



# Settore B

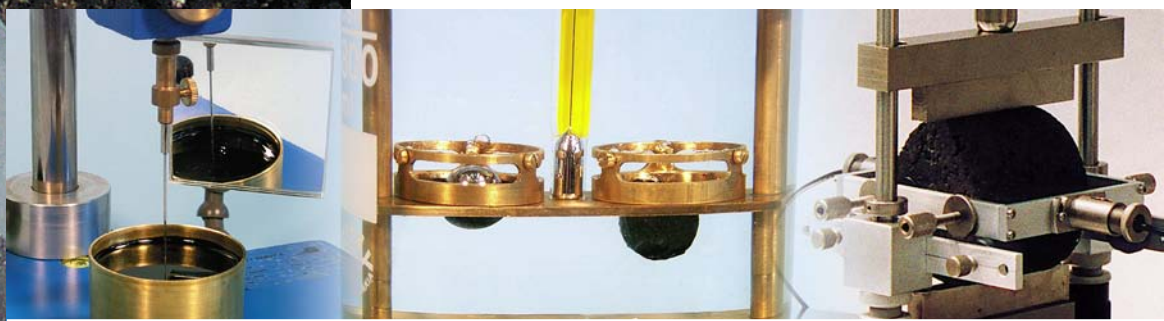
## BITUMEN - ASPHALT

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

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

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

*The equipment described in this Section largely satisfies all these test procedures.*



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**B005**

## Asphalt content furnace ignition method

STANDARDS: ASTM 6037 - AASHTO TP53 - NCAT (National Centre for Asphalt Technology) BS (DD)

section B



B005

The unit provides asphalt content of bituminous paving mixtures accurate to 0.11%, with a fast, accurate, environmentally friendly, and cost effective method of determining asphalt content.

Ignition method reduces testing time when compared to solvent extraction. A 1200-1800 gram sample of asphalt can be tested in 30-45 minutes using this Content Furnace.

Unit can accommodate samples up to 5000 grams!

MATEST Furnace has an internal scale, that automatically monitors the sample weight throughout the ignition process, saving valuable technician time and increasing productivity in the lab.

The ignition method replaces the costly and time consuming solvent extraction method by eliminating the primary cost of solvent purchase and the secondary cost of solvent disposal.

MATEST Content Furnace eliminates the exposure of the asphalt technician to harmful solvents. The automatic door-lock feature prevents opening the chamber door during the critical test time.

This feature provides operator safety and helps ensure testing integrity. This Content Furnace is the only system on the market containing a high temperature afterburner used in conjunction with a patented ceramic filter to reduce the emissions of the ignition process by up to 95%. Our System has the capability to accept positive or negative correction factors for use with mixes containing hydrated lime. This unique furnace automatically detects endpoint within .01% of the sample weight. Furnace software allows you to choose between automatic and manual test mode. In the automatic mode, the endpoint is detected; the software ends the test, prints out the results and beeps. In the manual mode, the endpoint is

detected; the unit begins to beep but will continue to test until the user presses "stop" to end it. Once the "stop" button has been pressed, the door will unlock and the results will be printed.

Furnace software automatically compensates for weight change due to sample and basket assembly temperature change. This compensation is computed for each sample load tested, unlike competitive models that assign a fixed number to a given range of load sizes. An RS232 port provides data interface with personal computer for graphical data analysis. 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: 220-240 V 1 F 50 Hz 4800 W 20 A

Temperature range: 200-650°C

Weight: 120 Kg

### B005 - accessories





## B008

### Automatic binder extraction unit

STANDARDS: EN 12697-1, 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: 0,075 - 0,250 - 0,800 - 1,6 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: 240/400V 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 ( $\text{CHCl}_3$ ), but as per 2001/59/CE Directive, it is classified "R45", and therefore considered a dangerous solvent. (Toxic and cancer-producing)

## ACCESSORIES:

### B008-03

KIT FOR USE OF B008 UNIT WITH DICHLOROMETHANE SOLVENT, NOT TOXIC, NOT CANCER PRODUCING

This kit has to be connected to the automatic binder extraction unit mod. B008. The kit allows the use of methylene chloride (dichloromethane  $\text{CH}_2\text{Cl}_2$ ), which is classified as very volatile solvent, with low extraction value, not toxic, not cancer-producing, classified: "R40". The kit is composed by a stainless steel solvent tank complete with cooling installation, vertical pump, metallic frame, piping, accessories. It is easily connectable to the automatic unit mod. B008

Dimensions: 360 x 430 x 810 mm Weight: 45 kg



B008-03

**B008-04** Modification to the existing B008 unit to get it usable with the Solvent Kit B008-03

## 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





## B010

### Centrifuge extractor 1500/3000 g capacity

STANDARD: ASTM D2172 - AASHTO T164 - CNR N° 38

Used for the determination of bitumen percentage in bituminous mixtures.

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

The electronic separate control panel automatically drives the bowl speed rotatorion ramp from 0 to 3000 rpm (3600 rpm with 60 Hz motor) as requestes by Standards, with automatic fast stop bowl rotation at the end of the test.

The centrifuge is supplied "without" alluminium bowl and cover and "without" filter discs to be ordered separately.

Power supply: 220-240 V 1ph 50/60 Hz 250 W

Dimensions: 580x300x480 mm

Weight: 45 Kg

## B010-01

### Centrifuge extractor 1500/3000 g capacity

Similar to mod. B010, but with safety micro-switch preventing the aluminium box opening when the machine is working, conforming to the 89/392/CE Directive.



B010

#### NEEDED ACCESSORIES:

### B010-11 BOWL AND COVER 1500 G. CAPACITY.

Made of precision machined cast aluminium.  
Weight: 3,6 kg

### B010-12 BOWL AND COVER 3000 G. CAPACITY.

Made of precision machined cast aluminium.  
Weight: 4,6 kg

### B010-15 FILTER DISC, 1500 G. CAPACITY.

Pack of 100 pieces.

### B010-16 FILTER DISC, 3000 G. CAPACITY.

Pack of 100 pieces.



## B014

### Continuous flow filterless centrifuge

STANDARDS: 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 0,149 mm. and 0,074 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: 220-240 V 1ph 50 Hz 600 W

Dimensions: 350x600x720 mm.

Weight: 60 Kg

#### SPARE:

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

#### ACCESSORY:

### V300-26 THRICHOROETHYLENE SOLUTION to use with centrifuges B010 - B014. Can of 40 kg



B014



B016

## B016 Air bath

Used for softening bitumen before performing a range of tests including ductility, flash point, penetration, loss on heating. Inner vessel, stainless steel made, has 600 g. capacity. Complete with thermoregulator; pilot lamp. Power supply: 220-240 V 1 ph 50-60 Hz 300 W Dimensions: 140x140x350 mm Weight: 5 Kg

## B017 Hot extraction apparatus

STANDARDS: CNR a.VII N° 38 - DIN 1996

This apparatus consists of a cylindrical glass jar containing a stainless steel wire basket cloth opening 0,074 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 the metal 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



B017

V200

### ACCESSORIES:

- B017-02** Wire basket stainless steel cloth opening 0,4 mm
- B017-04** Wire basket stainless steel, double cloth 0,074 and 0,4 mm. openings.
- V200** Hot plate dia. 185 mm  
220-240V 1 ph 50-60 Hz 1500 W
- V173-03** Iron wire gauze with ceramic centre

### SPARES:

- B017-01** Wire basket stainless steel cloth opening 0,074 mm
- B017-03** Pyrex glass jar
- B017-05** Metal condenser with ring

## B019

### Reflux extractor 1000 g capacity

STANDARDS: ASTM D2172 - AASHTO T164

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.  
220-240V 1 ph 50-60Hz 1500W

### SPARES:

- B019-01** Filter paper; pack of 100
- B019-02** Pyrex glass jar



B019

V200

## B020

### 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  
220-240V 1 ph 50-60Hz 2000W

### SPARES:

- B020-01** Filter paper; pack of 100
- B020-02** Pyrex glass jar





## Bituminous mixtures

### Hot extraction method

### Soluble binder content (bitumen recovery)

STANDARD: EN 12697-1 Clause B.3

#### B018

#### Binder recovery apparatus, vacuum pump method

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, see accessory)
- Pyrex flask, 1000 ml capacity, used as vacuum bottle

Power supply: 230V 1ph 50Hz 1000W

Weight: 25 Kg approx.

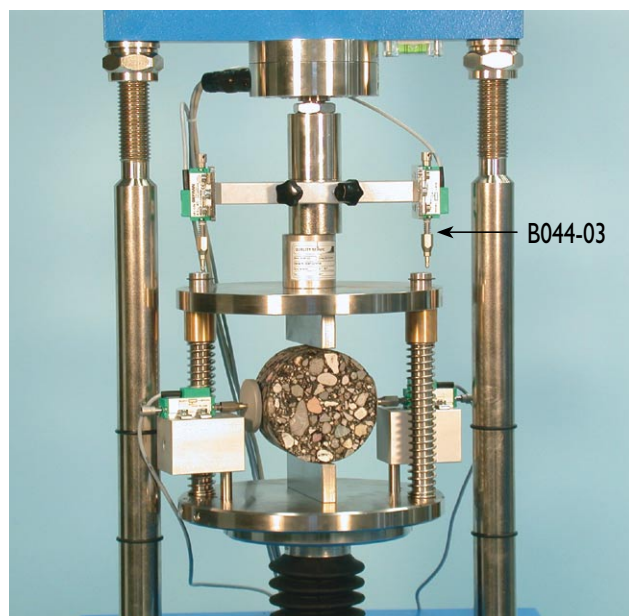
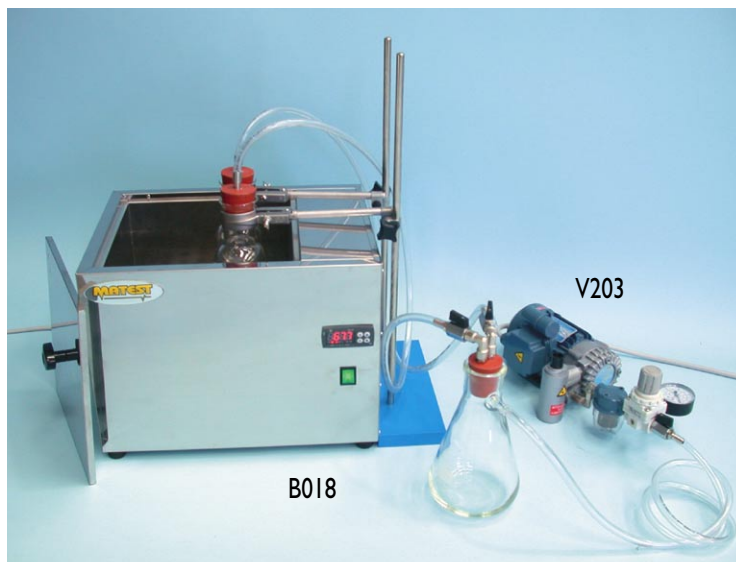
NEEDED ACCESSORY:

#### V203

Vacuum Pump to produce a vacuum down 220 mbar

Power supply: 230V 1ph 50Hz

Weight: 5 Kg approx.



