

ASPHALT TEST

75 Determination of asphalt mix composition

76 Marshall stability and Indirect tensile testing apparatus

77 Asphalt sample preparation

78 Rheological properties of bituminous mixtures

79 IPC Global Dynamic testing

80 Road quality testing

With a combined 80 years' experience, the Asphalt division of CONTROLS and IPC Global are pioneers and global leaders in construction material testing and dynamic asphalt test equipment. This know-how and experience has been accumulated in collaboration with the academic world and major international laboratories, as well as an active participation in trade associations and reference Standard organizations from around the world.

Superpave™ methods are directing the market of asphalt pavement testing towards more advanced systems and the new division is aligned with these requirements.

ASPHALT TESTING

75

Determination of asphalt mix composition

Automatic closed system asphalt analyser	326
Asphalt binder analyser by ignition method	328
Automatic bitumen extractor	329
Filterless centrifuges	330
Centrifuge binder extractors	331
Hot methods binder extractors	332
Binder recovery apparatus	333
Large vacuum pycnometers	334
Bottle rolling machine	336
Drainage basket	336
Digital asphalt thermometers	336
Solvent recovery units	337
Fume exhaust cupboard	337

76

Marshall stability and Indirect tensile testing apparatus

Marshall impact automatic compactors	338
Marshall hand compactor assembly	338
Marshall compression testers	340
Marshall accessories	341
Multispeed compression testers	342
Uniframe electromechanical universal tester	342
Water baths	343
Vibrating hammer	344
PRD split mould	344
Duriez compression test sets	344

77

Asphalt sample preparation

Automatic laboratory mixers	346
Planetary mixers	347
Slab compactors	348
Asphalt prism shearbox compactor	350
Asphalt saws	352
Asphalt core drill	354

78

Rheological properties of bituminous mixtures

Galileo gyratory compactors	356
Gyrocomp gyratory compactor	358
Internal angle measurement apparatus, IIs	361
DWT Double wheel trackers:	362
-Hamburg AASHTO	363
-Dry EN	363
-Universal AASHTO-EN	363

79

IPC Global Dynamic testing

UTM Universal Testing Machines	364
Modular asphalt testers	368
Test accessories	370
4PB Servo-pneumatic 4 point bender apparatus	373
SCB tester	373
IMACS2 and UTS Neutron	375

80

Road quality testing

Asphalt permeability apparatus	376
Particle loss and resistance to fuel (Los Angeles machine)	376
Skid resistance and friction tester	377
Accelerated polishing machine	377
Bulk density of asphalt	377
Indentation penetrometer	378
MOT Straightedge	379
Travelling beam device	379
Vialit plate for adhesion test	379
Benkelman beam apparatus	380
Sand patch apparatus	380
Rate of spread apparatus	381
Slurry seal mixture test apparatus	381
Sand density cone and tamper	381



Automatic Closed-System Asphalt Analyzer

75-PV50A15



For the quantitative determinations of bitumen in hot-mixed paving mixtures for specification acceptance, service evaluation, control and research.



This is one of the many **ADVANCED** products of **CONTROLS** Group range.

To get more information visit www.controls-group.com or link directly to the QRCode

PAVELAB50

STANDARD

► ASTM D8179 ► EN 12697-1

Operating principle

The asphalt sample (maximum 3.5 kg) is placed in a washing drum lined with a sintered multilayer mesh and it is fitted into the washing chamber. Bitumen and filler are separated from the sample by washing with solvent and ultrasonic motion. The mixture of filler/bitumen/solvent is then centrifuged and the filler is separated. The aggregates and filler are dried by forced air circulation and the residue of solvent recovered by condensation.

The remaining bitumen/solvent solution is distilled and separated in two different tanks. Part of the bitumen/solvent solution can be drained off before distillation and connected to a flask for use with a rotary evaporator to recover a bitumen sample for other tests. The clean distilled solvent is recycled for other extractions.

The Pave Analyzer shall be connected to a suitable water cooling unit to feed the three different cooling coils of the apparatus.

MAIN FEATURES

- » Fully automatic test cycle:
 - Washing of the asphalt sample (up to 3.5 kg) with solvent and ultrasonic motion, with simultaneous heating and rotation of the drum lined with screening mesh
 - High speed extraction centrifuge for separation of filler from binder solution
 - Condensation of solvent vapour in a stainless steel tank including cooling coil
 - Automatic recovery of solvent by a continuous distillation process
 - Easy binder recovery for further tests such as penetration, softening point, etc.
 - Fast connection for rotary evaporator flask available as an option
- Extraction time reduced to approx. 55 minutes (including drying)
- » No toxic fumes in the laboratory, conforming to latest anti-pollution requirements
- » 7" touchscreen swinging panel
- » Version incorporating a balance for an accurate measurement of asphalt sample (10 Kg \pm 0.1 g) also available
- » High extraction capacity: up to 300 g of filler for each extraction
- » Automatic sample drying after extraction
- » Silent operation



Automatic closed-system asphalt analyzer with open chambers



Water cooling system. (Accessory)



7" touchscreen swinging panel displays the operating stage and recorded data.



Placing the centrifuge cup into the centrifuge unit



Introduction of the washing drum



Detail of fast connection for Rotary evaporation flask, for bitumen solution sampling. (Accessory)

BITUMAX Asphalt binder analyzer by ignition method

STANDARD

► EN 12697-39 ► ASTM D6307 ► AASHTO T308/TP53

75



The Asphalt binder analyzer essentially consists of a high precision apparatus combining an ignition oven to a continuous weighing system to monitor the loss of weight of the asphalt sample and to automatically determine, at the end of the test, the binder content and percentage. An independently controlled auxiliary afterburner chamber significantly reduces the furnace emissions.

The Analyzer is supplied complete with double sample basket/safety cover, extraction fork and 3 meters of metal exhaust pipe.

Specifications

- 240 x 128 pixel large graphic display
- Weighing system 10000 g capacity, 0.1 g resolution
- High quality stainless steel internal chamber
- Sample size up to 4500 g for a more representative test result
- Maximum power rating: 10 kW
- Holding power during the test: 3.5 kW
- Safety features: automatic door lock during the test even if the power is interrupted; Door closure is automatically monitored before the test starts

Overall dimensions:

- width: 640 mm
- depth: 900 mm
- height (without external pipe): 960 mm
- height (with external pipe): 1060 mm
- Weight (without accessories): 155 Kg approx

MAIN FEATURES

- » Full automatic test cycle with simultaneous display of all test parameters, including weight loss and %
- » High efficiency heating system with additional afterburner for complete combustion of exhaust fumes, conforming to CE prescriptions
- » PID closed loop temperature control
- » Built in weighing system
- » Test time reduced to 30-40 minutes
- » Test performance menu comprising the simultaneous display of all test data
- » Internal database, up to 100 tests. Each test can be displayed and printed or sent to PC by the RS 232 port

75-PV0008

Asphalt binder analyzer by the ignition method. Complete with double sample basket/safety cover, extraction fork and 3 meters of metal exhaust pipe.
380 V, 50 Hz, 3 ph

