with electric aspirator, electric lighting, switches, electric and water installation, windows, shelves. The front door, made with transparent material can be lifted for an easy access to the operation desk.
 Power supply: 230V 1 ph 50 Hz 350 W
 Dimensions: 1250x750x2600 mm approx.
 Weight: 180 kg



B030-06

B079



B029-01

B029 KIT

B030

B030-01

B030-02

B030-03

B030-04

B030-05

B040

Gyratory compactor

STANDARDS: UNI EN 12697-10, 12697-31 / AASHTO T312 / SHRP M-002

The Gyratory Compactor is used to simulate and reproduce the real compaction conditions achieved under actual road paving operations, hence determining the compaction properties of the asphalt. The acquired results are also employed in the investigation of volumetric and mechanical characteristics of the asphalt mix.

The constant pressure applied by the hydraulic ram on the specimen, which is placed into a cylindrical mould, is combined with a gyratory motion where the angle-degree of rotation is guided and directed by a servo-controlled hydraulic system.

This machine is able to run tests on emulsified asphalts as well, besides regular standard mixes. For this purpose, a proper perforated mould is required (see accessories).

The Gyratory test method has been recognized and approved by the Strategic Highway Research Program (SHRP) and made standard by the AASHTO and EN institutions.

The features of this product make this machine the easiest to use model with the best performances currently found on the market. Possibility to store in memory up to 20 tests, and a USB port for connecting the unit to a variety of hardware such as printers and computers, useful to download the data and print reports.

Main Features:

- Conform to the Superpave and FHWA criteria.
- Pressure of Consolidation: Selectable 90 – 1000kPa
- Angle of Rotation: Adjustable from 0° to 1.5° Internal and External
- Speed of Rotation: 30 ± 0.5 rotation/minute
- Number of Rotations: Adjustable range 1 to 999
- Two modes of operation available:
 - Compaction of specimen in accordance to the selected number of rotations
 - Compaction upon reaching the selected height of specimen
- Data acquisition: number of rotations, specimen height, angle of rotation, value of shear strength (accessory).
- Data Transfer (Output): USB and RS232 port to connect printers, computers, or flash memories.
- Unit of Measure: International system
- Internal memory: possibility to save up to 20 tests.

The Gyratory Compactor is supplied with standard height block, lubricant, power cord, printer, RS232 and USB cable, whereas moulds, filter paper, and extruder need to be ordered separately (see accessories).

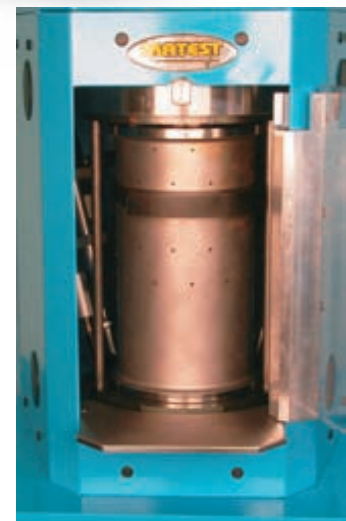
Power Supply: 240V 1ph 50Hz 12A 1440W
 Dimensions: 1740 x 760 x 650mm
 Weight: 227kg

ACCESSORIES

- B040-11** Solid cylindrical mould Ø 100mm
- B040-12** Solid cylindrical mould Ø 150mm
- B040-15** Perforated cylindrical mould Ø 100mm
- B040-16** Perforated cylindrical mould Ø 150mm
- B040-20** Filter paper for Ø 100mm moulds
- B040-21** Filter paper for Ø 150mm moulds
- B040-06** Gravity Extruder
- B040-07** DAVII – Dynamic Angle Verification to measure and verify the angle of gyration
- B040-25** KIT for the pressure monitoring and control
- B040-26** Device for the determination of the shear value



B040



B040-16 Perforated cylindrical mould detail



B039

ROLLER COMPACTOR

STANDARD: EN 12697-33

This Roller Compactor entirely developed and manufactured by Matest is used to produce representative sample slabs of several dimensions of bituminous mixtures laid and compacted in the roads.

The compaction is performed through a segmented roller with alternated operated rotation simulating the on-site action of a street roller. Slabs are compacted up to the selected density and are then compatible for rut tests with B038 Matest Wheel Tracker (see pag. 88).

The slabs can also be cored or cut off to obtain cylinders and beams for bending fatigue, indirect tensile, static and dynamic creep, stiffness, 4-point tests, etc.

section B

THE ROLLER COMPACTOR CONSISTS OF:

- Sturdy steel frame, mould support table with alternating displacement system, for table displacement and vertical load pressure
- 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.

Three transducers are installed to manage the roller and table displacements and vertical load pressure.

The compaction cycle can be programmed by aiming 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)



B039

Detail of the control panel



TECHNICAL SPECIFICATIONS:

- Possibility to use roller segments of different sizes (see accessories): width up to 400mm and radius 490mm, with obtainable slabs dimensions of:
 - 320x260mm thick up to 180mm
 - 305x305x25 to 100 mm thick
 - 400x305x25 to 100 mm thick
- 500x400mm, thick up to 180mm**
- Vertical force selectable up to max. 38 kN (at 8 bar)
- Programmable density target compaction
- Polycarbonate safety enclosure to CE Directive
- Simple and quick roller and mould positioning
- Easy to maintain
- Power supply: 230V 50/60Hz 1 ph 550W
- Dimensions: 2200x1030 xh 1880 mm (2410mm with opened guard)
- Weight: 1300 kg

ACCESSORIES:

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. 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
- B038-13** MOULD for slabs 400x305x100mm
- B038-18** MOULD for slabs 500x400x180mm

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

Heating of the Segment Roller

This device allows the heating and the temperature control of the Segment Roller mounted on the Compactor; thus avoiding the cooling of the specimen when it enters in contact with a cold surface.

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 150°C

It is connected to the segment roller equipped with heating resistances.

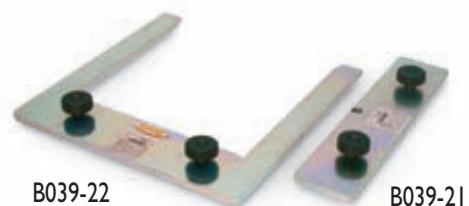
B039-03

Heated Segment Roller

The segment roller (mod. B039-04 to B039-07) is upgraded with a set of heating resistances which are connected to the control unit granting a controlled temperature to the segment roller.



section B



B038

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.

section B

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)

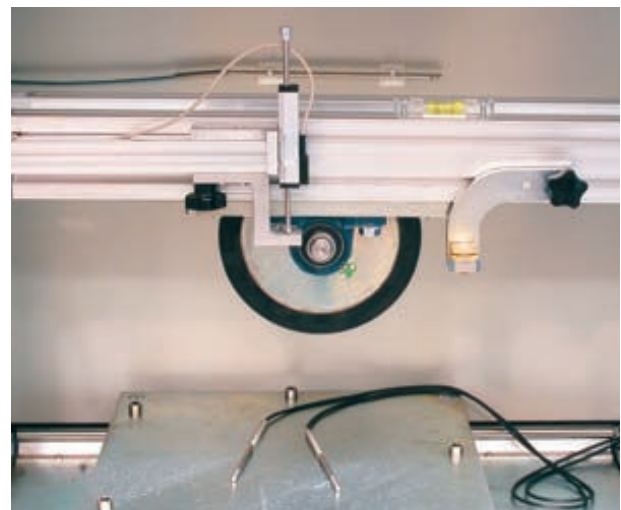
- Matest wheel tracker accepts also samples with dimensions up to 400 x 500 mm, 180 mm high (this mould can be compacted with Matest Roller Compactor)

- 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 with open doors



B038 detail



88

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 x 1790 mm
 Weight: 400 kg approx.