#### 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 B043-02 software the average value of the two transducers is given.

## 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.

## 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.







## 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 made.

Power supply: 220-240 V 1 ph 50-60 Hz 1300 W

Dimensions: 320x400x650 mm

Weight: 17 Kg



B021

## B024

### Permeameter

FOR DRAINING PAVEMENTS IN SITU.

STANDARD: ITALIAN HIGHWAY SYSTEM (SOC. AUTOSTRADE) 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 hermetically positioning it on the carpet under test and then in calculating the time needed by a certain quantity of water to be absorbed by the same. The instrument

is composed of a bottomless plexiglass cylinder 140 mm inside diameter; fitted on a base. The cylinder has two black calibration lines: one at zero point and one at 250 mm.

Dimensions: 260x260x425 mm

Weight: 8 Kg



B024

B024-01

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.

## B061

### Kumagawa (Soxhelet) extractor 1 litre capacity

STANDARDS: LCPC - CNR N.38

Used to extract the bitumen from mixtures. Consisting of an electric heating device, balloon 1000 ml. capacity, glass pipes, cooling unit and 25 filtering cartridges.

Power supply: 220-240 V 1 ph 50/60 Hz 750 W

## B061-01

### 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

B061-01

B061-02





## B025

### Mixer 20 litres capacity

STANDARD: BS 598:107

This large capacity mixer has been designed to mix bituminous samples for compaction tests 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 different speeds. The plastic cover can be lifted to inspect the bowl, and in this case the motor automatically turns off to prevent accidents to CE safety Directive. The mixer is supplied complete with hook beater and stainless steel bowl, but without the insomantle electric heater that must be ordered separately.

Power supply: 400V 50 Hz 3 ph 0,5 HP (230V 1 ph on request)

Dimensions: 260x760x860 mm - Weight: 160 Kg



ACCESSORIES FOR B025:

**B025-01** Isomantle electric heater, complete with thermoregulator  
Power supply: 220 - 240V 1 ph 50-60 Hz 1000 W

**B025-02** Beater

**B025-03** Whisk beater

**B025-04** Spiral beater

SPARE:

**B025-05** Hook beater

## B026

### Large capacity mixer

Similar to mod. B025 but having 40 LITRES CAPACITY



B028-01

## E094

### Mixer 5 litres capacity

STANDARD: 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" beater or whisk to be ordered separately.

Power supply: 220-240V 1 ph 50 Hz 1800 W

Dimensions: 450x400x480 mm Weight: 50 Kg

E094 + B028-03



## E095

### Mixer 5 litres capacity

Same to mod. E094 but equipped also of safety guards to 89/392/ CEE Directives.

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 carried out immediately after having taken off the bowl from the oven. As an alternative to this procedure the heater mod. B028-01 can be used.



E095-01

B028-03

ACCESSORIES FOR E094 and E095:

**B028-01** Electric Heater, complete with thermoregulator.  
Power supply: 220 - 240V 1 ph 50-60 Hz 800 W

**B028-03** Whisk Beater

**E095-03** Beater, stainless steel made

SPARE: **E095-01** Stainless steel Bowl

## Marshall testing equipment

STANDARDS: ASTM D 1559 - AASHTO T245 - DIN 1996  
CNR N° 30 - NF P98-251-2

### B029

**Standard compaction mould** consisting of mould body, base plate, filling collar. Inside diameter 4" (101,6 mm). Steel manufactured and plated against corrosion. Weight 5 Kg

SPARES:

**B030** Compaction mould body only. Weight: 2 Kg

**B030-01** Filling collar only. Weight: 2 Kg

**B030-02** Base plate only. Weight: 1 Kg

ACCESSORIES:

### B030-03

**EXTRACTION PLATE**, to eject specimens from the mould. It is used in conjunction with B030-04 receiver. Weight: 2 Kg

### B030-04

**SPECIMEN RECEIVER**, used to receive specimens ejected by the B030-03 extruder. Weight: 3 Kg

**B030-05** PAPER DISC dia. 100 mm. Pack of 100.

### B032

## Hand Marshall compactor

STANDARDS: ASTM D 1559  
AASHTO T245  
NF P98-251-2 - DIN 1996  
CNR N° 30

This hand-operated machine compacts Marshall samples as described in the International Specifications.

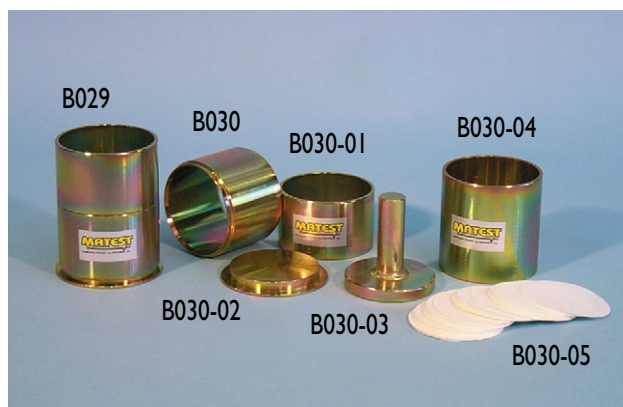
The mould is held in position by a quick clamping device and it is easily inserted and removed from the compactor.

The apparatus consists of a wooden compaction base, a steel frame, a compaction hammer, plated against corrosion, guided on a shaft and a mould clamp device fitted on the steel frame.

The apparatus is supplied without the mould which must be ordered separately. Dimensions: 320x320x1600 mm  
Weight: 60 Kg



B032



SPARES TO B032 COMPACTOR:

### 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 fitted on the steel plate. Weight: 30 Kg

**B037** Hammer guide

PAVEMENT CORE DRILLING

See section "C" Concrete  
mod. C319.



C319



B033



B037

B034

B036



B033-01





## Hot mix asphalt compactability determination

B03I

### Marshall Automatic EN (impact) Compactor

**STANDARDS: EN 12697-10 / EN 12697-30**

section B

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:  $4535 \pm 15$  g

Free fall height:  $457 \pm 5$  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 750W

Dimensions: 500 x 500 x 1890 mm

Weight : 220 kg



B03I



DETAIL:

Mould clamping device, allows a very fast fixing and removal of the mould in fully operator safety condition



DETAIL:

Fast fixing/removal of the rammer for an easy maintenance

## ACCESSORIES:

### B031-01

CABINET, lined with sound-proofing material for noise reduction within CE limits  
Dimensions: 800 x 800 x 2000 mm approx.  
Weight : 150 kg approx.

### STANDARD COMPACTION MARSHALL MOULD, EN 12697-10 / EN 12697-30 Specifications.

Plated against corrosion.

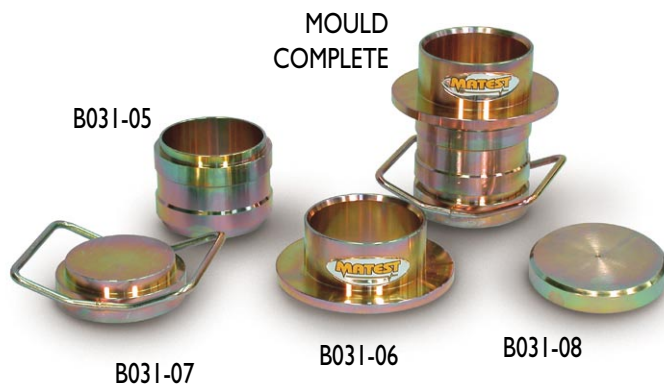
Comprising:

**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 B031 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 long term reliable and accurate. The readout unit has PC interface, and through a suitable software allows management and file of the test data.

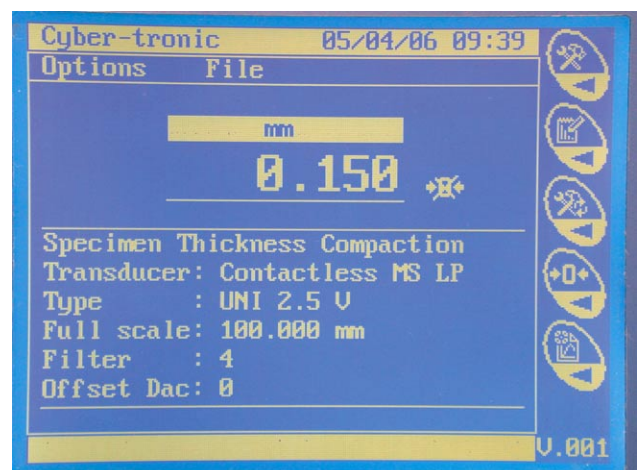


**B031-12** Software for the management and file of the compressibility test data.



#### DETAIL:

When opening the door, the compactor automatically stops and cannot operate, as requested by the safety CE Directive



section B



MATEST



## B033

### Automatic Marshall compactor

STANDARDS: ASTM D1559 - CNR N° 30 - AASHTO T 245  
NF P98-251-2 - DIN 1996

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. The compactor is supplied complete except for the mould which must be ordered separately.

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

Dimensions: 540x400x1600 mm

Weight: 95 Kg

## B033-01

### Automatic Marshall compactor

Similar to mod. B033 but equipped with safety guards to 89/392 CEE Directive.

## B033-05

### Automatic Marshall compactor

Same to mod. B033, but equipped with steel cabinet lined with sound-proofing material for noise reduction within CE limits. The cabinet is also equipped with safety microswitch to 89/392/CEE Directive.

## ACCESSORIES:

## B033-04

STEEL PLATE dia. 100x50 mm. to heat the Compaction Hammer.

## SPARE:

## B033-11

COMPACTION HAMMER, complete for mod. B033, B033-01 and B033-05 machines

## 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



S114



B033-05

## B033-02

### Automatic Marshall compactor

STANDARD: BS 598:107

Basically structured as mod. B033 but manufactured in accordance with BS Standards. Supplied complete with concrete base, safety guards to CE Directive.

Dimensions:

600x600x1800 mm

Weight: 380 Kg



B033-02





## Marshall compression frames

Available models:

- B042** Marshall mechanical load frame
- B043** Marshall digital load frame
- S212** Universal Multispeed load frame (see section "S" Soil)
- S213** CBR/Marshall dual speed load frame (see section "S" Soil)

### B042

#### Marshall mechanical 50 kN load frame

STANDARDS: ASTM D1559 - AASHTO T245, T283 - BS 598:107  
NF P98-251-2 - DIN 1996 - CNR N° 30, pr EN 12697-34

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:

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: 220-240 V 1 ph 50 Hz 750 W

Dimensions: 410x400x1110 mm

Weight: 110 Kg

### B042-01

#### Marshall 50 kN load frame

Same to mod. B042 but supplied "without" load proving ring, stability mould, flow meter and dial gauge.