75-PV0008/Z

As above but 220 V, 60 Hz, 3 ph

Accessories

75-PV0008/5

Metal stand

75-PV0008/10

Face shield

75-PV0008/12

Safety cover for sample basket. Bench mounting

75-PV0008/14

Additional double sample basket

75-PV0008/2

Auxiliary top pan digital balance, 10.000 g capacity, 0.1 g sensitivity, for connection to Asphalt binder analyzer via the RS 232. 230 V, 50-60 Hz, 1 ph

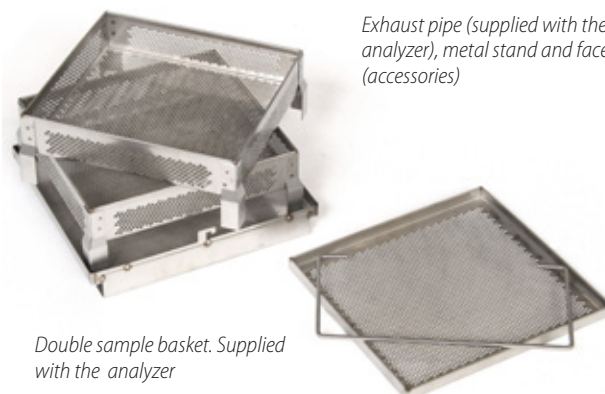
```
*****
Controls
Ignition Machine 88008
*****
11/11/88      18:02:23
Record n.      002
ID Test:       0000000000
Operator:      OPERATORE1
*****
Tray weight:   3546.8g
Sample wt. :   1428.2g
Combined wt:   4974.2g
*****

TEST RESULTS
Test time :    49min
Final weight   1361.8g
Weight loss:   66.4g
% Wt. loss :   4.65%
% bit.on aggr. 4.876%
Corr. Factor:  0.00%
Notes :-----
Notes+:-
*****
```

Example of printed report



Exhaust pipe (supplied with the binder analyzer), metal stand and face shield (accessories)



Double sample basket. Supplied with the analyzer

Automatic bitumen extractor

STANDARD

► ASTM D2172 ► EN 12697-1



Used for separation and extraction of bitumen by use of perchloroethylene or trichloroethylene solvents and sieving, for the separation of filler by centrifuge action and for the recovery of solvent material. The complete cycle is carried out automatically.

The basic machine comprises:

- A sieving unit with solvent spraying nozzle to separate and wash out the asphalt sample capacity 7 sieves 200 mm diameter.
- A filterless centrifuge to separate the filler from the solvent and bitumen solution.
- A solvent recovery unit to recover the solvent.

75-B0005 model includes the following parts:

- 200 mm diameter stainless sieve 75 µm op., 250 µm op., 710 µm op., 2 mm op.
- 200 mm diameter sieve frame only
- 200 mm diameter sieve pan
- O-ring gaskets for above

-Overall dimensions of the testing unit: 1200x650x1200 mm approx.

-Weight approx.: 170 kg

MAIN FEATURES

- » Fully automatic testing cycle:
 - Sieving
 - Centrifuge extraction
 - Solvent recovery
- » Conforms to latest anti-pollution requirements
- » Ideal for mastic asphalt
- » Big reduction of toxic fumes in the laboratory
- » Maximum quantity of asphalt per extraction: 3.5 kg
- » High extraction capacity: up to 400 g of filler per test
- » Sensible reduction of extraction time
- » Avoids solvent handling by the operator
- » Low quantity of solvent material used and sensible reduction of extraction cost
- » Use of perchloroethylene as solvent
- » Maximum solvent recovery capacity: 40 to 50 l/h

75-B0005/A

Automatic binder extraction unit, supplied without sieves. 380 V, 50 Hz, 3 ph

75-B0005/AZ

As above but 220 V, 60 Hz, 3 ph

75-B0005

Automatic binder extraction unit complete with four 200 mm diameter test sieves: 0.075, 0.250, 0.710 and 2 mm openings. Conforming to EN 12697-1 and ASTM D2172. 380 V, 50 Hz, 3 ph

Accessories and spares

75-B0005/I

Spare stainless cup for centrifuge

15-D2330/J

200 mm diameter stainless sieve 75 µm op.

15-D2275/J

200 mm diameter stainless sieve 250 µm op.

15-D2230/J

200 mm diameter stainless sieve 710 µm op.

15-D2185/J

200 mm diameter stainless sieve 2 mm op.

5-B0005/2

Spare lining paper for centrifuge cup. Pack of 100

75-B0005/8

O-ring gasket. Pack of 10

15-D2001/J

200 mm diameter sieve frame only

Cabinet with aspirator

75-B0005/50

Cabinet with aspirator for Automatic extraction unit. 230 V, 50 Hz, 1 ph.

Designed to house the extraction unit. Including wheel mounted carriage for easy removal of the extraction unit, fit with electric aspirator and roof opening with basket for activated charcoal. The use of this cabinet is recommended to minimize the diffusion of toxic solvents in the laboratory.

>Overall dimensions (wxdxh):

1635x920x2300 mm

>Weight approx.: 200 kg



Filterless centrifuge binder extractors

STANDARD

▶ ASTM D1856 ▶ EN 12697-1 ▶ AASHTO T170 ▶ AASHTO R59

75



75-B0024/N with sieves

Used for rapid filterless separation of filler (ash) from binder solution coming, for instance, from Wire mesh extractor model 75-B0015. The centrifuge can also be used for binder recovery from an asphalt sample previously disintegrated in solvent and poured into the funnel fit with 200 mm diameter test sieves to gradually separate the aggregates.

The test is carried out by pouring the solvent from the top funnel into the rotating aluminum cup. Due to the centrifugal effect, the liquid spreads on the wall and moves upwards, leaving mineral particles in the cup whilst the liquid is discharged outside through the outlet tubing. The cup should be internally lined with paper for a better and complete removal of filler. See accessories: 75-B0005/2.



75-B0024/B

MAIN FEATURES

- » 11000 rpm maximum speed with continuous flow
- » Filterless method assures complete filler recovery
- » Automatic ramp and pre-set speed control
- » Two models available: 75-B0024/N for filler extraction up to 100 g per test and 75-B0024/B for filler extraction up to 400 g per test
- » Up to 100 g or 400 g can be extracted per test

Specifications

Models 75-	B0024/N	B0024/B
Max. quantity of filler, g	50-100	400
Cup dim. Mm	Dia. 70x190	Dia. 122x211
Max. speed rpm	11000	11000
Power, W	550	1000
Sieves included	See accessories	0.075, 0.25, 0.71, 2 mm
Overall dim. mm (lxwxh)	500 x 370 x 850	560 x 640 x 1200
Weight approx., kg	55	100

75-B0024/N

Continuous flow filterless centrifuge, 70 mm **diameter** cup. 230 V, 50 Hz, 1 ph.

75-B0024/NY

As above but 220 V, 60 Hz, 1 ph.

75-B0024/NZ

As above but 110 V, 60 Hz, 1 ph.