B038-09 ÷ B038-18

ACCESSORIES:

- * **B038-09** MOULD
size 320 x 260 x 180 mm
- * **B038-10** MOULD
size 305 x 305 x 50 mm
- * **B038-11** MOULD
size 305 x 305 x 100 mm
- * **B038-12** MOULD
size 400 x 305 x 50 mm
- * **B038-13** MOULD
size 400 x 305 x 100 mm
- * **B038-14** MOULD for core sample 200 mm diameter, 50 mm high
- * **B038-18** MOULD
size 500 x 400 x 180 mm
- * **H009-01** PC complete with LCD monitor 17", keyboard, mouse, cables, installation.



B038 with closed doors

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.



Marshall compression frames

Available models:

- B042 KIT** Marshall mechanical load frame
- B043 KIT** Marshall digital load frame
- S212-S215 KIT** Universal Multispeed load frame (see pag. 378)
- S213-S214 KIT** CBR/Marshall dual speed load frame (see pag. 378)
- S205** UNITRONIC load frame (see pag. 384)

section B

B042 KIT Marshall mechanical 30 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: 230V 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.



B046N

B047-01

B047

B042 KIT



ACCESSORIES:

B047-02

Tensile splitting device

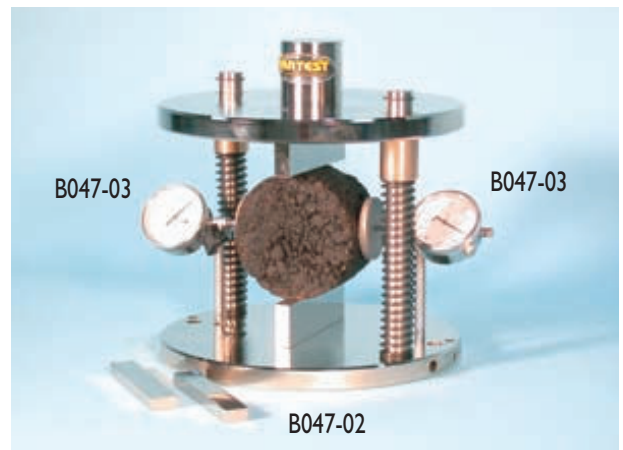
STANDARDS: EN 12697-23 / ASTM D4123 / CNR 134

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.



B047-03

B047-03

B047-02

B043 KIT

Digital Marshall Tester 30 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 $\pm 0,1\%$ linearity. The **Cyber-Plus Evolution** 8 channels digital display unit with microprocessor (technical details: see B044N-SET page. 98, 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: 230V 1 ph 50 Hz 900W 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

SPARE:

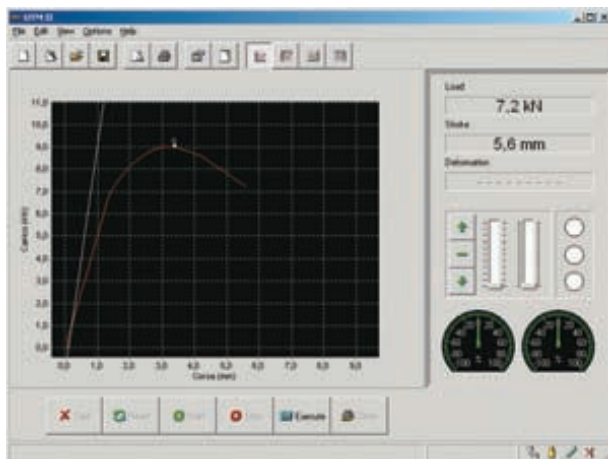
B046N

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



B043 KIT

Note:

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

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. 417

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

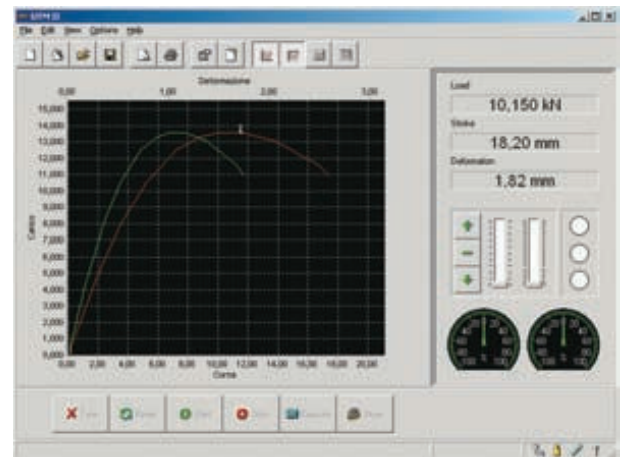
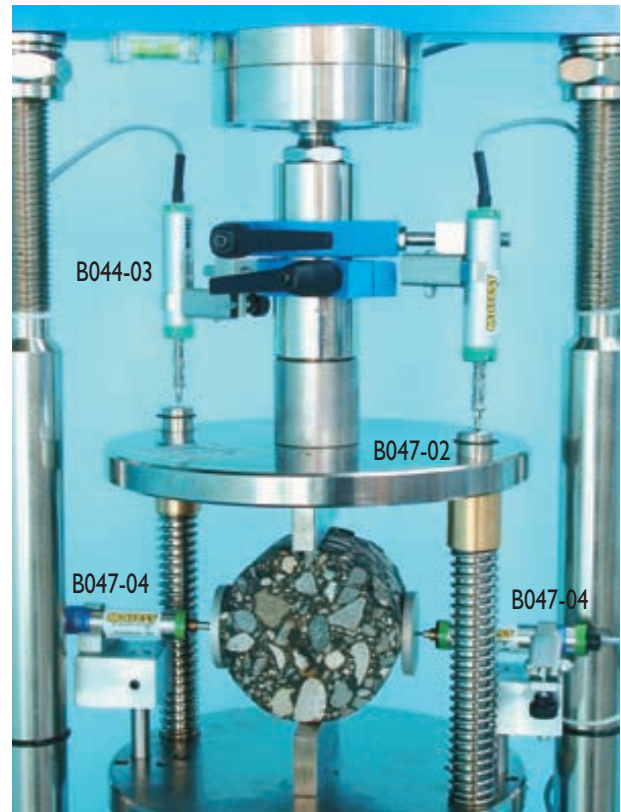
Temperature range: +3 to +95°C., accuracy +/- 1°C.

(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. 101



B043-02N: Test report



B052-02



MULTI-FUNCTION TESTING FRAMES, ALSO SUITABLE FOR MARSHALL TESTS

S213

CBR/Marshall 2 speeds frame 50 kN

The frame is provided of two fix speed ranges, easily selectable by a gear:

- 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. 378

S212

Universal multispeed load frame, 50 kN

This motorized machine with electronic digital control by micro-processor is suitable to perform all the tests where the requested speed rate is within 0,5 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, Quick triaxial.

The speed rate is infinitely variable, easily and promptly selected. Upper beam can be adjusted in height.

Supplied "without" load ring and accessories which have to be ordered separately.

Technical details: see pag. 378



S213

with accessories for Marshall test

ACCESSORIES for S212 and S213 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 S212 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 S212 and S213 are suitable also for tensile splitting tests (EN 12697-23) by using the specific devices described at pag. 90, 92

S212



B046-02



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. S212 - S213), 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% independent linearity.