SPARES:

### B046

STABILITY MOULD, with inside dia. 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

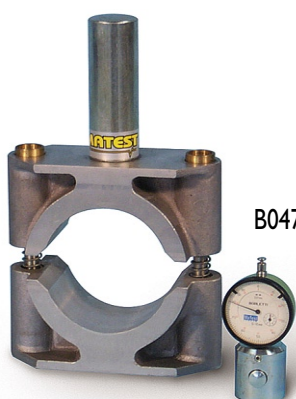
#### DIAL GAUGE

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

B046

B047-01

B047



B042



ACCESSORY:

### B047-02

#### Tensile splitting device

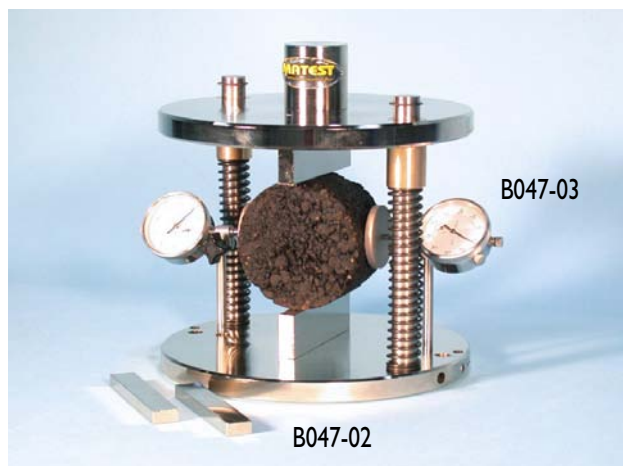
STANDARDS: ASTM D4123 - CNR 134 - pr EN 12697-23

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

B047-02



## B043

### Marshall computerized 50 kN load frame with "Cybertronic" digital display unit

STANDARDS: ASTM D1559 - AASHTO T245, T283 - BS 598:107  
NF P98-251-2 - DIN 1996 - CNR N° 30 - pr EN 12697-34

The testing frame is the same as for mod. B042, but the load is measured by an electric cell with high precision strain transducers; the flow is measured by an electrical displacement transducer 50 mm stroke and  $\pm 0,1\%$  linearity.

The "Cybertronic" digital display unit with microprocessor (technical details: see next page mod. B044) 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: 220-240V 1 ph 50 Hz 900 W

Dimensions: 650x400x1100 mm

Weight: 120 Kg

ACCESSORIES:



#### B043-01



SOFTWARE UTM2 (Universal Testing Machine 2)  
Developed for the management and the remote control through PC of Matest testing machines.  
Licence for MARSHALL test

Standards: ASTM D1559, CNR N. 30, BS 598:107, NF P98-251, prEN 12697-34

Data processing program for "X-Y STABILITY/FLOW"

General description and technical details: see UTM2 pag. 14



#### B043-02



SOFTWARE UTM2 (Universal Testing Machine 2)  
Developed for the management and the remote control through PC of Matest testing machines.  
Licence for TENSILE SPLITTING Test

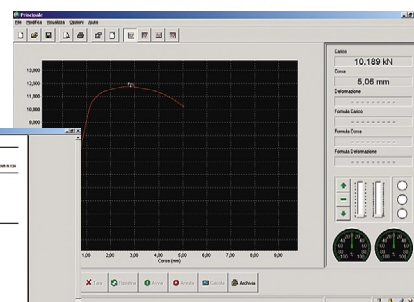
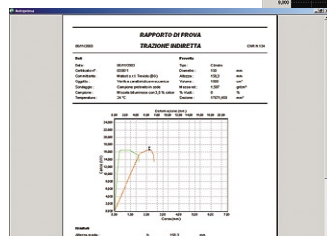
Standards: ASTM D4123, CNR N. 134, prEN 12697-23

General description and technical details: see UTM2 pag. 14



B043

B043-02: Test report



B043-01: Load/deformation graphic example

#### H009-01

PERSONAL COMPUTER, complete with LCD monitor 17", keyboard, mouse, connection cables, installation and setting up of the purchased softwares

#### B047-02

TENSILE SPLITTING DEVICE

Standards: ASTM D4123, CNR N. 134, prEN 12697-23

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. 248 x 270 mm

Weight: 14 kg

#### B074-04

Set of Two linear resistivity transducers, stroke 10 mm, accuracy and linearity  $\pm 0,3\%$ .

Complete with supports and accessories for strain measurements



B047-04

B047-02



H009-01

B043-01:  
Rapporto di prova

B043-01:  
Selezione Normativa  
e relative elaborazioni

B044

C128

B044

## Cybertronic, multichannel computerized digital display unit

for use with:

- Marshall mechanical load frame mod. B042
- CBR/Marshall two speeds load frame mod. S213
- Universal multi-speeds load frame mod. S212
- CBR loading machine mod. S211
- Triaxial load frame mod. S301

This unit displays at the same time:

- The Load measured by an extensometric cell
- The Deformation measured by 3 linear displacement transducers

The digital unit with relevant accessories can be used on any type of existing machine (also from other manufacturers).

The software displays simultaneously the following data:

- year/month/day/hour
- Instant load in kN with 3 decimal points ( $\pm$  values)
- Instant deformation in mm with 3 decimal points ( $\pm$  values)
- Hold peak values of load and deformation with memorization
- Test code, symbols of pushbuttons functions, informative messages (planning, alarms, load cell and strain transducer setting, etc.)
- Graphic display of large size
- Operator interface through 4 multi-function pushbuttons + selection encoder
- Memory recording of load and deformation peak values.
- Possibility to modify the test code (before the test)
- Safety function for automatic machine stop at max. reached load
- Safety function for automatic machine stop at max. reached deformation of the strain transducer
- Automatic loading of the scale correction values
- Calibration program for each channel for the correction of any non-linear situation due to the load cell or to the load frame
- Memorization of 2 calibration tables for load cell and strain transducer
- Software in different languages

Power supply: 220-240V 1 ph 50 Hz

Dimensions: 250x400x160 mm

Weight: 8 Kg

### ACCESSORIES:

#### B044-01

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

#### B044-02

LINEAR DISPLACEMENT TRANSDUCER, 50 mm stroke, independent linearity  $\pm 0,1\%$ , complete with cable and connector

#### B043-01



SOFTWARE UTM2 (Universal Testing Machine 2)

Developed for the management and the remote control through PC of Matest testing machines.

Licence for MARSHALL test

Data processing program for "X-Y STABILITY/FLOW"

Standards: ASTM D1559, CNR N. 30, BS 598:107, NF P98-251, prEN 12697-34

#### B043-02



SOFTWARE UTM2 (Universal Testing Machine 2)

Developed for the management and the remote control through PC of Matest testing machines.

Licence for TENSILE SPLITTING Test

Standards: ASTM D4123, CNR N. 134, prEN 12697-23

#### S218



SOFTWARE UTM2 (Universal Testing Machine 2)

Developed for the management and the remote control through PC of Matest testing machines.

Licence for CBR Test

Standards: ASTM D1883, CNR/UNI 10009, BS 1377, NF P94-078

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

Bench printer, A4 format, for the graphic and test certificate printing





**Archivio (45 - 45)**

Prova	Ciclo	Risultati	Grafico	Serie	Certificato	Note
5	Massa volumica:	Pv	2,329	g/cm <sup>3</sup>		
6	% di bitume sugli inerti:	Pb	5,7	%		
7	Peso specifico bitume:	Jb	1,03	g/cm <sup>3</sup>		
8	Peso specifico reale miscela inerti:	Ji	2,68	g/cm <sup>3</sup>		
9	Peso specifico reale conglomerato:	Pc	0	g/cm <sup>3</sup>		
10	% dei vuoti nel conglomerato:		0	%		
11	Scorimento:	S	2,845	mm		
12	Campo massimo:	Fm	11,748	kN		
13	Fattore di coesione:	f	0,99			
14	Stabilità corretta:	Sc	11,631	kN		
15	Rigidità:		4,088	kN/mm		

**B043-01 Selection of the data to be printed on the test report**

**RAPPORTO DI PROVA TRAZIONE INDIRETTA** CNR N.134

Data: 06/11/2003  
 Certificato n°: 030611  
 Committente: Matest s.r.l. Treviolo (BG)  
 Oggetto: Verifica caratteristiche meccaniche  
 Sondaggio: Campione prelevato in sede  
 Temperatura: 24 °C

Prove: Cilindro  
 Tipo: 150  
 Diametro: 150,3 mm  
 Altezza: 169,0 mm  
 Volume: 1,987 dm<sup>3</sup>  
 Massa vol.: 0  
 % Vuoti: 17671,658 mm<sup>3</sup>  
 Sezione: 0

Risultati:  
 Altezza media: 150,3 mm  
 Diametro medio: 150,3 mm  
 Deformazione unitaria di trazione: 0,014  
 Deformazione unitaria di compressione: 0,012  
 Carico di rottura a compressione: 1662,5 N  
 Resistenza a trazione indiretta: 0,045 MPa

Note:  
 Valore ottimale di trazione indiretta brasileira = 2,5 kg/cm<sup>2</sup>  
 Verifica caratteristiche meccaniche campione di terra stabilizzata al 3,5 % calce.

**B043-02 Test report with graphics**

**RAPPORTO DI PROVA TRAZIONE INDIRETTA**

**Profilo**

Prova: Macchina: Calcoli: Grafico: Certificato:

Data: 06/11/2003  
 Certificato n°: 030611  
 Committente: Matest s.r.l. Treviolo (BG)  
 Oggetto: Verifica caratteristiche meccaniche  
 Sondaggio: Campione prelevato in sede  
 Campione: Miscela bituminosa con 3,5 %  
 Temperatura: 24 °C

Prove:  
 Tipo: 150  
 Diametro: 150,3 mm  
 Altezza: 169,0 mm  
 Volume: 1,987 dm<sup>3</sup>  
 Massa vol.: 0  
 % Vuoti: 17671,658 mm<sup>3</sup>  
 Sezione: 0

**B043-01 Load/Deformation graphics**

**B043-02 Setting of the test profile**

Formula Corsa  
 Formula Deformazione

**Principale**

File Modifica Visualizza Opzioni Aiuto

**B043**

**H009-01**



## Water baths for Marshall specimens

STANDARDS: ASTM D1559 - BS 598:107 - AASHTO T245 - NF P98-251, 2 - DIN 1996 - CNR N° 30

Used to maintain in water Marshall specimens at constant temperature of  $60 \pm 1^\circ\text{C}$  and asphalt specimens at  $37,8 \pm 1^\circ\text{C}$ . 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  $95^\circ\text{C}$ .

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



B051-01

B051-02

“NEEDED” ACCESSORY for the B051 Bath:

### B051-01

THERMOSTAT ANALOGIC Heating System, complete with immersion heating element.