75-B0024/B

Continuous flow filterless centrifuge, 122 mm diameter cup, complete with four 200 diameter sieves, openings 0.075, 0.250, 0.710, 2.00 mm. 380 V, 50 Hz, 3 ph.

75-B0024/BZ

As above but 220 V, 60 Hz, 3 ph

15-D2275/J

200 mm diameter ISO test sieve, 250 µm opening

15-D2230/J

200 mm diameter ISO test sieve, 710 µm opening

15-D2185/J

200 mm diameter ISO test sieve, 2 mm opening

Note: the EN standard require 63 µm and 2 mm opening sieves.
The ASTM standards require 75 µm and 150 µm opening

Lining paper

75-B0005/2

Lining paper for 75-B0024/N and 75-B0024/B series centrifuges. Pack of 100

ACCESSORIES AND SPARES

Accessories

Test sieves

15-D2335/J

200 mm diameter ISO test sieve, 63 µm opening

15-D2330/J

200 mm diameter ISO test sieve, 75 µm opening

15-D2300/J

200 mm diameter ISO test sieve, 150 µm opening

Spares

75-B0024/1

Spare aluminum cup diameter 70x190 mm for 75-B0024/BN series centrifuges.

75-B0005/1

Spare stainless steel cup diameter 122x211 mm for 75-B0024/B centrifuge.

Centrifuge binder extractors

STANDARD

► ASTM D2172 ► AASHTO T164-A ► EN 12697-1



75-B2212 to 75-B2314



75-B2222, 75-B2322 Explosion proof models

The centrifuges are used for the determination of bitumen percentage in bituminous mixtures. All models comprise a removable precision-machined rotor bowl housed in a cylindrical aluminum box. The rotating unit is suspended on the base by four calibrated springs, which assure a perfect stability all over the test.

All models are fit, for emergency use, by a hand brake system. The control panel includes: Start/Stop button, speed control knob, and digital display.

Two capacities and two versions available:

- Standard 1500 and 3000 g capacity (75-B2212, 75-B2214; 75-B2312, 75-B2314)
- Explosion proof 1500 and 3000 g capacity (75-B2222; 75-B2322)

The standard models can be upgraded with an electromagnetic system to prevent the opening of the cover during rotation. This option (see code 75-B2210/UP1) is applicable on standard models only and has to be factory installed.

- AC drive motor (inverter), 550 W
- Overall dimensions (lxdxh): 539x406x509 mm
- Weight approx.: 54 kg

MAIN FEATURES

- » Speed control up to 3600 rpm at 50 or 60 Hz by AC drive (inverter)
- » Can be set for the automatic speed ramp up to 3600 rpm or to any intermediate speed
- » Electric brake
- » Stable and silent throughout the test
- » Electronic control and digital display monitoring the frequency (proportional to the speed)
- » CE version available with electromagnetic arrangement to prevent the opening of cover during rotation
- » Explosion proof option
- » Supplied complete with 100 filter discs
- » Interchangeable rotating bowl (1500 or 3000 g capacity)

Standard versions

75-B2212

1500 g capacity digital centrifuge extractor. Speed control up to 3600 rpm. Complete with 100 filter discs. 230 V, 50-60 Hz, 1 ph

75-B2214

As above but 110 V, 60 Hz, 1 ph

75-B2312

3000 g capacity digital centrifuge extractor. Speed control up to 3600 rpm. Complete with 100 filter discs. 230 V, 50-60 Hz, 1 ph

75-B2314

As above but 110 V, 60 Hz, 1 ph

Explosion proof versions

75-B2222

1500 g capacity digital centrifuge extractor, explosion proof version. Speed control up to 3600 rpm. Complete with 100 filter discs. 230 V, 50-60 Hz, 1 ph

75-B2322

As above but 3000 g capacity 230 V, 50-60 Hz, 1 ph

ACCESSORIES, SPARES AND UPGRADING

75-B0022/1

Filter discs for 1500 g capacity centrifuges. Pack of 100

75-B0023/1

Filter discs for 3000 g capacity centrifuges. Pack of 100

75-B0022/2

Spare bowl and cover for 1500 g capacity centrifuges

75-B0023/2

Spare bowl and cover for 3000 g capacity centrifuges

75-B2210/UP1

Electromagnetic system to prevent the opening of the cover during rotation conforming to CE directive. Suitable for 75-B2212 and 75-B2312 standard models only. To be factory installed and specified at time of order.



75-B2210/UP1



75-B0022/2, 75-B0023/1

Hot methods binder extractors for the quantitative determination of bitumen in hot-mix mixtures and pavement samples

STANDARD

► EN 12697-1 ► Clause B.1.2

75-B0015

HOT EXTRACTION APPARATUS: WIRE MESH FILTER METHOD



75-B0015 with 10-D1402/D and 75-B0015/6

The apparatus consists of a glass jar with a wire basket suspended in it by a supporting ring, and a metal condenser. The filler, or ash, passing through the 75 µm wire basket has to be separated from the bitumen/solvent solution using an appropriate centrifuge extractor (see model 75-B0024/N page 330). The solvent used can then be recovered using the solvent recovery unit (see page 337). The apparatus has to be used with a hot plate, such as our model 10-D1402/D, and an aluminum disk 75-B0015/6 for better heat distribution.

- Maximum basket capacity: 3 kg
- Overall dimensions: 165 mm diameter x 335 mm height
- Weight: 2.8 kg (approx.)

Accessories

10-D1402/D

Hot plate, 185 mm diameter 230 V, 50-60 Hz, 1 ph.

10-D1402/DZ

Same as above but 110 V, 60 Hz, 1 ph.

75-B0015/6

Aluminum disk, 160 mm diameter.

STANDARD

► ASTM D2172

REFLUX EXTRACTORS



75-B0013/A with 10-D1402 and 75-B0015/6, 75-B0014/A

These extractors consist of two wire mesh cones with interlocking frames, a cylindrical glass jar and a water condenser with inlet/outlet tubes. Two models are available with 1 or 4 kg capacities (75-B0013/A and 75-B0014/A).

They have to be used with a hot plate and an aluminum disk. Filter paper is not included and has to be ordered separately (see Accessories).

The solvent used can be recovered using the solvent recovery unit (see page 337).

Overall dimensions (h x diameter):

- 75-B0013/A, 465 x 150 mm
- 75-B0014/A, 510 x 265 mm
- Weight (approx.): 3/9 kg

75-B0013/A

Reflux bitumen extractor, 1000 g capacity

75-B0014/A

Reflux bitumen extractor, 4000 g capacity

Accessories

10-D1402/D

Hot plate, 185 mm diameter 230 V, 50-60 Hz, 1 ph.

10-D1402/DZ

Same as above but 110 V, 60 Hz, 1 ph.

75-B0015/6

Aluminum disk, 160 mm diameter.

75-B0013/4

Filter paper, 300 mm diameter, for 75-B0013/A. Pack of 50.

75-B0014/4

Filter paper, 400 mm diameter, for 75-B0014/A. Pack of 50.