The "CYBER-PLUS 8 EVOLUTION" computerized multichannel digital display system (technical details: see mod. B044N-SET at page after), 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:

S214 KIT

CBR/Marshall 2 speed load frame digital, computerized

Technical details of the frame: see mod. S213, pag. 378

Supplied complete with "Cyber-Plus 8 Evolution" system (B044N-SET, details at pag. 98, Hardware details at pag. 24), load cell and displacement transducer; but "without" accessories to be ordered separately.

S215 KIT

Universal multispeed load frame digital, computerized

Technical details of the frame: see mod. S212, pag. 378

Supplied complete with "Cyber-Plus 8 Evolution" system (B044N-SET, details at pag. 98, Hardware details at pag. 24), load cell and displacement transducer; but "without" accessories to be ordered separately.



S215 KIT + accessories MARSHALL



S214 KIT + accessories MARSHALL

ACCESSORIES FOR THE FRAMES,
MOD. S214 KIT AND S215 KIT
MARSHALL tests

- S212-05** Load piston
- B046N** Stability mould 4" Ø
- B046-02** Stability mould 6" Ø
(with S215 KIT frame only)
Standard: ASTM D5581-96



B046-02

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 S214 KIT and S215 KIT are suitable also for tensile splitting and direct shear (Leutner) test, by using the specific devices described at pag. 91

S206

MULTI-TESTER 200kN

UNIVERSAL ELECTROMECHANICAL FRAME FOR COMPRESSION, FLEXURE, TENSILE TESTS OF CONSTRUCTION MATERIALS WITH SERVO-CONTROLLED SYSTEM OF LOAD OR DISPLACEMENT/STRAIN.

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 system, that through a servo-controlled motor, assures the correct application of load and constant speed.

The two crossheads foresee couplings to fix the different test devices (see accessories).

The stress is measured by an electric load cell, and the crosshead displacement by transducers, all incorporated into the machine. It is possible to fix electric load cells of lower capacity, to satisfy specific test requirements.

Technical specifications:

- Max. load: 200kN (both compression and tensile)
- Max. vertical daylight: 800mm (without accessories)
- Max. vertical daylight with compression platens: 700mm
- Compression platens diameter: 180mm (upper platen on seat ball)
- Distance between columns: 610mm
- Crosshead travel: +/- 200mm (400mm 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: I

The Multi-Tester is supplied complete with electric load cell 200kN, crosshead displacement transducers, software for Duriez, Marshall, CBR tests, PC with LCD monitor, keyboard, mouse, connection cables, upper and lower compression platens.

“Are not included”: printer and accessories for the specific tests that must be ordered separately (see accessories).

Power supply: 230V 1ph 50Hz 850W. Dimensions: 1350 x 510 xh 2250 mm. Weight : 850 kg approx.





ACCESSORY: **C128** LASER PRINTER, bench model, for graphics and certificates, with direct connection via USB.



S206



Main tests and specific accessories:

MATERIALS	TEST		STANDARD	ACCESSORIES
Bituminous mixtures	Duriez		NF P98-251-I/4	Duriez set (vedi pag. 118)
	Marshall		EN 12697-34 ASTM D1559	Stability mould B046N Load piston S212-05
	Splitting tensile		EN 12697-23 ASTM D4123	Splitting device B047-02 Set of two gauges B047-03 Load piston S212-05
	Leutner shear		ALP A StBT.4	Leutner head B047-10 Sparcers 100 mm dia. B047-11 Load piston S212-05

Additional specific accessories for tests on:

Concrete and Mortar (compression, flexure, punching etc.) - Soils (CBR) - Steels (Tensile), are listed in soil section, pag. 390

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 51 mm/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. 384

S205

UNITRONIC, 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

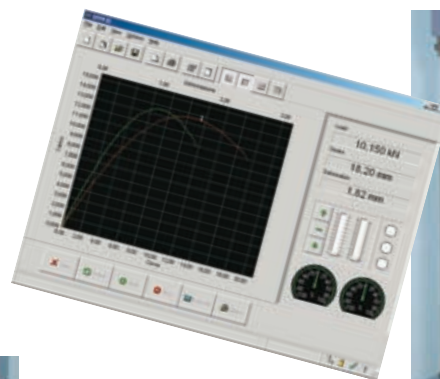
Standards: EN 12697-23 / ASTM D4123 / CNR N° 134
Test development with displacement control.

Needed accessories:

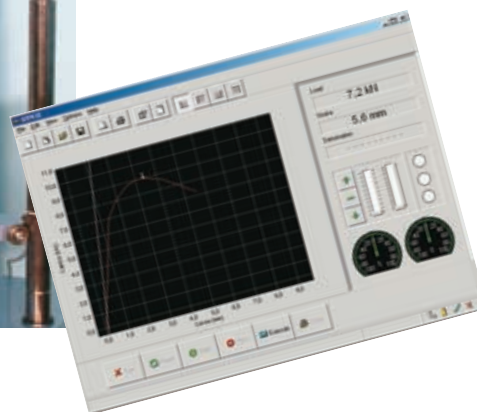
- S337-34** Strain gauge load cell, 50 kN capacity.
- S212-05** Loading piston.
- B047-02** Splitting tensile device for samples dia. 4" and 6"
- B047-04** Set of TWO displacement transducers with accessories.
- B043-02** Software for Splitting Tensile test.



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. 384





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. S213.
- Universal multi-speeds load frame mod. S212.
- 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 independent channels available for the load cells or potentiometric transducers or strain gages for load, deformation or displacement measurements.
- Stabilized power supply of the analogical channels: 5Vcc and 3Vcc
- Analogue input: +/- 20 mV and +/-5V
- 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"

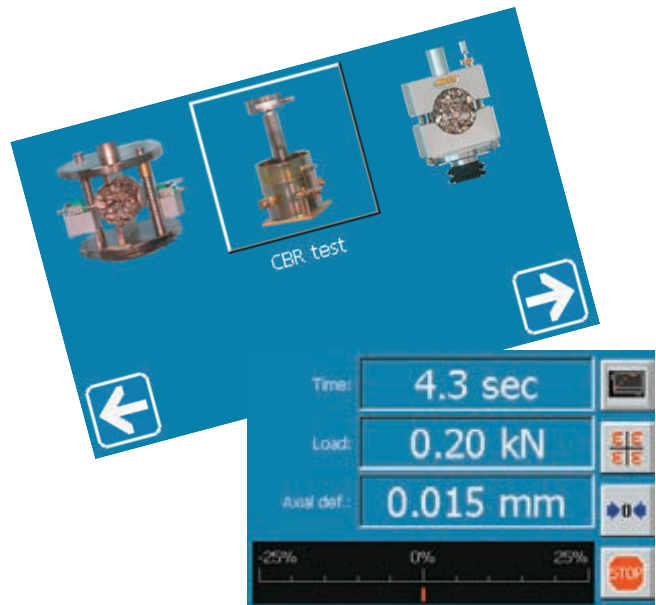
Standards: **EN 12697-34** / CNR N. 30 / ASTM D1559
BS 598 :107 / NF P98-251-2

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

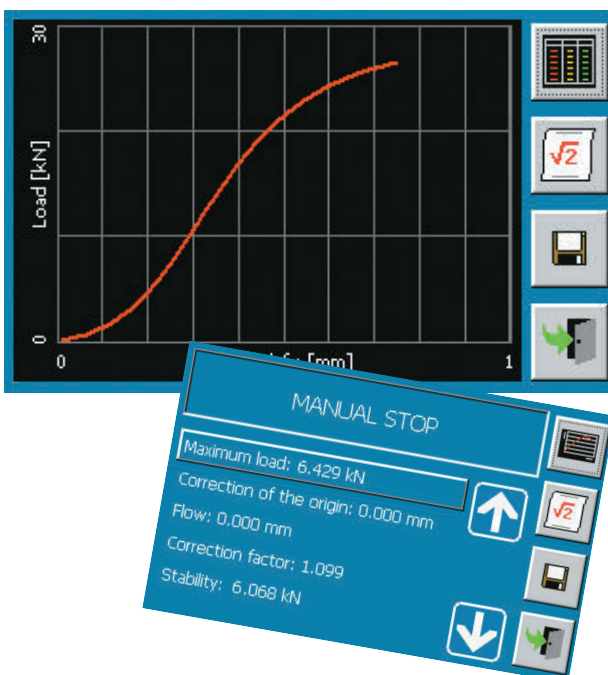
S218-01N

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 constant temperature of $60\text{ }^{\circ}\text{C} \pm 1\text{ }^{\circ}\text{C}$ and asphalt specimens at $37,8\text{ }^{\circ}\text{C} \pm 1\text{ }^{\circ}\text{C}$. 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 $95\text{ }^{\circ}\text{C}$.