Power supply: 220-240V 1ph 50/60Hz 1500W

### B051-02

THERMOSTAT DIGITAL Heating System, complete with immersion heating element. The digital system ensures a better temperature accuracy control of the water at  $60 \pm 1^\circ\text{C}$  or  $37,8 \pm 1^\circ\text{C}$  as requested by Standards

Power supply: 220-240V 1ph 50/60Hz 1500W

### C306-03

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



DETAIL B051-02



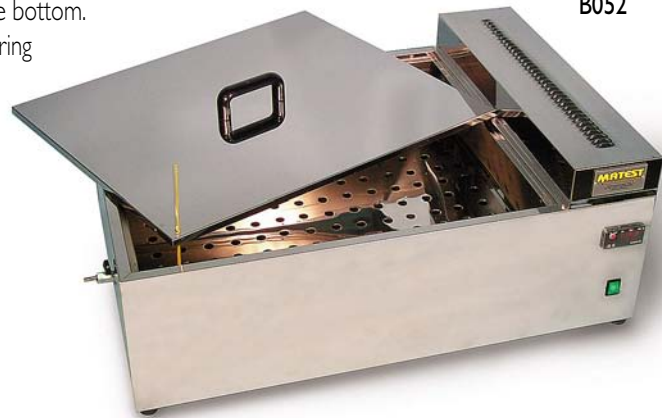




## B052

### Digital water bath

This bath is fully double walled stainless steel made with wool insulation. The specimens are held by a shelf spaced from the bottom. Complete with digital thermostat and electric stirrer, ensuring a constant and uniform water 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  $95^\circ\text{C}$   
Inside dimensions: 700x550x165 mm  
Outside dimensions: 900x640x340 mm  
Power supply: 220-240 V 1 ph 50/60 Hz 1500 W  
Weight: 28 Kg

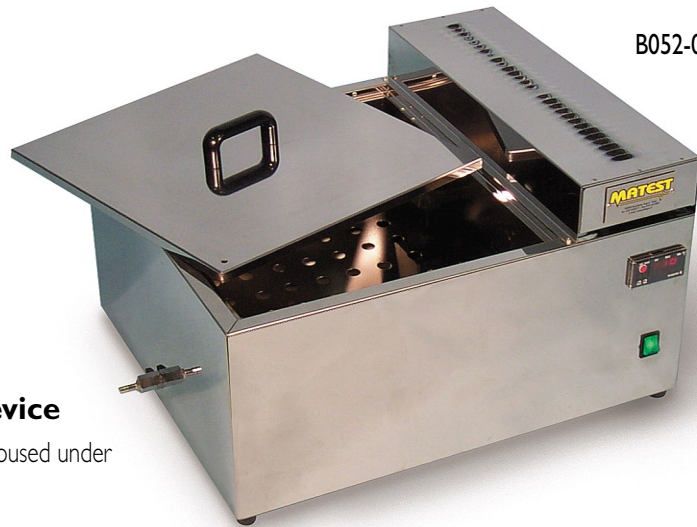


B052

## 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  
Weight: 15 Kg



B052-01

## B052-02

### Digital water bath with cooling device

Similar to mod. B052 but equipped with cooling unit housed under the water bath.  
Temperature range from:  $+5$  to  $+95^\circ\text{C}$   
The bath can hold up to 12 Marshall specimens  
Capacity: 42 litres  
Inside dimensions: 510x350x230 mm  
Outside dimensions: 680x420x950 mm  
Power supply: 220-240 V 1 ph 50/60 Hz 2000 W  
Weight: 60 Kg



B052-02

ACCESSORY FOR MOD. B051 ÷ B052-02

**B052-10** Mercury control thermometer  $0-100^\circ\text{C}$  subd.  $1^\circ\text{C}$

## B067

### Vacuum pyknometer 10 litres capacity

STANDARDS: 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.

Dimensions: dia. 300x450 mm

Weight: 10 Kg



B067

## B048

### Gyratory compactor "Servopac"

STANDARDS: ASTM D6307 - AASHTO TP-4 - prEN 12697-31 - CEN TC227 - NF P98-252 - BS DRAFT

The Servopac is a fully automated, servo-controlled gyratory compactor designed to compact asphalt mixes using the gyratory compaction technique.

Compaction is achieved by the simultaneous action of static compression and the shearing action resulting from the mould being gyrated through an angle about its longitudinal axis.

The Servopac has a four column frame for superior rigidity. Vertical stress is measured by a load cell and is accurately controlled during compaction. The gyratory motion is also servo-controlled enabling the gyratory angle to be accurately controlled during compaction, irrespective of load and any compliance of the machine's components. The Servopac does not require any wearing plate.

The Servo-controlled operation of the machine allows vertical stress, gyratory angle and speed to be quickly modified from a hand-held control pendant or PC. The shear stress facility is built into the Servopac and shear stress is measured/displayed on the PC screen.

The PC-Windows (TM) interface provides a screen to input test parameters and display and plot either height, density, shear stress or angle against gyratory cycles in real time.

The test data may be stored and retrieved or transferred to other analysis packages.

The Servopac is designed to comply with SHRP Superpave asphalt mix design requirements and the proposed CEN European Specifications on gyratory compaction.



70



#### SPECIFICATIONS:

Vertical force: 0 to 20kN +/- 100N (with 1000kPa air supply)

Gyratory angle: 0 to 3 +/- 0.02 degrees

Gyratory rate: 3 to 60 +/- 0.1 gyrations per minute

Number of gyrations: 0 to 999

Minimum specimen height: 50 mm

Air supply capacity: minimum 5 litres/second of clean, dry air

Operating pressure: 800 to 1000 kPa

Power supply: 220-240V 1ph 50Hz

Dimensions: 760 x 450 x 1970 mm

Weight: 400 kg

The Servopac is supplied complete with stand, specimen extractor, software, mains power and PC communication leads.

#### ACCESSORIES:

##### B048-01

Cylinder mould assembly 100 mm diameter

##### B048-02

Cylinder mould assembly 150 mm diameter

##### B048-03

Pendant Controller; used for running the machine, (not absolutely necessary, but highly desirable), as well for the re-calibration

##### B048-04

Servopac angle verification kit, including dial gauge

##### B048-05

Servopac calibration spacers kit for angle, load and vertical travel, including 5 spacers and 3 calibration gauges

##### V206

Laboratory Air Compressor



## B049

### Asphalt testing system - MATTA

STANDARDS: ASTM D4123 - BS598:111 - BS DD 213, DD226

This apparatus is a general purpose testing machine developed to carry out a range of tests on asphalt. The emphasis has been on producing affordable systems with the versatility to perform both routine testing and detailed research investigations. The MATTA is based on a simple reaction frame comprising a steel base plate, support columns and crosshead. Cylindrical samples are positioned between the base plate and the crosshead, and an electro-pneumatic actuator is used to

exert dynamic compressive forces. Measurement of displacement and forces enables the resultant stress and strain in the sample to be determined. Jigs are provided to allow axial or diametral (indirect tensile) loading of samples.

The machine is controlled by a compact microprocessor based Control & Data Acquisition System (CDAS). All time-critical parameters are controlled directly by the CDAS

unit for reliability and accuracy. A temperature controlled cabinet is available (accessory) where accurate control of test temperature is required, as is the case when testing asphalt.

Open-loop controlled 5-pulse Indirect Tensile Modulus to BS DD213 - ASTM D4123

Open-loop controlled Repeated Load Strain test to BS DD226

Open-loop controlled Static Load Uniaxial loading Strain to BS598:

111

The Pneumatic Actuator has 5kN capacity and 50mm stroke

The CDAS has 8 analogue input channels, and high acquisition sampling rate (up to 1000 readings per second)

The basic system includes: loading frame, pneumatic actuator and regulator; solenoid valve and load cell, CDAS.

Power supply: 220-240v

1ph 50/60Hz

Weight: 120 kg



#### ACCESSORIES:

##### B049-01

INDIRECT TENSILE JIG for 100mm and 150mm diameter specimens, with transducers

##### B049-02

CREEP JIGS for 100mm and 150mm diameter specimens, with transducers

##### B049-03

STEEL PROVING RING calibration check device having nominal modulus of 2000 Mpa, used, to verify the accuracy of results from indirect tensile tests

##### B049-04

TORQUE SCREWDRIVER, used for indirect tensile tests

##### B049-13

ENVIRONMENTAL CHAMBER, stainless steel construction with glass door.

Temperature range: +2 to +60°C. 220-240V 1ph 50/60Hz

##### B049-14

ENVIRONMENTAL CHAMBER, stainless steel construction with glass door.

Temperature range: -15 to +60°C. 220-240V 1ph 50/60Hz

##### B049-15

Environmental chamber shelf & bracket assembly for temperature conditioning samples

NOTE: A compressor with a working pressure of 850kPa is required





## B049-10

### Universal testing machine UTM-5P

STANDARDS: ASTM D4123, D3497 - AASHTO T294/SHRP P46  
BS 598, DD213, DD226

This Closed-loop pneumatic servo-controlled system allows asphalt to be tested for its ability to simulate repeated axial loading conditions, replicating traffic conditions.

It can also perform Static and Dynamic Creep tests giving measurements for Plastic Determination, and enables testing of to different types of asphalt and granular specimens.

The system comprises a loading frame fitted with a servo-controlled pneumatic actuator assembly, a personal computer (PC), a control and data acquisition system (CDAS) with 8 transducer inputs and housing an additional module that controls the servo-valve. One important feature of the CDAS unit is that the control and data acquisition functions are fully integrated. The user-friendly software can generate any desired loading waveshape that can be defined in 512 points.

The high performance pneumatic Servo-Actuator has 5 kN capacity, 30 mm stroke and it is suitable for high frequency loading (up to 70Hz sinusoidal).

Acquisition sampling rate: up to 1000 reading/sec.

Three input channels for force, displacement and/or strain controlled loading.

Can simultaneously control up to 3 axes

The basis system includes: loading frame, 5kN double action servo-pneumatic actuator; 6kN load cell, closed-loop pneumatic reservoir assembly, filter; Control and Data Acquisition System (CDAS), Universal Testing Machine (UTM) and software.