STANDARD

► EN 12697-1 Clause B.1.1

► EN 12697-14

75-B0016

HOT EXTRACTOR APPARATUS: PAPER FILTER METHOD

It is supplied complete with a pack of 100 filter papers (Grade No.5, 400 mm diameter) and has to be used with a suitable hot plate (eg. 10-D1402/D), which is not included.

- Overall dimensions (assembled): 1000 x 500 x 500 mm
- Weight: 25 kg (approx.)



75-B0016

75-B0018

STANDARD

► EN 12697-1

KUMAGAWA EXTRACTORS

It consists of a round glass flask, a cooling unit, a Dean-Stark receiver, and an electric heating mantle with regulator and fittings. Two models are available with 1 or 2 liter capacities. The filtering cartridges have to be ordered separately - see Accessories.

- Weight: 15 kg (approx.)

75-B0018

Kumagawa extraction apparatus, 1 liter capacity. 230 V, 50-60 Hz, 1 ph.

75-B0018/A

Kumagawa extraction apparatus, 2 liter capacity. 230 V, 50-60 Hz, 1 ph.

Accessories

75-B0018/1

Filtering cartridges, 58 mm diameter x 170 mm, for 75-B0018 extractor. Pack of 25.

75-B0018/A1

Filtering cartridges 80 mm diameter x 200 mm, for 75-B0018/A extractor. Pack of 25.

Binder recovery apparatus

STANDARD

- ▶ EN 12697-3 ▶ ASTM D5404
- ▶ AASHTO TP2 ▶ EN 12607-3

ROTARY EVAPORATOR



The apparatus is used for the recovery of soluble bitumen from bituminous pavement materials in a form suitable for further testing.

For the test sets conforming to EN and ASTM versions, see accessories.

- Complete with 1000 ml capacity glass flat evaporating balloon
- Rotation speed: adjustable from 20 to 270 rpm
- Temperature range: from + 20 to + 210°C
- Power: 1300 W
- Weight approx.: 27 kg

The Rotary evaporator can accept evaporating balloons up to 5000 m capacity

75-PV1650

Rotary evaporation apparatus. 230 V, 50-60 Hz, 1 ph

75-PV1650/Z

As above but 110 V, 60 Hz, 1 ph



86-D2004/1D

75-B0165/6

Accessories

EN 12697-3 accessories

75-B0165/5

Diathermic oil. 18 kg can

75-B0165/4

Glass flask 1 liter capacity with rubber stopper

75-B0165/3

Glass tubing with three way valve and transparent flexible hose for solution intake

86-D2003

Dual stage high vacuum pump. 230 V, 50 Hz, 1 pf. (For 110 V, 60 Hz ask model 86-D2003/Z)

86-D2004/1D

Vacuum regulator with digital gauge, 0.001 bar resolution. 230 V, 50-60 Hz, 1 ph. (For 110 V, 60 Hz ask model 86-D2004/1DZ)

86-D2064

Rubber tube for vacuum, 6.5/16.5 int./ ext. mm diameter, 2 m

ASTM D5404, AASHTO TP2 accessories

75-B0165/5

Diathermic oil. 18 kg can

75-B0165/2

Glass flat evaporation balloon 2000 ml capacity

75-B0165/3

Glass tubing with three way valve and transparent flexible hose for solution intake

86-D2003

Dual stage high vacuum pump. 230 V, 50 Hz, 1 pf. (For 110 V, 60 Hz ask model 86-D2003/Z)

86-D2004/1D

Vacuum regulator with digital gauge, 0.001 bar resolution. 230 V, 50-60 Hz, 1 ph. (For 110 V, 60 Hz ask model 86-D2004/1DZ)

86-D2064

Rubber tube for vacuum, 6.5/16.5 int./ ext. mm diameter, 2 m

75-B0165/6

Flow control device and flowmeter to monitor the CO₂ flow rate up to 1000 ml/min

Note: for more information on vacuum pumps and vacuum regulator see page 431

STANDARD

- ▶ ASTM D1856 ▶ CNR 133
- ▶ AASHTO T170
- ▶ AASHTO R59

BINDER RECOVERY APPARATUS BY ABSON METHOD



Used for recovering the asphalt (bitumen) from a solution of a previous extraction. The apparatus consists of a distillation assembly including: Extraction flasks, Glass tubing, Inlet aeration tube, Electric heating mantle, Water-Jacketed condenser, Thermometer, Gas flowmeter, Stands and clamps

75-B0026

Distillation assembly for recovery of binder from solution by Abson method. 230 V, 50-60 Hz, 1 ph

75-B0026/Z

As above but 110 v, 60 Hz, 1

STANDARD

- ▶ EN 12697-1

BINDER RECOVERY APPARATUS BY VACUUM



Used to remove the solvent from the binder/solvent solution in order to determine directly the total content binder in the aggregate/binder mixtures.

The apparatus includes a vacuum pump with vacuum regulator, thermostatically controlled water bath, and two flat-bottomed flasks 250 ml capacity, fittings and connections.

- Power rating: 1380 W (1200 water bath, 180 vacuum pump)
- Weight approx.: 23 kg

75-B0025/B

Binder recovery apparatus, vacuum pump method. 230 V, 50-60 Hz, 1 ph

75-B0025/BZ

As above but 110 V, 60 Hz, 1 ph

Determination of maximum density

STANDARD

- ▶ EN 12697-5 ▶ ASTM D2041
- ▶ AASHTO T209

75

LARGE VACUUM PYKNOMETERS

These pyknometers are for determining the theoretical maximum specific gravity of uncompacted bituminous paving mixtures. They can also be used for the calculation of the percentage of air voids in compacted bituminous mixtures and the amount of bitumen absorbed by the aggregates. We offer three models, all of which are fitted with a vacuum gauge, a coupling for vacuum application and a vent valve:

- 75-D1122, heavy duty version, 10 liter capacity, specially designed for this application, made from robust transparent plastic. Suitable for paving mixture samples up to 6 kg, with a maximum aggregate size of 50 mm (2").
- 75-D1123/C, 4.5 liter capacity, made from aluminum with a transparent lid. Suitable for paving mixture samples up to 2 kg, with a maximum aggregate size of 19.1 mm (¾").
- 75-D1123/D, 10 liter capacity, made from plastic with a transparent lid. Suitable for paving mixture samples up to 6 kg, with a maximum aggregate size of 50 mm (2").

The 10 liter models (75-D1122 and 75-D1123/D) can also be used as vacuum bells for small glass pyknometers with capacities up to 2000 ml.

All the above models have to be used with the 15-D0407/C vibro-deaerator which gently shakes the pyknometer to evacuate the air. A vacuum pump with de-airing system is also required to complete the apparatus. For more information see page 431 and 432 . These are not included and have to be ordered separately - see Accessories.



75-D1123/D

Product code	75-D1122	75-D1123/C	75-D1123/D
Capacity, L	10	4.5	10
Maximum sample weight, kg	6	2	6
Maximum aggregate size, mm	50 (2")	19.1 (¾")	50 (2")
Internal dimensions, mm (diameter x height, approx.)	280 x 186	191 x 152	273 x 337
Overall dimensions, mm (diameter x height, approx.)	300 x 450	200 x 160	300 x 360
Weight, kg (approx.)	6.7	3	5

75-D1122
Large, heavy duty vacuum pyknometer, 10 liter capacity.