Inside dimensions: $615 \times 505 \times 150\text{ mm}$

Overall dimensions: $660 \times 540 \times 230\text{ mm}$

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.

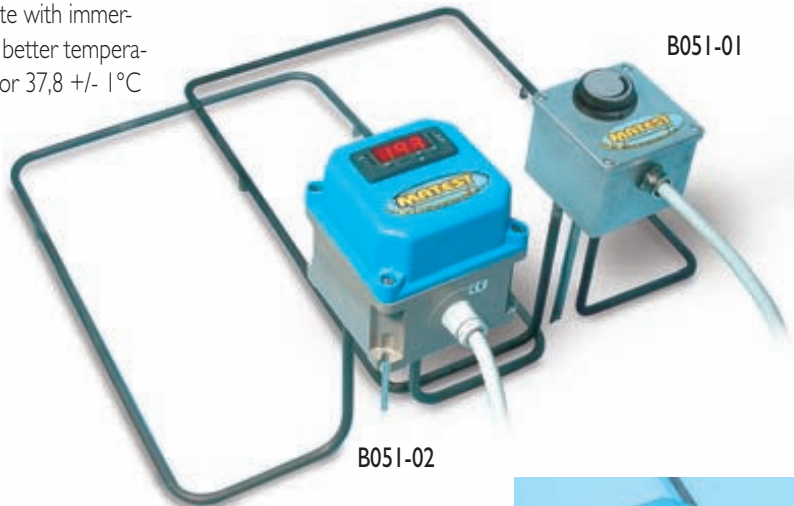
Power supply: 230V 1ph 50/60Hz 1500W

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 $60 \pm 1\text{ }^{\circ}\text{C}$ or $37,8 \pm 1\text{ }^{\circ}\text{C}$ as requested by Standards

Power supply: 230V 1ph 50/60Hz 1500W



B051-01

B051-02



C306-03



DETAIL B051-02

C306-03

Separate control panel, complete with switch and electrical protections to get B051-01 and B051-02 thermostats to CE safety Directive.



B052

Digital water bath

This bath is fully double walled stainless steel made with wool insulation. The specimens are held by a shelf spaced from the bottom. Complete with digital thermostat and electric stirrer "for continuous water recirculation", ensuring a constant and uniform temperature of $60 \pm 1^\circ\text{C}$ or $37,8 \pm 1^\circ\text{C}$ as prescribed by the Standards.

The bath can hold up to 20 Marshall specimens
Capacity: 60 litres

Temperature range: from ambient to 95°C

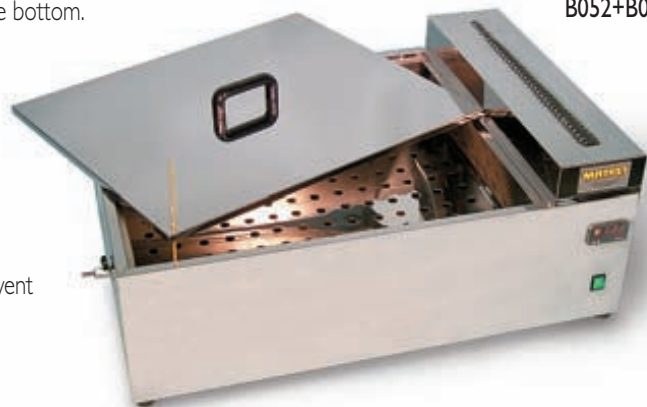
The bath is equipped of a dual safety thermostat to prevent accidental over-heatings.

Inside dimensions: 700x550x165 mm

Outside dimensions: 900x640x340 mm

Power supply: 230V 1 ph 50/60 Hz 1500W

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: 230V 1 ph 50/60 Hz 1200W

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 $+95^\circ\text{C}$, accuracy: $\pm 1^\circ\text{C}$.

The bath can hold up to 12 Marshall specimens

Capacity: 45 litres

Inside dimensions: 635x360x205 mm

Outside dimensions: 800x430x1000 mm

Power supply: 230V 1 ph 50/60 Hz 1650W

Weight: 60 kg

ACCESSORY FOR MOD. B051 ÷ B052-02

B052-10 Alcool control thermometer $0-100^\circ\text{C}$ 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 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 " 250x250x19 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)

B053-05

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

B053-10



B053-20

Planetary abrasion tester (not illustrated) 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: 340x460x500 mm approx.

Weight: 40 kg approx.

S148

Consistency determination

STANDARD: EN 12274-3

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

Weight: 600 g approx.



B053-05



S148

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.



A113
SKID RESISTANCE AND FRICTION TESTER

MEASUREMENT OF SKID RESISTANCE OF AN ASPHALT SURFACE

STANDARDS: EN 13036-4 / EN 1097-8 / ASTM E103

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



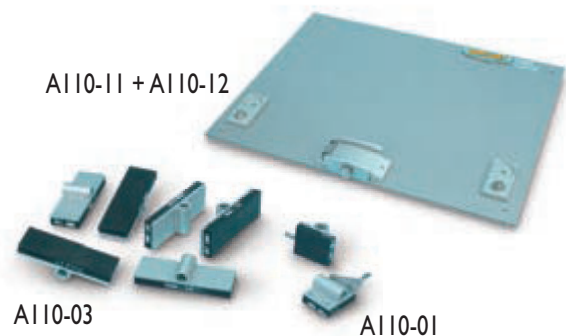
A113



A113 contained in carrying case

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.



A110-11 + A110-12

A110-03

A110-01



B056 KIT

Standard dial penetrometer

STANDARDS: EN 1426 / ASTM D5 / BS 2000 / NFT66-004 / AASHTOT49
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.