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

Weight: 120 kg



VERSATILE HARDWARE

#### ACCESSORIES:

### B049-11

ASPHALT MATERIALS TESTING PACKAGE, comprising:

Indirect tensile jig for testing 100 and 150 mm diameter samples

Closed-loop temperature measurement kit

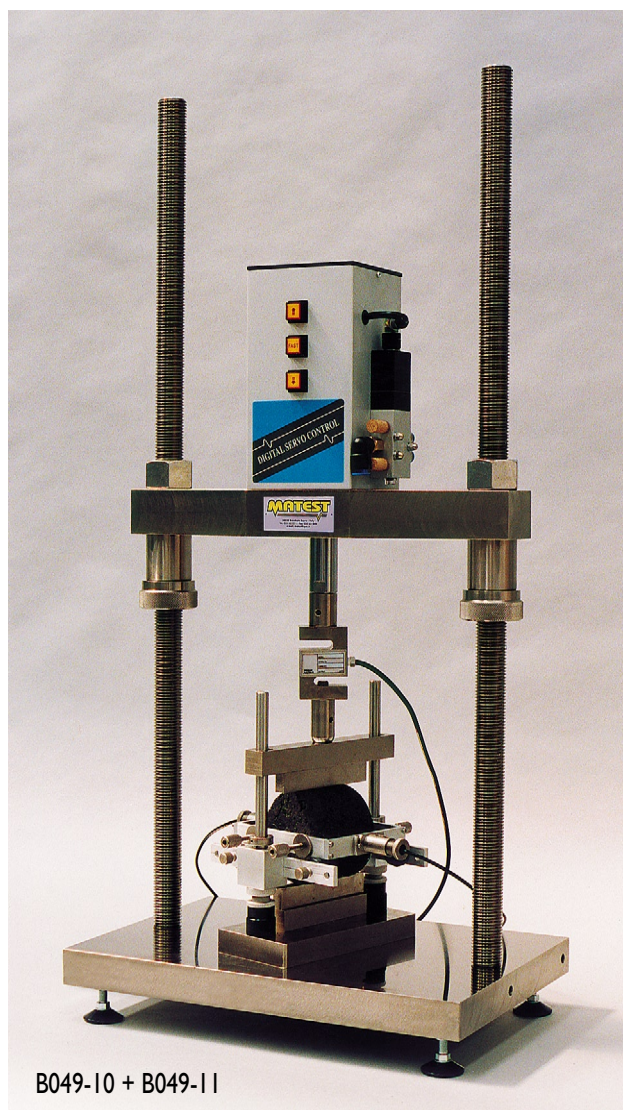
2 displacement transducers 5 mm stroke

2 displacement transducers 0,12 mm stroke

Creep testing jig for 100 and 150 mm samples

### B049-12

ASPHALT BEAM FATIGUE TESTING PACKAGE, comprising:  
Beam Fatigue Apparatus, on specimen displacement transducer, axial alignment adaptor, cradle assembly, clamp kit, PVC beam dummy specimen. This is the same as our Stand-alone unit, but shares the CDAS from the UTM-5P.



B049-10 + B049-11

**B049-13** ENVIRONMENTAL CHAMBER, stainless steel construction with glass door. Temperature range: +2 to +60°C. 220-240V 1ph 50/60Hz

**B049-14** ENVIRONMENTAL CHAMBER, stainless steel construction with glass door. Temperature range: -15 to +60°C. 220-240V 1ph 50/60Hz

**B049-15** Environmental chamber shelf & bracket assembly for temperature conditioning samples.

NOTE: A compressor with a working pressure of 850kPa is required

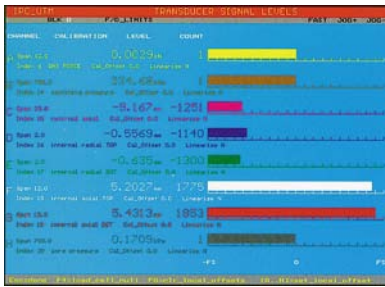


B049-12

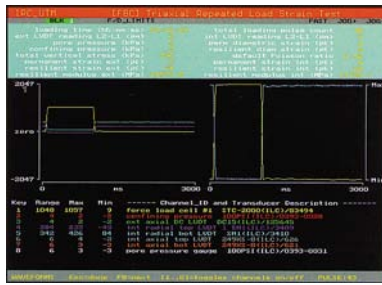


## User friendly software

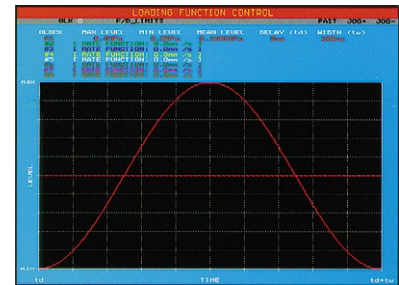
Display of transducer signal levels during setup.



Real time viewing of transducer outputs.



Programmable loading wave forms.



### B049-30

#### Fatigue testing of asphalt beams

STANDARD: SHRP M009

The Beam Fatigue Apparatus is a stand-alone system for fatigue life testing of asphalt beams subjected to repeated flexural bending, giving a measure of maximum tensile strength, maximum tensile strain and flexural stiffness. The cradle mechanism allows for free translation and rotation of the clamps and provides loading at the third points. Pneumatic actuators at the ends of the beam centre it laterally and clamp it. Servo-motor driven clamps secure the beam at the four points with a predetermined clamping force. Software has been developed to automatically perform the SHRP M009 test. The latest software allows for both controlled strain and stress loading.

Load measurement and control:

- Range:  $\pm 4.5$  kN
- Resolution: 2.2 N
- Accuracy:  $\pm 10$  N

Displacement Measurement and Control:

- Range:  $\pm 0.5$  mm
- Resolution: 0.25  $\mu$ m
- Accuracy:  $\pm 1.00$   $\mu$ m

Loading frequency: up to 10 Hz sinusoidal loading

Sample size: 50 x 50 x 350 mm  
50.8 x 63.5 x 381 mm (SHRP M009)

The system includes:

Stand alone Beam Fatigue apparatus, Control & Data Acquisition System assembly, Closed-loop pneumatic reservoir assembly, Servo cables kit, Software.

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

Dimensions: Beam Cradle 300 x 500 x 600mm  
CDAS unit 400 x 450 x 330 mm

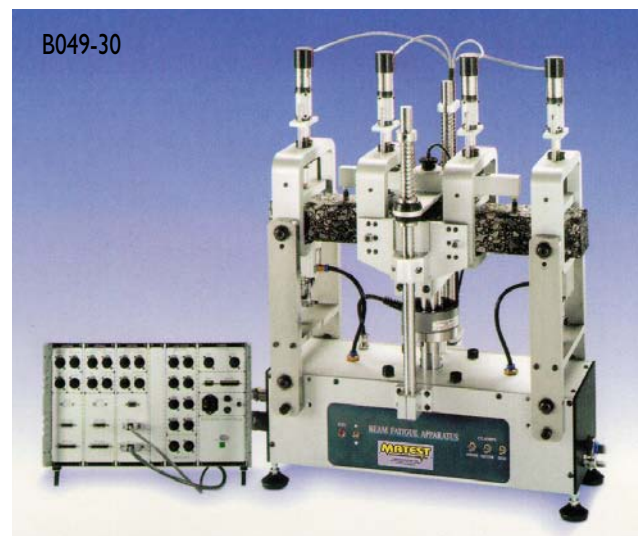
Weight: 40 kg

ACCESSORIES:

**B049-31** PVC beam (BFA dummy specimen)

**B049-13** ENVIRONMENTAL CHAMBER, stainless steel construction with glass door  
Temperature range:  $+2$  to  $+60^{\circ}\text{C}$ . 220-240V 1ph 50/60Hz

### B049-30

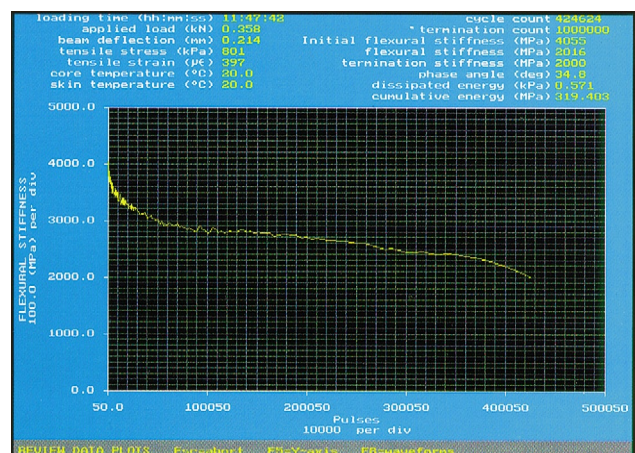


**B049-14** ENVIRONMENTAL CHAMBER, stainless steel construction with glass door. Temperature range:  $-15$  to  $+60^{\circ}\text{C}$ . 220-240V 1ph 50/60Hz

**B049-15** Environmental chamber shelf & bracket assembly for temperature conditioning samples

NOTE: A compressor with a working pressure of 850kPa is required.

Real time graphical plotting of selected parameters as the test progresses.



## B049-20

### Universal testing machine UTM-25

A robust 2-column loading frame with an air-cooled hydraulic power pack.

Manual or optional motor driven crosshead positioning, and hydraulic crosshead clamping (optional).

Servo-Hydraulic Actuator: 25kN static and 20kN dynamic capacity

Stroke: 50 mm

Suitable for testing samples incorporating larger aggregates, and where high load capacity for large/stiff samples is required.

Weight: 270 kg

ACCESSORY:

## B049-21

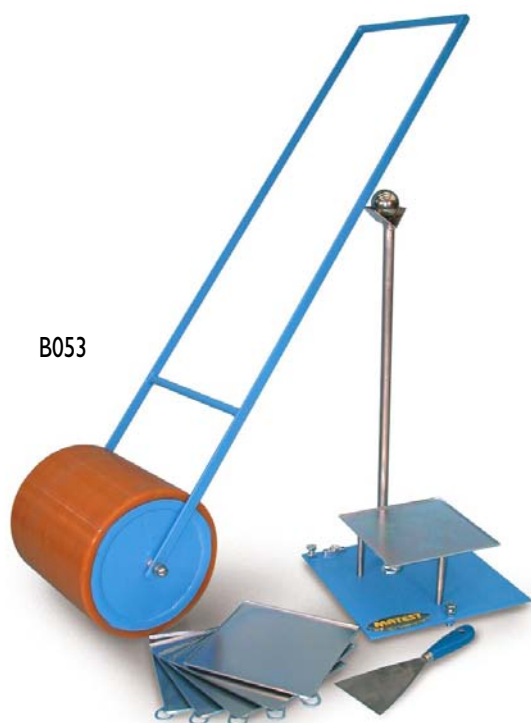
ENVIRONMENTAL CHAMBER, stainless steel construction with glass door.

Temperature range: -15 to +60°C. 220-240V 1ph 50/60Hz



B049-20 + B049-21

B053



## 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.





## B054

### Ductilometer

STANDARDS: EN 13589:2003

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  $25^{\circ}\text{C} \pm 0,5^{\circ}\text{C}$ .