75-D1123/C
Vacuum pyknometer, 4.5 liter capacity.

75-D1123/D
Vacuum pyknometer, 10 liter capacity.



75-D1123/C



75-D1122 with de-airing vacuum system, including Vacuum pump 86-D2003, Air drying unit 86-D2005 filled with 86-D0819 Silica gel desiccant, and two rubber tubes 86-D2064.

Accessories

Electromagnetic vibro-deaerators

15-D0407/C

Electromagnetic vibro-deaerator, complete with timer. 230 V, 50-60 Hz, 1 ph.
Power: 400 W
Overall dimensions: 496 x 406 x 600 mm (w x d x h) approx.
Weight: 30 kg (approx.)

15-D0407/CZ

As above but 110 V, 60 Hz, 1 ph.

15-D0407/B1

Device for clamping pyknometers to the electromagnetic vibro-deaerator.

Vacuum pump and de-airing system

86-D2003

Vacuum pump, double stage. 230 V, 50-60 Hz, 1 ph.
(For 110 V / 60 Hz, ask for model 86-D2003/Z.)

86-D2005

Air drying unit.

86-D0819

Silica gel desiccant with indicator, 1 kg.

86-D2064

Rubber vacuum hose (two pieces required).

For more information on the vacuum pump and de-airing system see Vacuum pumps, page 431 and 432.



15-D0407/B1



75-D1122 fitted to the 15-D0407/C with the device 15-D0407/B1



75-D1123/D fitted to the 15-D0407/C with the device 15-D0407/B1

STANDARD

► EN 12697-11

BOTTLE ROLLING MACHINE

This machine is used for determining the affinity between aggregate and bitumen. The result is expressed by visual registration of the degree of coverage on uncompacted bitumen-coated mineral aggregate particles after the influence of mechanical stirring action in the presence of water.

The machine is designed to accommodate three test bottles (model 75-B0011/A1). A glass rod, 75-B0011/A2 is also required to complete the system. These items are not included and have to be ordered separately - see Accessories.

Rotating speed: adjustable up to 80 rpm

Dimensions: 380x300x160 mm (wxdxh)

Weight: 10 kg (approx.)

75-B0011/A

Bottle rolling machine. 230 V, 50 Hz, 1 ph.

Accessories

75-B0011/A1

Test bottle, Pyrex glass, 86 mm diameter x 176 mm high, 34 mm neck diameter.

75-B0011/A2

Glass rod, 6 mm diameter, one end fitted with a 30 mm long rubber tube.



75-B0011/A with 3 test bottles
75-B0011/A1

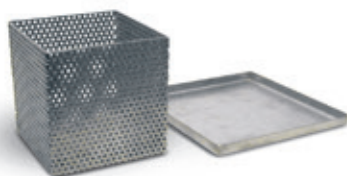


Test bottles 75-B0011/A with
75-B0011/A2 glass rod

STANDARD

► EN 12697-18

DRAINAGE BASKET



75-B0019/A and 75-B0019/B

The drainage basket and metal tray are used for determining binder drainage of bituminous mixtures, estimating the binder drainage for different binder contents, and evaluating the effect of varying the fine aggregate quantity or anti-draining additive content.

The basket is made of stainless steel perforated plate with 3.15 mm diameter holes and has four feet.

Weights (approx.):

75-B0019/A Drainage basket
360 g;

75-B0019/B Metal tray 210 g.

75-B0019/A

Drainage basket, 100 x 100 x 100 mm.

75-B0019/B

Metal tray, 160 mm sq., 10 mm deep.

STANDARD

► EN 12697-13

DIGITAL ASPHALT THERMOMETER

This microprocessor-controlled digital thermometer can be used for various field and laboratory applications in road and concrete testing. It is dual range (reading in both °C and °F), high resolution and is housed in a rugged ABS case. The highest and lowest temperatures measured in a test cycle can be recalled by simply pressing a button.

It is supplied without probes, which have to be ordered separately according to the requirements of the application. For asphalt temperature measurements, we recommend the following probes:

- 82-D1229/1 Penetration probe, 120 mm long, 3 mm diameter
- 82-D1229/2 Surface probe
- 82-D1229/5 Penetration probe, 220 mm long, 5 mm diameter
- 82-D1229/5S Penetration probe 300 mm long, 5 mm diameter conforming to NF
- 82-D1229/6 T bar probe, 650 mm long, conforming to BS 594

82-D1229

Digital thermometer, measuring ranges -50 to +199 °C and +200 to +1350 °C resolution: 0.1 °C up to 199.9 °C and 1 °C over.



82-D1229 with probes

Solvent recovery apparatus

SOLVENT RECOVERY UNIT



Used to recover the solvent liquid after its use for the extraction tests. This unit has been designed to recover non-flammable solvents and consists of two stainless steel chambers, one for dirty solvent and the other for the cleaned solvent. An electric heater in the left-hand chamber distils the solvent, which then passes through a water cooling system and drops into the second chamber ready for re-use in a new test. Once the process is completed, a temperature switch automatically stops the heating elements. Supplied complete with 10 m plastic tube, tube clamps, sieve insert 0.6 mm opening and one lid. Particularly useful to recover solvent used with the Paper filter extractor, Wire mesh extractor, Kumagawa extractor, Reflux extractors, Filterless centrifuge binder extractors.

- Maximum temperature: 150°C
- Power: 1200 W
- Overall dimensions: 400x320x650 mm
- Weight approx.: 17 kg

75-B0027/A

Solvent recovery unit, 10 l/h. 230 V, 50-60 Hz, 1 ph

FUME EXHAUST CUPBOARD WITH ASPIRATOR

The extraction method of the EN 12697-1 and corresponding ASTM standards, often require toxic solvent (e.g. methylene chloride). This solvent is hazardous to health and is subject to occupational exposure limits as described in relevant legislation and regulations. This unit fully satisfies the EN requirements.

MAIN FEATURES

- » Double aspiration system, Class 1, certified conforming to EN 14175-2-3, Bureau Veritas
- » Activated charcoal filter for solvents
- » Electrical aspirator delivering up to 1350 m³/h
- » Waterproof illumination system
- » Stainless steel worktop 1200x750 mm, incorporating sink and bibcock
- » Front sash opening with counterweight
- » Electric control panel
- » Double current outlet
- » Base cabinet with two doors and two shelves
- » Overall dimensions (wxdxh): 1200x830x900+1600 mm
- » Weight approx.: 185 kg



75-D3521

Fume exhaust cupboard with aspirator and activated charcoal filter for solvents. Stainless steel worktop incorporating sink and bibcock. Base cabinet with two doors and two shelves. Certified to EN 14175-2-3 Bureau Veritas. 220/400 V, 50-60 Hz, 3 ph.