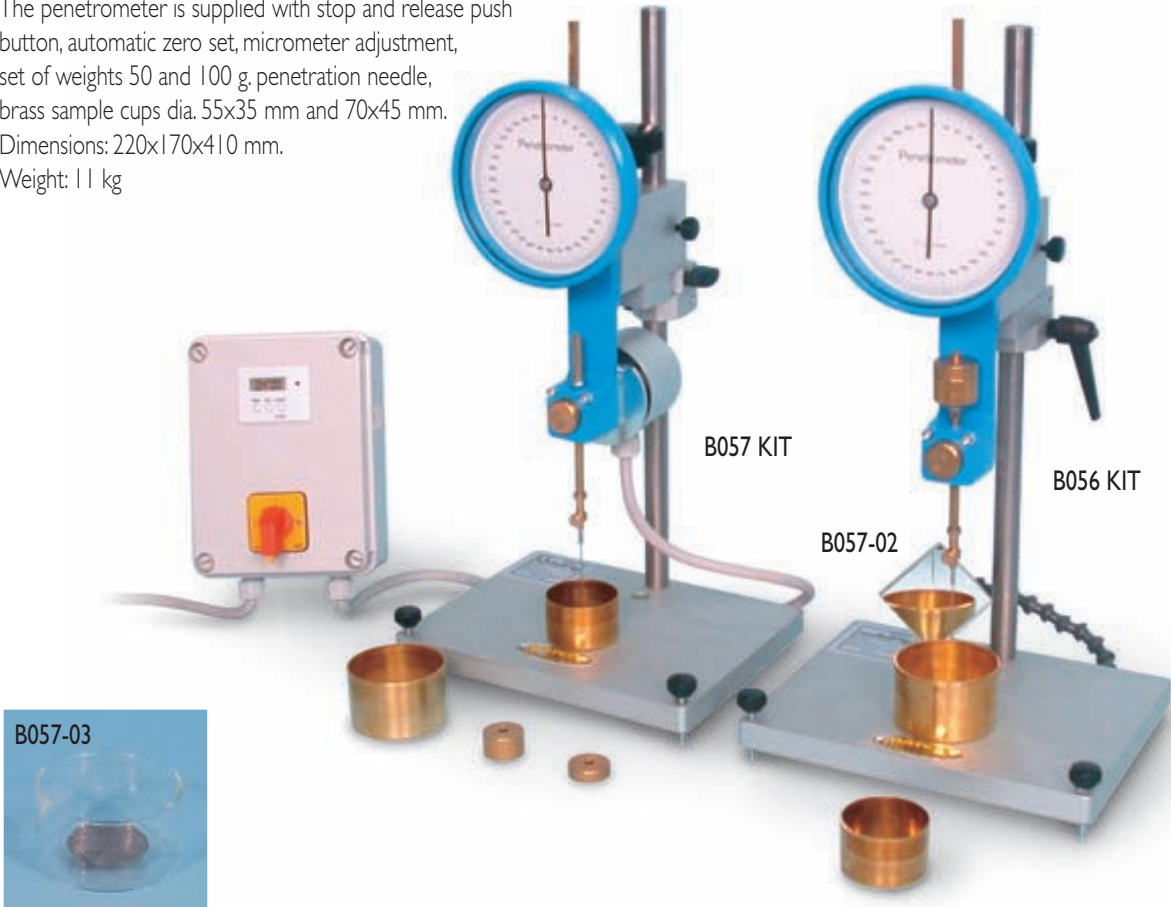
Power supply: 230V 1 ph 50/60 Hz 200W

Dimensions: 220x280x410 mm.

Weight: 15 kg



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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. 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 / AASHTOT49
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

B056-02 KIT

Automatic digital penetrometer

Basically structured as mod. B056-01 KIT but having a magnetic controller device with electronic digital programmable timer that automatically releases the plunger head and ensures free falling of the needle during the 5-seconds test.

Power supply: 230V 1 ph 50/60 Hz 200W

Dimensions: 220x280x410 mm. Weight: 15 kg

ACCESSORIES:

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

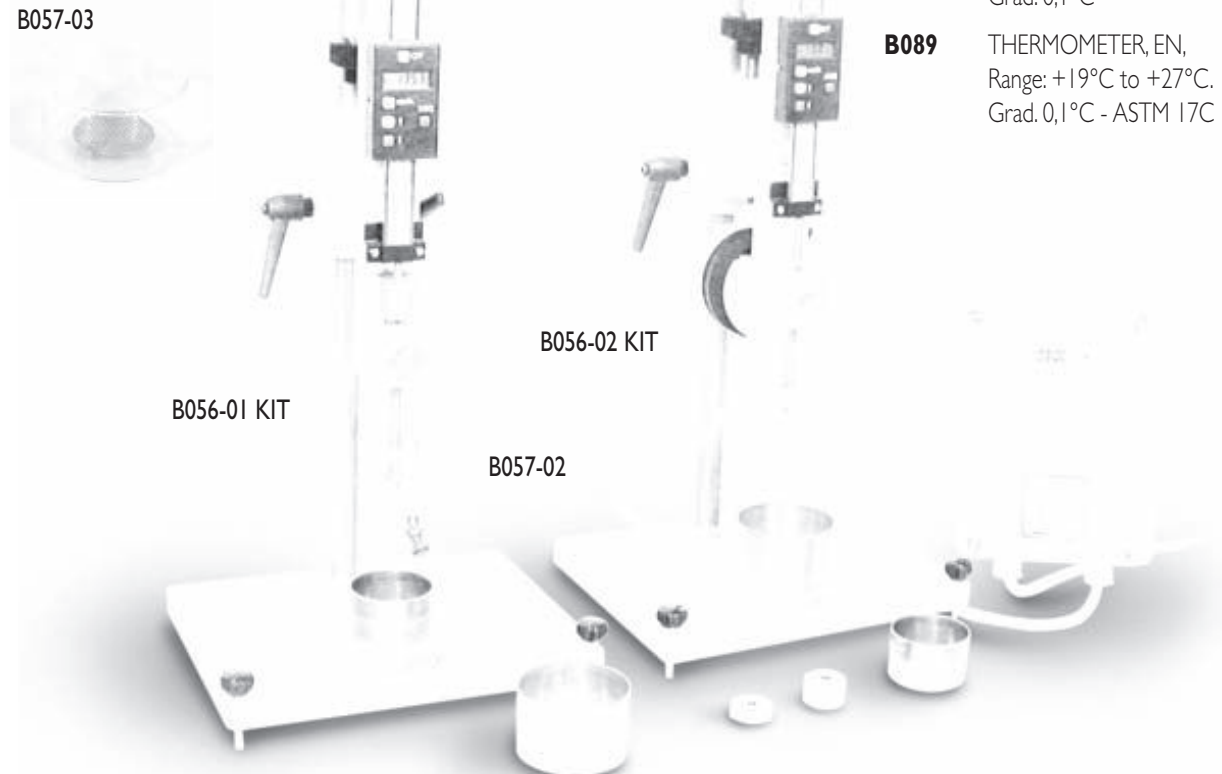
B057-03 TRANSFER DISH, made from glass, with support.

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 THERMOMETER, IP 38C
Range: +23°C to +26°C.
Grad. 0,1°C

B089 THERMOMETER, EN,
Range: +19°C to +27°C.
Grad. 0,1°C - ASTM 17C



SPARES:

B057-01 PENETRATION NEEDLE. Weight: 2,5 ± 0,05 g

B057-04 50 g weight.

B057-05 100 g weight.

VI22-05 SAMPLE CUP, brass made, dia. 55x35 mm

VI22-06 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 $25 \pm 0,1^{\circ}\text{C}$.
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
Dimensions: 375x335x420 mm
Weight: 12 kg



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 / NFT66-004
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
CNR N° 54

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 / NFT066-011 / AASHTO T47 / CNR N° 50
NFT066-011 - 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.