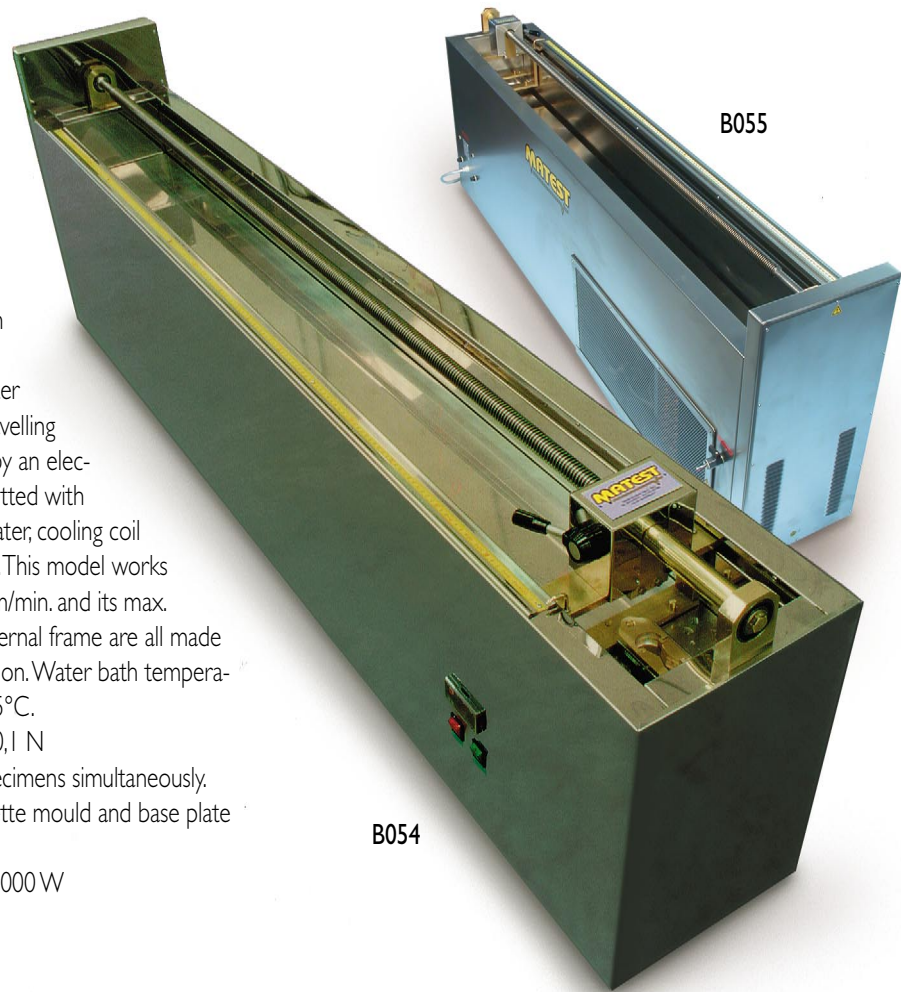
Max. traction force: 300 N, accuracy:  $\pm 0,1$  N

The ductilometer can accept up to 3 specimens simultaneously. Supplied complete except for the briquette mould and base plate that must be ordered separately.

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

Dimensions: 2140x350x400 mm

Weight: 95 Kg



B054

B055

## B055

### Ductilometer

Same as for mod. B054 but equipped with incorporated refrigerating unit for tests with water temperature at  $+5^{\circ}\text{C}$ .

Dimensions: 2140x350x750 mm. Weight: 130 Kg

#### ACCESSORIES:

### B054-01

#### 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

#### BRIQUETTE MOULD

STANDARDS: EN, NF, UNE, CNR

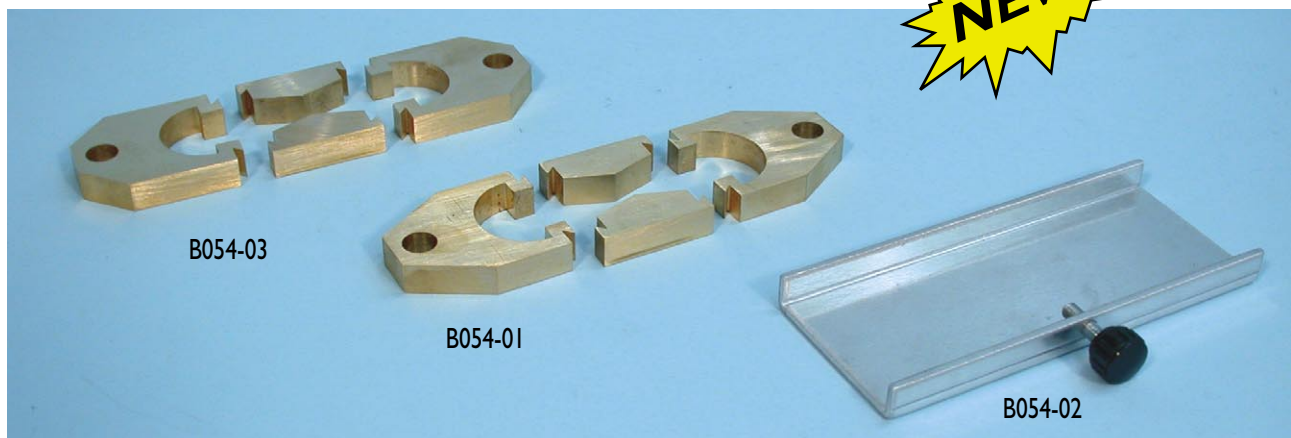
Used to prepare the specimen, it is brass made, accurately machined.

Supplied without base plate.

Weight: 300 g

### B054-02

BASE PLATE for briquette mould mod. B054-01 and B054-03



B054-03

B054-01

B054-02

## B056

### Standard penetrometer

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

Used to determine the consistency of a bituminous sample under fixed conditions of load, time and temperature. The penetration is expressed in distance of tenths of millimeters vertically penetrated by a standard needle. The standard penetrometer is ruggedly constructed, with a base table in light alloy 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, two sample cups dia. 55x35 mm and 70x45 mm.

Dimensions: 220x170x410 mm.

Weight: 11 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 NAMAS Verification Certificate. Weight:  $2,5 \pm 0,05$  g

**B057-07** PENETRATION NEEDLE HARDENED STEEL, each needle is individually verified and perfectly meets EN 1426 Specification.

#### SPARES:

**B057-01** PENETRATION NEEDLE. Weight:  $2,5 \pm 0,05$  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



## B057

### Automatic penetrometer

Basically structured as mod. B056 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: 220-240 V 1 ph 50 Hz 200 W

Dimensions: 220x280x410 mm

Weight: 15 Kg

## B057-03







## **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: 220-240 V 1 ph 50 Hz 1050 W  
Dimensions: 375x335x420 mm  
Weight: 12 Kg

### 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.



## **DETERMINATION OF THE AFFINITY BETWEEN AGGREGATE AND BITUMEN**

STANDARD: EN 12697-11

The equipment is formed by:

### **B022**

**Bottle rolling machine**, with rotation speed adjustable up to 60 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.



### **B022-11**

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.

### **B060**

#### **Bacon sampler**

STANDARDS: 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



## Determination of particle polarity of bitumen emulsions

STANDARDS: EN 1430 / ASTM D244 / CNR N. 99

### B063-10

#### Particle charge tester

This apparatus is used to identify the particle charge of bitumen emulsions.

The equipment comprises:

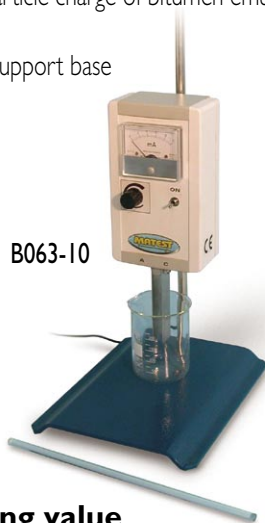
- Milliammeter scale up to 10 mA on support base
- Variable resistor
- Two stainless steel electrodes
- Insulating device
- Beaker 500 ml capacity
- Glass rod

Power supply: 230V 1ph 50/60Hz

Dimensions: 200x200x600mm

Weight: 3 kg approx.

B063-10



B065

### Bituminous Binders.

#### Determination of the

#### resistance of hardening.

#### Rotating Flask Test: RFT Method

STANDARD: EN 12607-3

### Extraction Method. Binder Recovery by Rotary Evaporation

STANDARDS: EN 12697-1, 12697-3 / ASTM D5404 / AASHTO TP2

### B065

#### Rotary Evaporation Apparatus

This unit can be used for two different tests:

- To evaluate the hardening effect of a treated bituminous binder sample (EN 12607-3)
- To recover bitumen from a solvent by minimizing the changes in the asphalt properties (EN 12697-1, 12697-3, ASTM D5404, AASHTO PT2)

The hardening resistance 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 binder recovery 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 sample is subjected to high vacuum according to EN Spec.; or to partial vacuum and flow of nitrogen gas as requested by ASTM and AASHTO Spec.

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°

Power supply: 230V 1ph 50Hz

Weight: 27 kg approx.

ACCESSORIES:

**B065-11** Diaphragm pump. 230V 1ph 50Hz

**B065-12** Flow control flowmeter device to keep the flow air rate to 500 ml/min.

**B065-13** Distillation flask 2000 ml capacity (ASTM D5404)

## Determination of breaking value of cationic bitumen emulsions.

### Mineral filler method

STANDARDS: EN 13075-1 / IP 494

### B090

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 Complete with base support.

**B090-11** Propeller for electric stirrer.

**B090-12** Metallic container, 500 ml capacity.

**B090-20** Reference filler, 50 kg bag.

B090



B090-10



B090-11

B090-12



News





## B063

### Emulsified asphalt distillation apparatus

STANDARDS: 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, bunsen burner with gas stop valve controlled by a flame sensor to CE safety Directive. Weight: 12 Kg



B063

## B064

### Asphalt oven with rotating shelf

STANDARDS: CNR N° 50 - ASTM D6, D1754 - NFT66-011  
AASHTO T47, T179 - BS 2000 - UNE 7110

Internal chamber and external frame all made from stainless steel, double wall insulation with fiberglass, double door. Temperature control by digital thermoregulator. 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: 220-240V 1 ph 50 Hz 1200 W

Internal dimensions: 330x330x330 mm

Outside dimensions: 460x450x700 mm

Weight: 40 Kg

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

#### B064-01

Rotating shelf complete with 9 containers dia. 55x35 mm for the "Determination of Loss on Heating" to ASTM D 6 - BS 2000 NFT66-011 - AASHTO T47 Standards.

#### B064-02

Rotating shelf, complete with 2 containers dia. 140x9,5 mm for the "Determination of Thin Film" to ASTM D1754 - AASHTO T179 UNE 7110 - CNR N° 50 Standards.



B064-02

B064-01



B064 + B064-01

SPARES:

**B064-03** Thermometer ASTM 13C, +155 to +170°C subd. 0.5°C

**V122-05** Brass container dia. 55x35 mm

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

**B066**

## Rolling Thin-Film Oven

Effect of heat and air on a moving film of asphalt  
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.

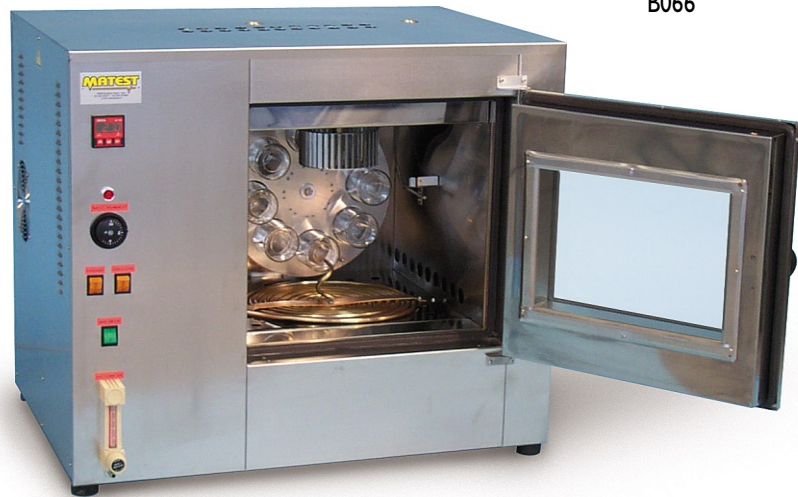
The oven must be connected to a suitable air pressure supply.