Marshall compaction

STANDARD

- ASTM D6926 ► EN 12697-10
- EN 12697-30

ASTM AND EN MARSHALL AUTOMATIC IMPACT COMPACTORS

The apparatus automatically compacts the sample and stops after the pre-set number of blows. The mould is held in position by a quick and practical clamping device. The trip mechanism is arranged so that the sliding hammer falls at the same distance for every blow. The compactor includes the laminate hardwood block and the EN version also includes a vibrated concrete base 450x450x200 mm.

All moving parts are protected with safety guard, which automatically stops the compactor when opened, and the control panel is fitted with an emergency stop button, all conforming to CE prescriptions.

The compactor can be factory installed inside the 76-B4000/CB Noise reduction and CE security cabinet. See accessories.



Common FEATURES

- » Automatic control
- » Complete protection for operator safety to CE prescriptions
- » High resolution graphical display 128x80 pixel and 6 key membrane keyboard
- » Improved rammer lifting device, constant height fall, modern and reliable design
- » User friendly rammer replacement system
- » Noise reduction and security cabinet available on request
- » Power rating: 800 W
- » Blows frequency: 50 blows in 55/60 s
- » Sliding mass weight: 4535 ± 9 g
- » Total hammer weight: 7850 ± 50 g
- » Free fall height: 457 ± 3 mm
- » Laminated hardwood block: 200x200x450 mm, density 670 to 780 kg/m³
- » Concrete base (EN version only, included): 450x450x200 mm
- » Overall dimensions: EN version 540x556x2066 mm, ASTM version 385x470x1867mm
- » Weight approx.: EN version 270 kg, ASTM version 150 kg

STANDARD

- ASTM D6926

76-B4442

Marshall impact automatic compactor for 101.6 mm diameter (4") specimens conforming to ASTM D6926. 230 V, 50 Hz, 1 ph

76-B4443

Same as above but 220 V, 60 Hz, 1 ph

76-B4444

Same as above but 110 V, 60 Hz, 1 ph

STANDARD

- EN 12697-10 ► EN 12697-30

76-B4432

Marshall impact automatic compactor for 101.6 mm diameter specimens. Conforming to EN Standard 230 V, 50 Hz, 1 ph

76-B4433

Same as above but 220 V, 60 Hz, 1 ph

76-B4434

Same as above but 110 V, 60 Hz, 1 ph

Accessories

76-B4000/CB

Noise reduction cabinet for automatic Marshall ASTM and EN compactors

The Marshall automatic compactors can be factory installed inside the cabinet which provides either the sound isolation (less than 78 dB) or operator safety conforming to CE prescriptions, as the machine automatically stops opening the door. The cabinet is delivered disassembled with instructions for the easy laboratory assembly.
-Dimensions: 850x670x2200 mm approx
-Weight approx.: 130 kg



EN and ASTM compactors. Detail of lifting mechanism.



EN and ASTM compactors. Detail of clamping mechanism



Noise reduction and security cabinet for automatic Marshall ASTM and EN compactors model 76-B4000/CB

STANDARD

- ASTM D6926 ► AASHTO T245
- ASTM D1559

MARSHALL HAND COMPACTION ASSEMBLY



The assembly consists of a wooden compaction pedestal, support rod to hold the hammer in a perpendicular position, compaction hammer and mould holder. All parts can be ordered individually.

76-B0058/AC

Manual Marshall compactor.

Spare parts

76-B0058/A

Compaction hammer for 4" samples.

76-B0059

Compaction pedestal.

76-B0058/B

BS compaction pedestal

76-B0059/1

Hammer guide.

76-B0056/A

Compaction mould holder.



76-B0057, 76-B0057/B5, 76-B0059 with 76-B0056/A, 76-B0059

STANDARD

- ASTM D1559 ► AASHTO T245
- EN 12697-10 ► EN 12697-30
- ASTM D6926

MARSHALL COMPACTION MOULDS AND OTHER ACCESSORIES

All moulds are made from steel, protected against corrosion. They are specially made for use with the automatic compactors.

The three parts of the compaction moulds can be purchased individually. See spare parts. Conforming to ASTM D6926 (ex D1559), the compaction can also be performed manually.



76-B0057

Standard compaction mould, 101.6 mm diameter (4"), including base plate, mould body and filling collar, conforming to ASTM and EN standards

Mould parts

76-B0057/1

Base plate

76-B0057/A2

Mould body

76-B0057/A3

Filling collar

Other accessories

76-B0060

Paper discs, 101 mm diameter (4"). Fit the mould base before introducing the mixture. Pack of 1000.

76-B0057/B5

Extraction plate. For removing 101.6 mm (4") specimens



76-B0060, 76-B0057/B5

Accessories EN 12697-30

76-B0042/1

Steel block 100 mm diameter 50 mm high. For the initial heating of the compaction hammer.

76-B0043/4

Storage plate with six 100 mm diameter discs. To cool the specimens in air.

Marshall stability, Water sensitivity, Indirect tensile strength

THE MARSHALL TESTERS

Under this denomination we offer various testers which satisfy one or more Standards as follows:

Standard	Title	Tester*	
ASTM D1559	Resistance of plastic flow of bituminous mixtures (1981)	76-B0030	34-V1072
		76-B0030/A	34-V1172
		76-B3802	70-T1082 70-T1192
ASTM D5581	Resistance of plastic flow of bituminous mixtures on 6" diameter specimens Standard test method for Marshall stability and flow Standard test method for Indirect Tensile (IDT) strength Cracking tolerance index by indirect tensile	76-B3802	70-T1082
ASTM D6927		34-V1072	70-T1192
ASTM D6931		34-V1172	
ASTM D8225			
EN 12697-12	Determination of the water sensitivity	76-B3802	70-T1082
EN 12697-23	Determination of the indirect tensile strength	34-V1072	70-T1192
EN 12697-34	Marshall test	34-V1172	

*With the suitable accessories

STANDARD

► ASTM D1559 ► ASTM D5581 ► AASHTO T245 ► ASTM D6927

MARSHALL COMPRESSION TESTER ANALOG VERSION



MAIN FEATURES

- » 50 kN maximum capacity, suitable for testing 4" and 6" diameter specimens
- » All the load rings are provided with 0.001mm high resolution dial gauge, assuring a strict conformity to the standards.
- » Platen speed 50.8 mm/min

76-B0030/A with 76-B0033 and 76-B0034

A bench mounted compression frame with motor and worm gear housed within the base unit. The machine is supplied complete with load ring, 30 kN capacity, incorporating stem brake feature to hold the maximum reading. For testing 6" diameter (152.4 mm) specimens, the 82-T1009/F load ring should be used instead of the 30 kN fit on the machine. See accessories.

The stability mould and flow meter have to be ordered separately. See accessories.

The machine is also available in the frame-only version (76-B0030), for alternative configuration.