B064-02

B064-01 KIT

SPARES:

V122-05 Brass container dia. 55x35 mm

B064-04 Stainless steel container dia. 140x9,5 mm

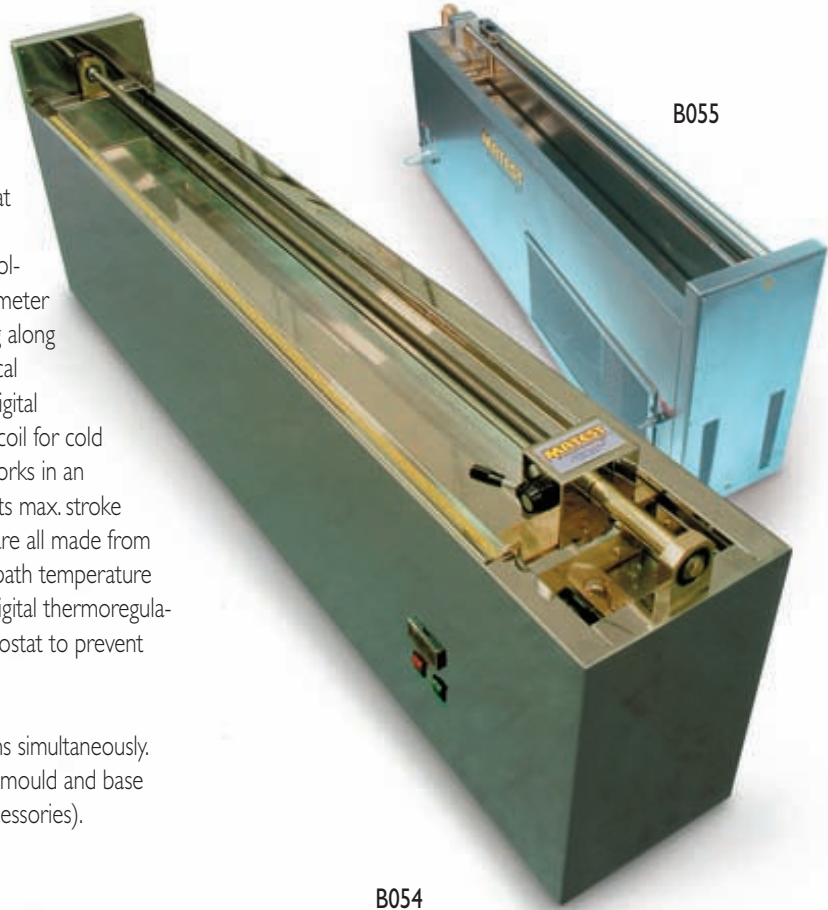


**B054
Ductilometer**

STANDARDS: EN 13589 / EN 13398
ASTM D113 / AASHTO T51 / NFTA66-006
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 maintained constant at $25^{\circ}\text{C} \pm 0,5^{\circ}\text{C}$. by a digital thermoregulator. The unit is equipped of a dual safety thermostat to prevent accidental over-temperatures.

Max. traction force: 300 N, accuracy: $\pm 0,1$ 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 1000W
Dimensions: 2140x350x400 mm
Weight: 95 kg



108

**B055
Ductilometer with cooling system**

Same as for mod. B054 but equipped with incorporated refrigerating unit for tests with water temperature from $+ 5^{\circ}$ to $+ 25^{\circ}\text{C}$.
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
STANDARDS: 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 harmonic steel

B077-02
Thermometer IP 42C

B055-10

Ductilometer with data acquisition

Technical and mechanical specifications: same to mod. B054, but upgraded with:

- Cyber-plus 8 evolution data acquisition and processing system, "colour touch screen display" 1/4 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
- One electric load cell 50 N capacity complete with installation and calibration. (Possibility to install up to 3 cells).

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).

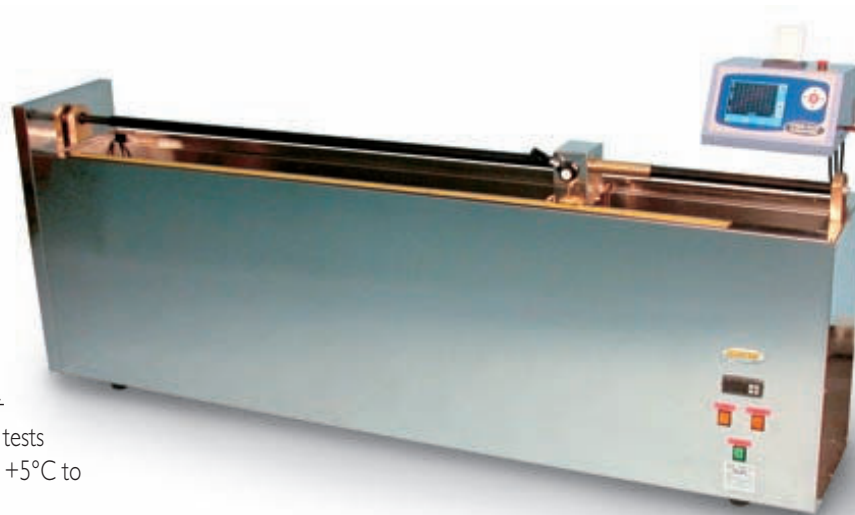
B055-16

REFRIGERATING UNIT, incorporated into the machine, for tests with water temperature from +5°C to +25°C

C128

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

Ductility moulds and base plate: see pag. 108



B055-10



B055-20

Ductilometer with data acquisition "high performance"

Developed and manufactured for ductility tests and for research purposes.

- Stepper motor providing a variable speed range from 1 to 50 mm/min with digital displacement measuring system.
- Up to 4 samples can be tested simultaneously.
- One electric high capacity load cell 500 N (possibility to connect up to 4 cells).
- Cyber-plus 8 evolution data acquisition and processing system "colour touch screen display" (technical details: see above).
- Glass upper cover.

Supplied "without" briquette mould and base (see accessories).

Power supply: 230V 1ph 50Hz 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 4 cells).

B055-16 REFRIGERATING UNIT, for tests with water temperature from +5°C to +25°C

C128

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

Ductility moulds and base plate: see pag. 108



Detail: four 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 breaker, 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

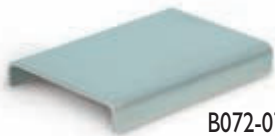
B072-02 THERMOMETER ASTM 16 C +30 to +200°C subd. 0,5°C



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

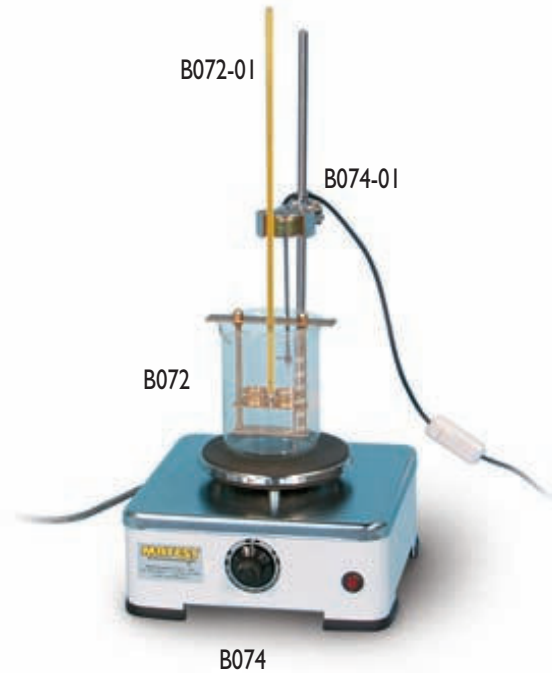
B074

Hot plate, complete with thermoregulator for temperature adjustment.
 Power supply: 230V 1 ph 50/60 Hz 1000W
 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: 230V 1 ph 50 Hz 100W
 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 1 ph 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 1 ph 50-60Hz 1000W

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

B070N

Automatic Digital Ring and Ball apparatus

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

This "high technology" digital microprocessor tester, designed and manufactured by Matest, automatically determines the softening point of asphalts and pitches.

Two laser sensors detect the balls fall determining the softening point.

The bath temperature is measured by an electronic system maintaining the gradient (5°C./min) as specified by the Standards.