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.

Power supply: 220-240 V 1 ph 50 Hz 1300 W

Dimensions: 620x620x910 mm

Weight: 55 Kg



B066

**B066-01**

## Rolling Thin-Film Oven

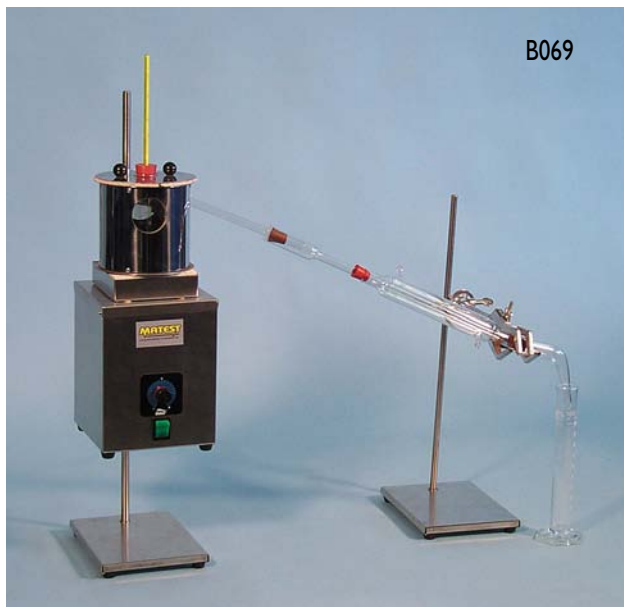
STANDARD: EN 12607-1

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

SPARE:

**B066-02**

Glass container dia. 64x140 mm



B069

**B069**

## Distillation of cut-back asphalts

STANDARDS: ASTM D402 - AASHTO T78 - NFT 66-003 - CNR  
UNE 7112, 7072

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

Power supply: 220-240 V 1 ph 50/60 Hz 750 W

Weight: 12 Kg

**B070**

## Automatic Ring and Ball apparatus

STANDARDS: ASTM D36 - AASHTO T53 - NFT66-008 - EN 1427  
UNI 4161 - DIN 52011 - BS 2000 - CNR N° 35

Used to determine the softening point of bituminous materials.

The adjustment of the increase of the temperature and the complete test procedure performed by a microprocessor in a fully automatic way.

Digital reading of the values on two channels.

Complete with pyrex beaker, rings, balls, accessories, interface RS232C

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

Dimensions: 340x220x230 mm

Weight: 15 Kg

B070



section B



79

**MATEST**



## B072

### Ring and Ball softening point apparatus

#### STANDARDS:

ASTM D36 - AASHTO T53 - NFT66 008 - BS 2000

UNI 4161 - DIN 52011 - UNE 7111 - CNR N° 35 - EN 1427

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. This simple apparatus has been developed to determine these characteristics. It 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

#### SPARES:

**B072-03** Steel ball dia. 9,5 mm

**B072-04** Brass tapered ring

**B072-05** Ball centering guide

**B072-06** Pyrex beaker



80



B072

## B074

**Hot plate**, complete with thermoregulator for temperature adjustment.

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

Weight: 6 Kg

## B074-01

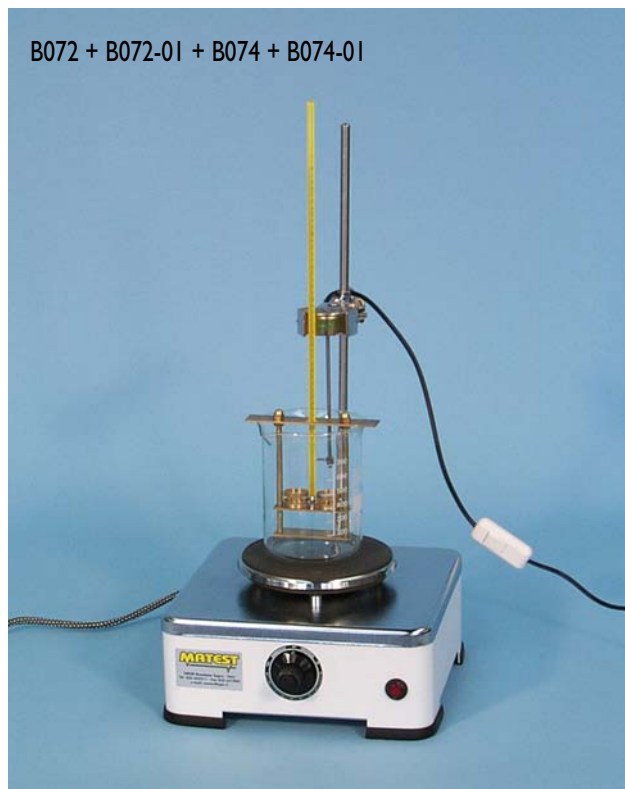
**Electric stirrer**, accessory to the hot plate B074 to ensure a more uniform temperature to the bath.

Supplied complete with vertical support and base.

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

Weight: 3 Kg

B072 + B072-01 + B074 + B074-01



## B073-01

### Electric heater with magnetic stirrer

Complete with thermoregulator for temperature adjustment and magnetic stirrer with electronic adjustment from 100 to 1200 rpm. Alternative version to mod. B074 + B074-01

Power supply: 220-240 V I ph 50/60 Hz

Weight: 3 Kg



B073-01 + B072 + B072-01

## B076

### Water in bituminous materials (Dean - Stark)

STANDARDS: ASTM D95, D244 - IP 74/77  
AASHTO T55, T59 - NLT 123  
NFT66-113, T66-023  
CNR N°101

Used to determine the water in petroleum products or bituminous materials by distilling them with volatile solvent. The equipment comprises electric heater with thermoregulator; glass still, support stand, condenser; receiving trap, clamps.

Power supply:  
220-240 V 1 ph 50/60 Hz 500 W  
Weight: 8 Kg



B076

## ASH CONTENT

STANDARDS: EN 7  
ASTM D482  
BS 4450

Muffle furnace to determine the percentage of mineral in petroleum and cut-back bitumen

See section "A" Aggregates, mod. A022



A022

## B077

### Fraas apparatus

STANDARDS: IP 80 - NFT66-026 - DIN 51012 - CNR N° 43



B077

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

## 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. Wooden plastified made, with gres ceramic table, complete with 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. Complete with electric aspirator and electric lighting. Power supply: 220-240 V 1 ph 50 Hz 350 W  
Dimensions: 1250x750x2600 mm  
Weight: 180 Kg



B079

THERMOMETERS FOR ASPHALT TEMPERATURE MEASUREMENT  
See section "V", Various







B080

## B080 Engler 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 thermometer, electric stirrer; cooling device, Engler flask.

Power supply: 220-240 V 1 ph 50 Hz 300 W

Dimensions: 265x270x550 mm. Weight: 12 Kg

## B081 Engler viscometer "Two elements"

Basically structured as mod. B080 but having "Two elements", electrically operated, supplied complete. Weight: 20 Kg

### ACCESSORIES:

**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

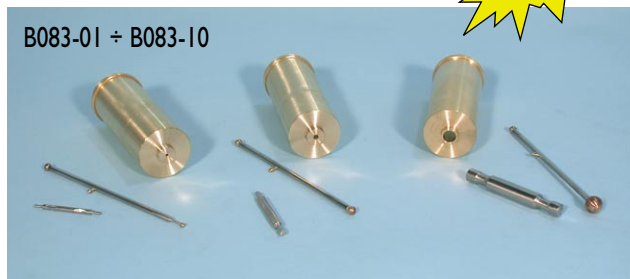
**B082-03** THERMOMETER ASTM 25 C range +95 +105°C  
subd. 0,2°C

**B082-04** THERMOMETER NFT66 -020 range 0-55°C. subd. 0,2°C

### SPARE:

**B082-05** Engler testing flask

B083-01 ÷ B083-10



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

STANDARDS: EN 12846 / EN 13357 / IP 184 / NFT66-005  
BS 2000

## B084-01 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.

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

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

### ACCESSORIES:

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 13357

**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 + accessories





## B086

### Cleveland flash and fire point tester

OPEN CUP ELECTRIC HEATING

STANDARDS: BS 4689 - ASTM D92 - AASHTO T48 - UNI 4160  
IP 36/67 - UNE 7075 - EN 22592 - NFT60-118  
CNR N° 72

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.

Supplied "without" flame gas device to be ordered separately.

Power supply: 220-240V 1ph 50-60Hz 600W

Weight: 10 kg

NEEDED ACCESSORY:

#### B086-01

FLAME GAS device

#### B086-02 CE model

FLAME GAS device, complete with gas-stop valve controlled by a flame sensor and maximum thermostat with reset button as requested by European CE Directive.

SPARE:

**B086-10** Thermometer IP 28C (ASTM 11C), range -6 +400°C.

## B087

### Saybolt viscometer

STANDARDS: ASTM D88 - D244 - 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 are not included and must be ordered separately.

Power supply: 220-240V 1 ph 50 Hz 500 W

Dimensions: 270x270x550 mm

Weight: 12 Kg

SAYBOLT THERMOMETERS:

		Range	Subd.
<b>B089</b>	ASTM 17C	+19 a +27°C	0,1°C
<b>B089-01</b>	ASTM 18C	+34 a +42°C	0,1°C
<b>B089-02</b>	ASTM 19C	+49 a +57°C	0,1°C
<b>B089-03</b>	ASTM 20C	+57 a +65°C	0,1°C
<b>B089-04</b>	ASTM 21C	+79 a +87°C	0,1°C
<b>B089-05</b>	ASTM 22C	+95 a +103°C	0,1°C

SPARES:

**B089-06** FUROL orifice

**B089-07** UNIVERSAL orifice

**B089-08** SAYBOLT flask 60 ml capacity

B086 + B086-01



#### B087-01

### Two tube Saybolt viscometer

Basically structured as mod. B087 but with two tubes. Supplied complete except thermometers.

B087-01







## B092

### Tag closed viscometer

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: 220-240 V 1 ph 50 Hz 600 W.

Weight: 8 Kg



B092

## B093

### Tag open-cup viscometer

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: 220-240 V 1 ph 50 Hz 600 W.