- Power rating: 736 W
- Overall dimensions (h x l x d): 1028x392x560 mm
- Weight approx.: 85 kg



76-B0030/A

Marshall compression testing machine. Complete with load ring 30 kN capacity with peak hold function, fitted with 0.001 mm resolution dial gauge (fully conforming to the standards) and compression device. 230 V, 50 Hz, 1 Ph

76-B0030/AY

Same as above but 220 V, 60 Hz, 1 ph

76-B0030/AZ

Same as above but 110 V, 60 Hz, 1 ph

Load frame only:

76-B0030

Marshall compression tester, 50 kN capacity 230 V, 50 Hz, 1 ph

76-B0030/Y

Marshall compression tester, 50 kN capacity 220 V, 60 Hz, 1 ph

76-B0030/Z

Marshall compression tester, 50 kN capacity 110 V, 60 Hz, 1 ph

Accessories to complete the 76-B0030 frames only

34-T0104/10

Compression device. To fit the load ring to press the stability mould

82-T1007/F

Load ring, 30 kN capacity, fitted with gauge 0.001 mm resolution, complete with stem brake feature to hold the maximum reading.

82-T1009/F

Load ring, 50 kN capacity, fitted with gauge 0.001 mm resolution, complete with stem brake feature to hold the maximum reading. (As alternative to 30 kN model)

Alternative configuration

82-T1007/FC

Load ring, 30 kN capacity, fitted with gauge 0.01 mm resolution, complete with stem brake feature to hold the maximum reading.

82-T1009/FC

Load ring, 50 kN capacity, fitted with gauge 0.01 mm resolution, complete with stem brake feature to hold the maximum reading. (as alternative to 30 kN model)

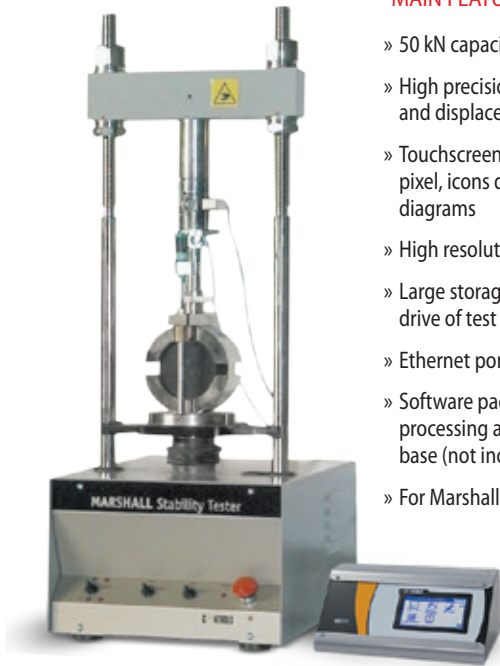
STANDARD

- ▶ ASTM D1559 ▶ ASTM D5581 ▶ ASTM D6927 ▶ ASTM D6931
- ▶ AASHTO T245 ▶ EN 12697-12 ▶ EN 12697-23 ▶ EN 12697-34
- ▶ AASHTO T283

MARSHALL COMPRESSION TESTER DIGITAL VERSION

MAIN FEATURES

- » 50 kN capacity
- » High precision strain gauge load cell and displacement transducer included
- » Touchscreen graphic display 240x128 pixel, icons driven showing figures and diagrams
- » High resolution: 132000 points
- » Large storage capacity on USB pen drive of test data downloadable to PC
- » Ethernet port for connection to PC
- » Software package available for data processing and print including data-base (not included)
- » For Marshall and Indirect tensile tests



The frame is identical to the 76-B0030/A version. The machine is fit with a precision strain gauge load cell and displacement transducer, both connected to the Digimax Touch data acquisition and processing system (which is part of the system) featuring a large display and standard software covering either the Marshall or the Indirect tensile test. For more details see PC software.

The machine can be completed with a PC software (see accessories) suitable for running CBR, Marshall, Indirect Tensile and universal load/displacement tests. Data is presented numerically and graphically in real time.

Note: For detailed and complete information concerning the Digimax TS Data acquisition and processing system, and 82-SW/CMU software see page 129

76-B3802

Marshall compression testing machine with digital control panel and readout unit, motorized ram, two-column structure and adjustable crossbeam, load cell 50 kN capacity, external displacement transducer 25 mm travel, compression device and connector between load cell and crossbeam. 230 V, 50 Hz, 1 ph

76-B3803

As above but 220 V / 60 Hz / 1Ph

76-B3804

As above but 110 V / 60 Hz / 1 Ph

Accessories (for all testers)

For Marshall test, ASTM/AASHTO and EN 12697-34

76-B0033/4

Stability mould for 4" diameter (101.6 mm) specimens

76-B0033/6

Stability mould for 6" diameter (152.4 mm) specimens to ASTM D5581

76-B0034

Flow meter (for use with the 76-B0030 and 76-B0030/A only)



76-B0033/C, 76-B0033

76-B0034

For indirect tensile test, EN 12697-12, EN 12697-23, ASTM 6931, ASTM D8225. AASHTO T283

76-B0078/F

Frame for tensile splitting device. To be completed with suitable pair of loading strips. Tensile splitting device for compacted bituminous samples up to 160 mm (6") diameter complete with loading strips for 150 mm diameter samples

76-B0078/F1

Pair of loading strips for 100 mm diameter samples

76-B0078/F2

Pair of loading strips for 150 mm diameter samples

76-B0078/F3

Pair of loading strips for 116 mm diameter samples



76-B0078/F with 76-B0078/F1 and 76-B0078/F2

Interlayer bonding. Shear bond test (Leutner Test).

EN 12697-48

76-B0033/E

Shear bond test apparatus, for subjecting 150 mm diameter samples to direct shear loading.

76-B0033/E1

Adaptor to test 100 mm diameter samples with shear bond test apparatus



Material on the basis of organic binders for road and airfield construction. (Russian Standard).

GOST 12801

76-B0033/D

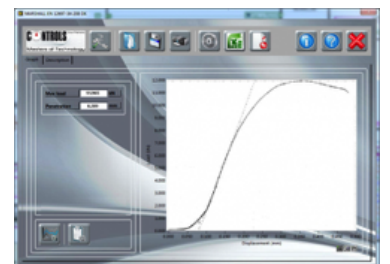
Stability head for 71.4 mm diameter specimens



PC software

82-SW/CMU

PC software for CBR, Marshall, Indirect tensile and universal tests. See page 125



Example of 82-SW/CMU software. Marshall test in progress

Marshall stability

Other testers to perform Marshall and Indirect tensile tests

MULTISPEED

COMPRESSION TESTERS

The ideal solution for Road testing laboratory. The 50 or 100 kN capacity and the fully variable test speed of 0.2 to 51 mm/min make it possible to perform not only the CBR and Marshall tests, but many other applications as for instance Indirect Tensile test, Quick Triaxial tests, Unconfined and Uniaxial soil testing and, in general, all tests to be performed under displacement control. Two versions available:

For complete and detailed information see page 126 or visit our website

MULTISPEED DIGITAL COMPRESSION TESTER

34-V1072

The machine can be equipped with analog or digital load/displacement measurement sys-

tems as well as with the specific accessories, to suit either the field or central laboratory requirement. The various test accessories and relevant Standards, are shown and listed on page 340, 341.