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

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 and Italian.
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.

The tester is basically composed by:

- Ceramic-glass heating plate with automatic cut off at the end of the test cycle.
- Graphic high resolution display, 320x240 pixels with membrane keyboard.
- The microprocessor, through a friendly driven menu controls all the selected parameters of the: heater/stirrer, temperature probe, laser sensors, pre-heating phase of the plate, records all results in its permanent memory, storing up to 300 tests.

RS 232 port for PC download.

Steel balls centering device.

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

Dimensions: 500x350xh550 mm

Weight: 20 kg approx.



B070N

Main Functions:

Large graphic display: 320x240 pixels

Memory up to 300 tests

RS 232 port for PC

Multilanguage selection

Microprocessor friendly-driven menu to control all the test phases

Top quality components: laser sensors, electronic magnetic stirrer, ceramic-glass heating plate.

Fully automatic.



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 / NFT66-023,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.

B069 KIT

Distillation of cut-back asphalts

STANDARDS: ASTM D402 / AASHTO T78 / NFT 66-003

UNE 71 12, 7072

Used to measure the amount of the most volatile constituents in cut-back asphaltic products. The apparatus consists of: "electric heater with thermoregulator", distillation flask, condenser tube, adapter, shield, receiver, supports, graduated cylinder, thermometer ASTM 8C -2 to +400°C subd. 1°C.

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

B069-11 Spare thermometer ASTM 8C



B069 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.

Dimensions: 270x175x265 mm.

Weight : 5 kg approx.



A122-10

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.



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 500 ml capacity
- Glass rod

Power supply: 230V 1ph 50/60Hz

Dimensions: 200x200x600mm

Weight: 3 kg approx.



B063-10

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. 110

B063 KIT

Emulsified asphalt distillation apparatus

STANDARDS: EN 1431 / ASTM D 244 / AASHTO T 59
CNR N° 100

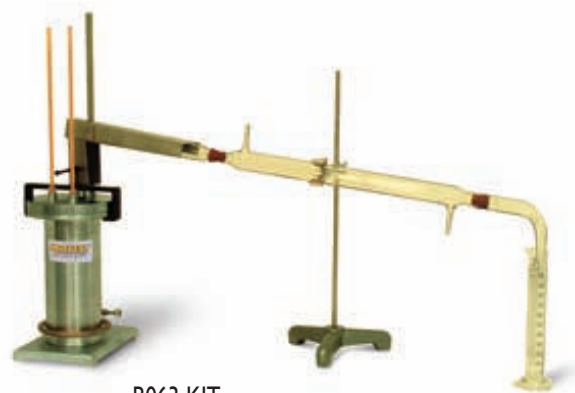
Used for the determination of cut-back asphaltic materials by the distillation test. The set is formed by: aluminium still container; glass connectors including condenser; stands, graduated cylinder, two thermometers ASTM 7C range -2 to +300°C, gas ring burner with gas stop valve controlled by a flame 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 blown into the flask containing the binder hardening the same. The hardening effect is evaluated by penetration, viscosity and softening point tests.

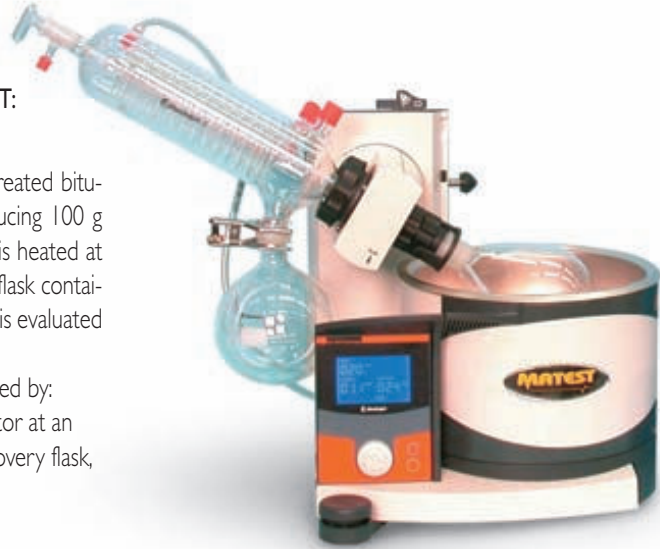
The Rotary Evaporation Apparatus is essentially composed by: distillation flask 1000 ml capacity rotated by a speed motor at an adjustable rate of 20 to 270 rpm, condenser, solvent recovery flask, heated oil bath.

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 Rotary 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 is also required. See pag. 112



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



B090-10

B090-11

B090-12



**B080
Engler digital viscometer**

STANDARDS: ASTM D 940, D 1665 / AASHTO T54 / BS 2000
NFT66-020 / 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: 230V 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 NFT66 -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



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

STANDARDS: EN 12846 / UNI EN 13357 / IP 184
NFT66-005 / 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 / NFT60-118 / ISO 2592

Used to measure the flash and fire points of lubricated 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:

230V 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.



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 heating device, thermometer ASTM 9C range -5 to +110°C and thermometer ASTM 57 C range -20 to +50°C.
 Power supply: 230V 1 ph 50 Hz 600 W.
 Dimensions: 200x300x400 mm approx.
 Weight: 6 kg



B092 KIT

B093 KIT

Tag open-cup viscometer. Flash Point

STANDARDS: ASTM D1310, D 3143

For the determination of open cup flash points of volatile flammable materials having flash points between 0 and 175 °F
 Supplied complete with cup, water bath, thermoregulated heating device, thermometers ASTM 9C -5 to +110°C and ASTM 57C -20 to +50°C.
 Power supply: 230V 1 ph 50 Hz 600 W.
 Dimensions: 200x300x400 mm approx.
 Weight: 6 kg



B093 KIT

SPARES:

- B092-10** Thermometer ASTM 9C
- B092-11** Thermometer ASTM 57C
- B094-10** Thermometer ASTM 10C

Hubbard-Carmick specific gravity

STANDARDS: EN ISO 3838 / ASTM D70 / NPT66-007

VIII

Cylindrical type, 24 ml

VIII-01

Conical type, 25 ml



VIII-01

VIII

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, electric 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 tester is equipped of a gas flame feeder.
 Power supply: 230V 1 ph 50 Hz 600 W.
 Weight: 6 kg



B094 KIT

B091

Pressure Ageing Vessel

STANDARDS: EN 14769 / ASTM PS36 / AASHTO PP-1 / SHRP

The unit has been developed to simulate the ageing of asphalt mixtures 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.
 The Pressure ageing vessel is supplied complete with accessories, software, RS232 with cable to PC connection.
 To perform the test a compressed air source must be provided.
 Power supply: 230V 1ph 50Hz 550W
 Dimensions: 660x450x410 mm
 Weight: 76 kg approx.



B091



Duriez test set

STANDARD: NF P98 - 251-1/4

Used to determine the mechanical and physical 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



118



B095-01 ÷ B095-07

S206

MULTI-TESTER 200kN

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. 390

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 and wire brushes.
- Screw-adjusted compass 300 mm graduated rule.
- Metallic cylinder for spheres volume measurement.
- Two glass pycnometers with metallic screw top and pouring hole
- Three graduated cylinders 10, 25 and 50 ml cap.
- Knee-guard
- Carrying case
- Weight. 4 kg approx.



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 D965.
- B099-17** NATURAL SAND 150/75 microns, 25 kg bag.
ASTM D965



S206

B111

“Non Nuclear” Electromagnetic Density Gauge, infrared temperature sensor

The Electromagnetic Density Gauge is a non nuclear sensing device that allows field density real time measurement of asphalt. This technically advanced instrument for quality control allow operators to immediately identify spots with low pavement density and trigger corrective actions leading to more uniform pavements.