Weight: 8 Kg



B093

### Hubbard-Carmick specific gravity bottles

STANDARDS: ASTM D70  
BS 4699 - AASHTO T228

**VIII** Cylindrical type,  
24 ml

**VIII-01** Conical type, 25 ml



VIII-01

VIII

## B094

### Pensky-Martens flash point tester

STANDARDS: ASTM D93 - AASHTO T73

Used for the determination of the flash point of petroleum products by the Closed Cup Test, with a Flash Point higher than 50°C.

Supplied complete with stirrer; shield for radiations, cast iron bath, electric heater with thermoregulator two thermometers ASTM 9C -5 + 110°C div. 0,5 C, and ASTM 10C +90 +370°C div. 2°C.

Power supply: 220-240 V 1 ph 50 Hz 600 W.

Weight: 8 Kg



B094

## Duriez test set

STANDARDS: 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



B095-01 ÷ B095-07

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

## B097

### P.R.D. mould

STANDARDS: BS 598:104 - EN 12697-32

This 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

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** Vibrating Hamer (see sector Soil)



B097

## B099

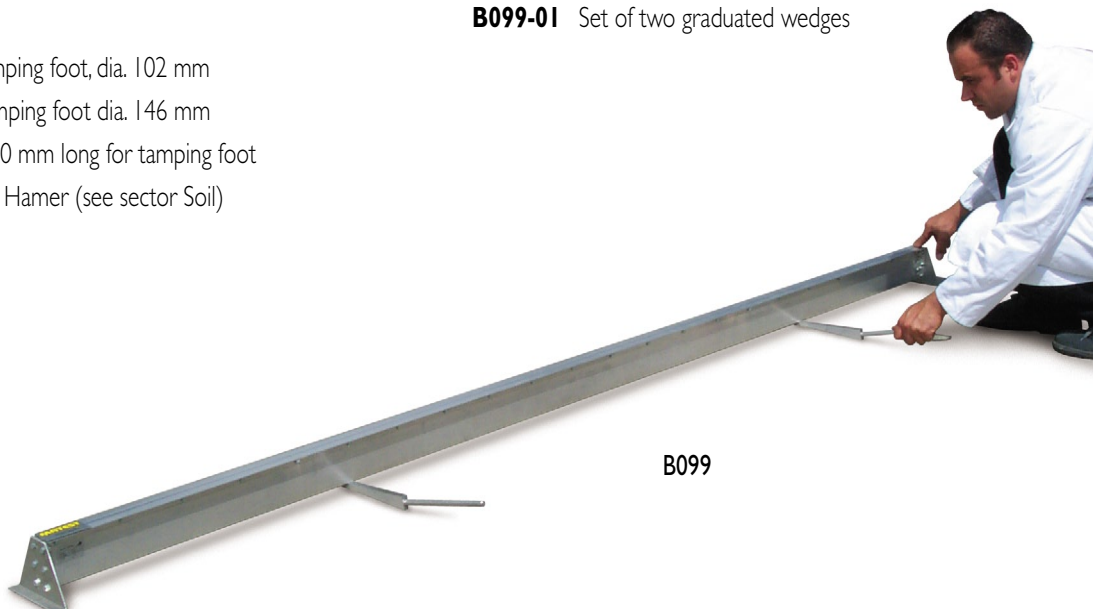
### MOT straight edge

Manufactured from aluminium alloy, it is utilized to measure irregularities on road pavement, floors, concrete pavement. Length is 3 metres, and it is supplied complete with two graduated measuring wedges.

Weight: 10 Kg

SPARE:

- B099-01** Set of two graduated wedges



B099





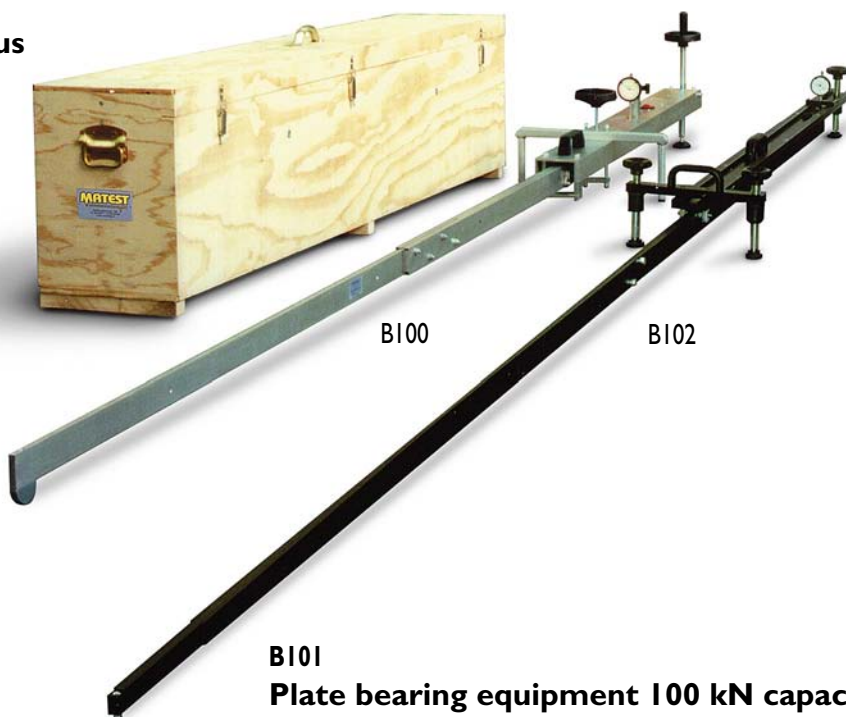


## B100

### Benkelman beam apparatus

STANDARDS: CNR N° 141  
AASHTO T256-77

Alluminium alloy made, complete with dial indicator and accessories, it is utilized to measure the deflection of the road surface when loaded by the wheels of vehicles. The beam is put in contact with the pavement under test between the tires of the vehicle. The measurement of the deflection is performed when the vehicle passes over the test area. Length of the Benkelman beam is 250 cm. Beam fulcrum ratio 4:1. Supplied complete with wooden carrying case. Weight: 15 Kg



## B101

### Plate bearing equipment 100 kN capacity

STANDARD: NF P94-117

Utilized with the Benkelman Beam B100 or B102, to measure the static deflection in the centre of the plate from an independent point of the local load deflections: EV1/EV2 (roads) and Westergard (platforms)

The equipment consists of:

- Bearing plate dia. 300 mm with central measuring device
- 100 kN capacity hydraulic ram complete with hand pump
- Manometer range 0-100 kN
- Extension rods, spherical bearing, couplings, hoses, accessories
- Portable wooden carrying case
- Weight: 72 Kg

## B103

### Plate bearing equipment 200 kN

Same as per mod. B101 but having capacity of 200 kN

ACCESSORY:

## S226-02

Bearing plate dia. 600 mm

## B102

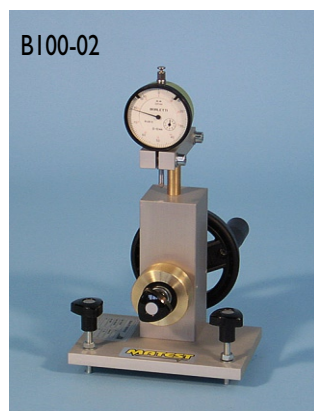
### Benkelman beam apparatus

STANDARD: NF P98-200/2

Basically similar to mod. B100 but manufactured according to the French Specifications.

Beam fulcrum ratio 2:1

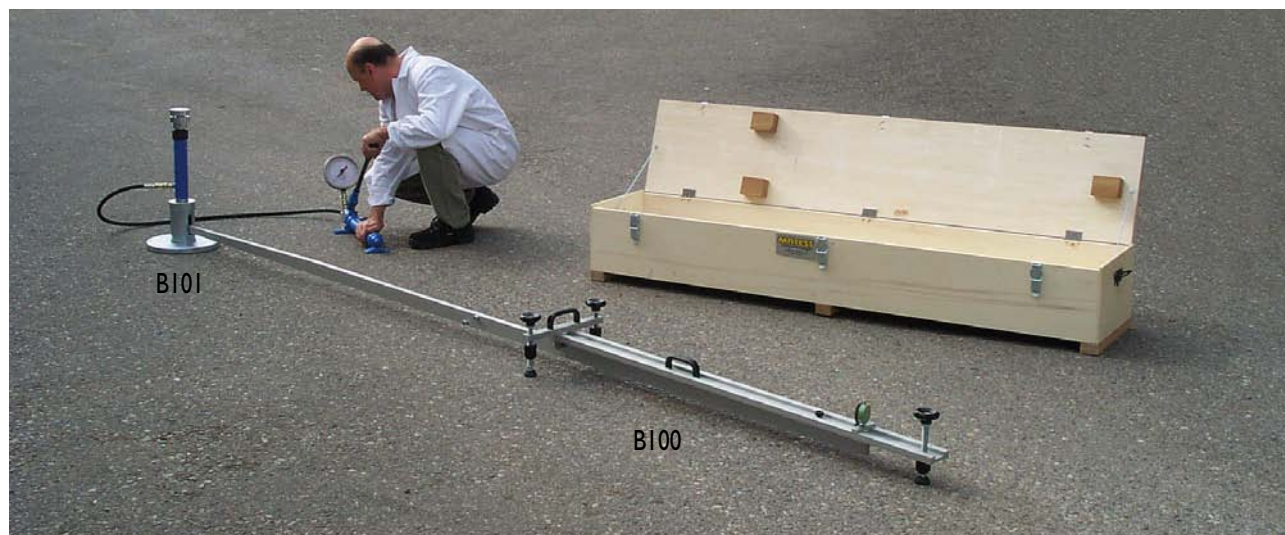
Supplied complete with wooden carrying case. Weight: 15 Kg



ACCESSORY:

## B100-02

Benkelman indicator gauge calibration unit, complete for mod. B100 and B102.





## “Non Nuclear” Electromagnetic Density Gauge

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

Density measurements are related to the dielectric property of asphalt in the first 40 mm of depth.

This instrument allow continous reading along the pavement to detect air voids or non uniformity.

The telescoping handle is projected to perform many measurements without bending. Tests can be executed also at high temperatures, when the pavement is still hot (max 150°C).

The Electromagnetic densimeter allow:

- Pavement tests.
- Real time measurements, in a continous mode.
- LCD visualization of:
  - Average density.
  - % Maximum density.
  - % Air voids (only BIII-01 version).
- No moisture or temperature corrections are needed.
- Non Nuclear device, so maximum safety for operator
- Setting on a referenced test plate only the first time the device is turned on.
- Storing up to 999 measurement data records and RS-232 (only BIII-01 version) computer interface.
- Rechargeable batteries for 32h continous usage.
- Charging supply for standard 220V/50Hz or 12Vcc.



Avaiable Models:

Model	Test Mode	Advanced Software	Memorization	Interfaccia PC	Recharge time	Keyboard and LCD
<b>BIII</b>	Fast Measurement Average Measurement on multiple data	no	no	no	Slow	Essentials
<b>BIII-01</b>	Continous Measurements Average Measurement on multiple data Segregation mode	si	si	si	Fast	Multifunction 30 key, 4 lines LCD