MULTISPEED AUTOMATIC UNIVERSAL TESTER WITH TOUCHSCREEN DIGITAL SPEED CONTROL AND DATA ACQUISITION

34-V1172

No external transducer is required for displacement measurement. The firmware allows performance of transducer calibrations and setting of up to 10 test profiles, saving data onboard. A real time test graph and transducer data are displayed on the touchscreen. The machine has built-in data acquisition with four channels dedicated to two strain gauge load cells and two potentiometric linear transducers; one of each can be used during the test.

UNIFRAME

70-T1182 and 70-T1192

Electromechanical Universal Testers, 50, and 100 kN capacity suitable for any kind of test that requires load and/or displacement control.

For complete and detailed information see page 318 and 320 or visit our website



34-V1072 With Marshall test accessories (Analog mode)



34-V1072 With Marshall test accessories (Digital mode)



MULTISPEED 34-V1172 equipped with Marshall digital testing accessories



Water baths

STANDARD

► EN 12697-34 ► ASTM D5581 ► ASTM D6927 ► AASHTO T245

Used to condition Marshall ($60 \pm 1^\circ\text{C}$) and other asphalt specimens (e.g. tar specimens at $37.8 \pm 1^\circ\text{C}$) in water. The water baths are available in four different dimensions: 30, 40 (with cooler unit), 56 and 110 liters capacity. Digital thermo-regulator and temperature display, internal and external case in stainless steel. Complete with perforated base shelf and cover. The water baths are available with or without continuous recirculating system (see technical specifications). The continuous recirculating water system ensures temperature uniformity. The larger model with recirculating system also responds to ASTM D5581 requirement to have a deeper bath for 6" samples.

Our product range also includes the model 65-D1409/A fitted with cooling unit with temperature range starting from 5°C , to satisfy EN 12697-23. This model is fully described on page 292



76-B0067/A 76-B0067/B

Code	76-B0066/A 76-B0066/B	76-B0067/A 76-B0067/B	76-B0067/C	65-D1409/A
Capacity	30 l	56 l	110 l	40 l
Marshall spec. capacity, appr.	12	20	30	15
Temp. Range, $^\circ\text{C}$	Ambient to 60	Ambient to 60	Ambient to 95	+5 to + 60
Accuracy, $^\circ\text{C}$	± 1	± 1	± 1	± 1
Power, W	1200	1200	2500	2000
Recirculating pump	76-B0066/B only	76-B0067/B only	yes	yes
Inside dim. Mm (w x d x h)	500 x 300 x 185	610 x 500 x 185	600 x 500 x 280	550 x 360 x 200
Outside dim.	640 x 340 x 240	650 x 540 x 240	816 x 547 x 600	830 x 480 x 950
Weight approx. kg	9.5	20	30	62



76-B0067/C, Circulating water bath, also suitable for Marshall specimens according to ASTM D5881 which need a deeper bath.

76-B0066/A

Digital water bath, 30 liters capacity
230 V, 50-60 Hz, 1 ph

76-B0066/AZ

As above but 110 V, 60 Hz, 1 ph

76-B0067/A

Digital water bath, 56 liters capacity
230 V, 50-60 Hz, 1 ph

76-B0067/AZ

As above but 110 V, 60 Hz, 1 ph

76-B0066/B

Digital recirculating water bath, 30 liters capacity
230 V, 50-60 Hz, 1 ph

76-B0066/BZ

As above but 110 V, 60 Hz, 1 ph

76-B0067/B

Digital recirculating water bath, 56 liters capacity
230 V, 50-60 Hz, 1 ph

76-B0067/BZ

As above but 110 V, 60 Hz, 1 ph

76-B0067/C

Digital recirculating water bath 110 liters capacity with PID thermoregulation, maximum temperature 95°C .
230V/50-60Hz/1Ph

76-B0067/CZ

As above but 110 V, 60 Hz, 1 ph

65-D1409/A

Circulating water bath with cooler unit, temperature range $+5$ to $+60^\circ\text{C}$ conforming to EN 12697-23. 230 V, 50-60 Hz, 1 ph

65-D1409/AZ

Same as above but 110 V, 60 Hz, 1 ph



76-B0066/A, 76-B0066/B



65-D1409/A

Vibration compaction hammer

STANDARD

- EN12697-9 ► EN 12697-10
- EN12697-32 ► EN 13286-4
- BS 1377:4 ► BS 1924:2

Used for the compaction of Proctor and CBR soil specimens. using the appropriate tamping foot it can also be used for compacting asphalt in the "Percentage refusal density test". See Vibrating hammer for PRD specimens.

The hammer is supplied without support frame and tampers which have to be ordered separately. See accessories.

- Overall dimensions (wxdxh): 130x530x380 mm
- Weight approx.: 6.8 kg

Ordering information

33-T8702/A

Vibrating hammer. 220-240 V, 50-60 Hz, 1 ph

33-T8702/AZ

Same as above but 110 V, 60 Hz, 1 ph

Accessories

33-T8702/FR

Supporting frame for vibrating hammer.

- Weight: 26 kg approx.

33-T8702/W

Extra weight, 20 kg total, for steel frame model 33-T8702/FR

33-T0087/6

Small tamping foot, 102 mm dia., head only

33-T0087/7

Large tamping foot, 146 mm dia., head only

33-T0087/8A

Shank, 300 mm long



33-T8702/A with 33-T8702/FR, 33-T0087/6, 33-T0087/7 and mould

76-B0088

PRD (Percentage Refusal Density) mould.

PRD Split mould and baseplate

Used to determine the degree of compaction of asphalt for road pavement quality control testing, this device consists of a mould, split vertically on one side, together with a clamp-attached baseplate. Both parts are plated for protection against corrosion. Weight: 20 kg(approx.)



76-B0088

Static tests on bituminous mixtures

DURIEZ COMPRESSION TEST SETS

The Duriez test is performed to determine and study the physical and mechanical properties of bituminous mixtures. We produce two sets for performing the test: one for 80 mm diameter specimens and one for 120 mm. All parts are made from steel protected against corrosion. 80 and 120mm diameter specimens can be compressed with our UNI-FRAME 250 model 70-T2502, 250 kN capacity. For more information see page 322, 323.



Ordering information

77-B0090

Test set for 80 mm diameter specimens, consisting of:

- 77-B0090/A1**
80 mm diameter mould
- 77-B0090/A2**
80 mm diameter cylindrical container
- 77-B0090/A3**
80 mm diameter extraction piston
- 77-B0090/A4**
80 mm diameter upper and lower pistons
- 77-B0090/A6**
80 mm diameter upper and lower engraved pistons
- 77-B0090/A5**
80 mm diameter set of two half spacers

77-B0091

Test set for 120 mm diameter specimens, consisting of:

- 77-B0091/A1**
120 mm diameter mould
- 77-B0091/A2**
120 mm diameter cylindrical container
- 77-B0091/A3**
120 mm diameter extraction piston
- 77-B0091/A4**
120 mm diameter upper and lower pistons
- 77-B0091/A6**
120 mm diameter upper and lower engraved pistons
- 77-B0091/A5**
120 mm diameter set of two half spacers

All the above parts can also be ordered separately