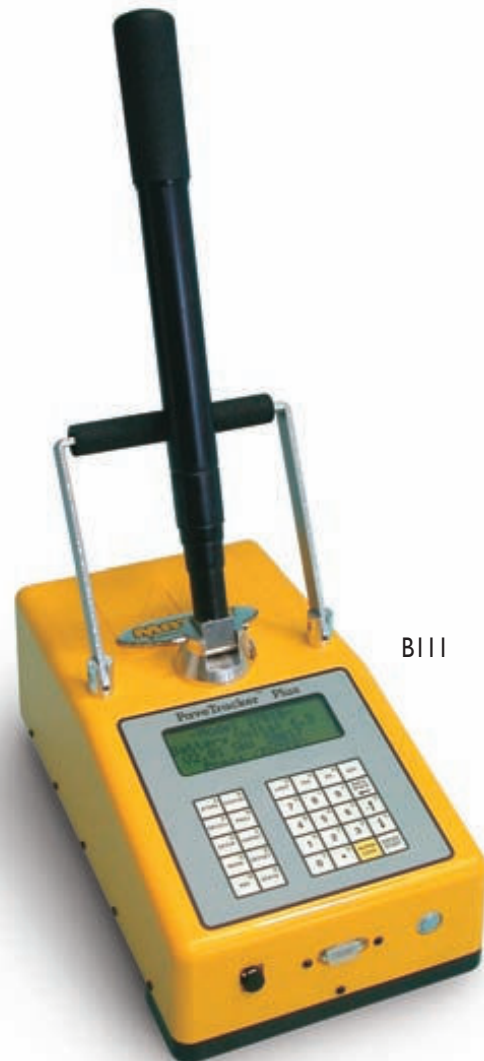
Density measurements are related to the dielectric property of asphalt in the first 40 mm of depth. This instrument allows continuous reading along the pavement to detect air voids or non uniformity.

The L-Shaped handle is provided to reduce bending over when performing many measures. Tests can be executed also at high temperatures, when the pavement is still hot (max 175°C).

The Electromagnetic densimeter allow:

- Pavement tests.
- Real time measurements, in a continuous mode.
- LCD visualization of:
 - Average density.
 - % Maximum density.
 - % Air voids.
- No moisture or temperature corrections are needed.
- Non Nuclear device, so maximum safety for operator
- Setting on a referenced test plate to check equipment stability quickly.
- 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 continuous usage.
- Charging supply for standard 230V/50Hz or 12Vcc.

Dimensions: 229x406x152 mm
Weight: 5 kg



B111



Test Mode	Advanced Software	Memorization Storage	Interface PC	Recharge time	Keyboard and LCD
Continuous Measurements	yes	yes	yes	2-3 hours	Multifunction
Average Measurement on multiple data	yes	yes	yes		30 key,
Segregation mode	yes	yes	yes		4 lines LCD



B111



B111



B111

B098

Travelling beam device

Used to detect and check any irregularity in both bituminous and concrete road surfaces. The unit consists essentially of a 3 metre long beam fixed on two rigid wheels at the extremities. In the middle of the beam a sensing unit comprising a wheel connected to an indicator provides a magnification of 4:1 and measures deviations of the surface. The deviations are shown on a scale calibrated in increments of 2 mm up to 10 mm and 5 mm up to 25 mm. The beam is supplied as three sub-assemblies which are quickly assembled on site. Weight: 55 kg approx.

B098-01 KIT

Travelling beam device with autographic recorder

Same to mod. B098 but comprising an autographic recorder providing 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. Weight: 60 kg approx.

SPARES:

B098-11

Pack of 10 chart rolls for approx 1000 metre run.

B098-12 Fibre-tipped pen for use with the recorder.

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.

B099-01N

GRADUATED WEDGES, anodized aluminium alloy (set of two)

B100

Benkelman beam apparatus

STANDARDS: CNR N° 141

Aluminium 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. Length 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 T256-77

Basically similar to mod. B100 but manufactured according to the French Specifications. Beam fulcrum ratio 2:1

Complete with wooden carrying case.

Weight: 16 kg



B098-01 KIT

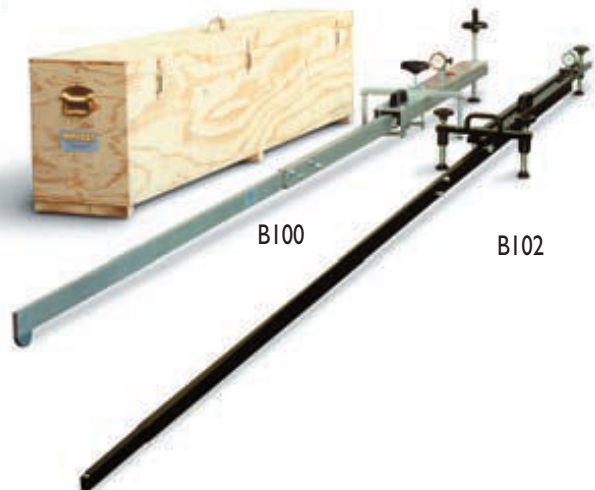


B099 KIT

B099-01N



B100-02



B100

B102

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)

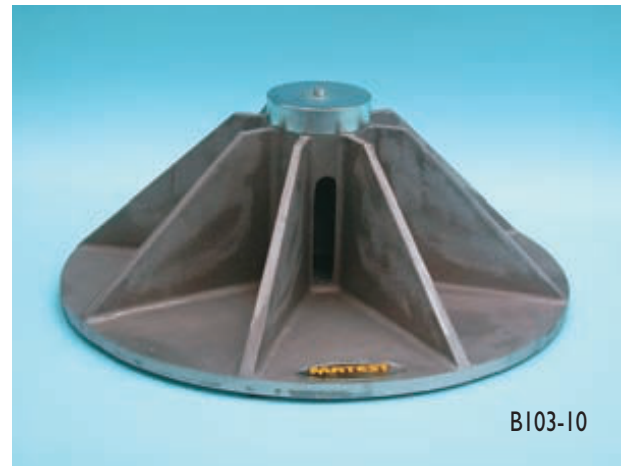
The plate foresees also three screwed lateral holes for three point measurements of the bearing capacity of a soil in-situ

(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

section B

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 hand pump, rubber pipe with fast connector, set of extension rods of different lengths, 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



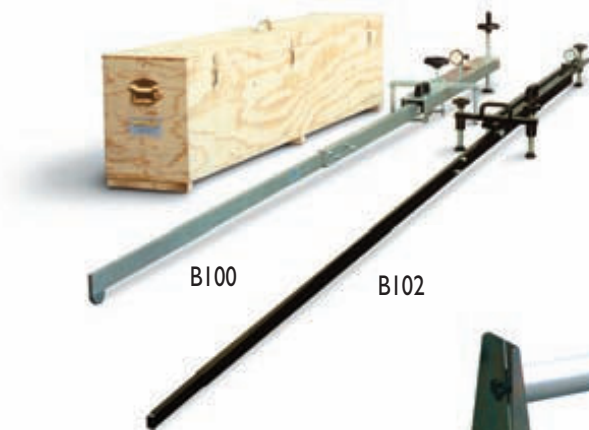
B103-05 KIT

B100

ACCESSORIES:

B100 Benkelman Beam apparatus according to Standards: CNR N. 141 / AASHTO T256-77

B102 Benkelman Beam apparatus according to Standards: NF P98-200-2 / LCPC



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. 393 of the catalogue)



S225 KIT + B103-10



