CFU
INTERNATIONAL TRADE
& SERVICES INC.

Asphalt

Testing Equipments

The main area of usage of bituminous mixtures is in road construction. The title of bituminous mixtures is called Asphalt in USA. Bituminous mixtures consist of essentially two ingredients, aggregate and binder. The major difference between asphalt and concrete is that bitumen and bituminous materials are used as binder in asphalt.

Analysis and design tests of bituminous mixtures, bitumen and bituminous binders tests, asphalt and road quality tests are provided for engineering firms and construction companies to produce, inspect and evaluate the paving materials to ensure the strength, physical and mechanical performance and durability towards safe application and use.

In the asphalt section, CFU Testing Equipment is basically grouped in four main headings

- Analysis of Bituminous Mixtures
- Design and Testing of Bituminous Mixtures
- Asphalt and Road Quality Testing

CONTENTS

REFLUX METHOD

Product Code

CFAS-0013	Reflux Extraction Test Set 1000 g, 220-240 V 50-60 Hz
CFAS-0014	Reflux Extractor Jar 1000 g
CFAS-0015	Reflux Extractor Condenser 1000 g
CFAS-0016	Reflux Extractor Conical Wire Screen 500 g
CFGH-1830	Iron Wire Gauze 120x120mm
CFAS-0020	Reflux Extraction Test Set 4000 g, 220-240 V 50-60 Hz
CFAS-0021	Reflux Extractor Jar 4000 g
CFAS-0022	Reflux Extractor Condenser 4000 g
CFAS-0023	Reflux Extractor Conical Wire Screen 2000 g
CFAS-0024	Filter Paper Ø300mm (50 pcs./pack) for CFAS-0013
CFAS-0025	Filter Paper Ø 400mm (50 pcs./pack) for and CFAS-0020
CFGH-1835	Iron Wire Gauze 160x160mm

Standards

ASTM D2172; AASHTO T164 B

The Reflux Extractor is used for the quantitative determination of bitumen in hot-mixed paving mixtures and pavement samples. The bitumen content is calculated by difference from the weight of extracted aggregates, moisture content and ash from an aliquot part of the extract.

The Reflux Extraction Test Sets are supplied complete with;

- Cylindrical Glass Extractor Jar
- Two Wire Mesh Cones with Interlocking Frames
- Water Condenser with Inlet/Outlet Tubes
- Filter Paper, 50 pcs./pack
- Hot Plate
- Iron Wire Gauze (CFGH-1830 with CFAS-0013, CFGH-1835 with CFAS-0020)

Dimensions	CFAS-0013	260x260x620 mm
	CFAS-0020	260x260x620 mm
Weight (approx.)	CFAS-0013	6 kg.
	CFAS-0020	8 kg.

CFAS-0020 CFAS-0013

CENTRIFUGE METHOD

Product Code

CFAS-0030	Centrifuge Extractor 1500 g
CFAS-0031	Filter Paper 250 mm Outer dia. 45 mm Inner dia. for CFAS-0030 (100 pcs/pack)
CFAS-0032	Rotating Bowl and Cover for CFAS-0030
CFAS-0035	Centrifuge Extractor 3000 g
CFAS-0036	Filter Paper 295 mm Outer dia. 45 mm Inner dia. for CFAS-0035(100 pcs/pack)
CFAS-0037	Rotating Bowl and Cover for CFAS-0035

Models for 220-240V 50-60 Hz, 1 ph.	CFAS-0030	CFAS-0035
Models for 110-120V 60 Hz, 1 ph.	CFAS-0030-N	CFAS-0035-N

Standards

EN 12697-1 Clause B.1.5; AASHTO T164 A; ASTM D2172 A

The Centrifuges are used for the determination of the bitumen percentage in bituminous mixtures. All models comprise a removable precision-machined rotor bowl housed in a cylindrical aluminum box.

The bowl is driven by an electric motor fitted with an AC drive (inverter) with the double function of speed control up to 3600 rpm regardless of the frequency (50 or 60 Hz) and electrical breaking. The centrifuge can be set for the automatic speed ramp up to 3600 rpm and will stop in 10-15 seconds.

The cover is precisely machined and fitted with a solvent resistant gasket to avoid leakages.

The control panel includes: Start/Stop button and speed control knob.

The Centrifuge Extractors are supplied complete with
- Bowl and Cover
- Filter Paper, 100 pcs.

Dimensions	450x650x550 mm
Weight (approx.)	50 kg (for both models)
Power	370 W (for both models)

CFAS-0030

CFAS-0035

CFAS-0031

CFAS-0032

CFAS-0036

CFAS-0037

ASPHALT BINDER ANALYSIS

Product Code

CFAS-0060-C	Asphalt Binder Analyzer (ABA) by the Ignation Method, 380 V, 50 Hz, 3ph.
CFAS-0065	Metal Stand for CFAS-0060

Standards

EN 12697-39; AASHTO TP53; ASTM D6307

The CFU ABA Asphalt Binder Analyzer is used to determine the binder content of hot mix asphalt/bituminous mixtures by the method of loss on ignition. The system combines a sophisticated furnace and weighing system to continuously measure the weight loss of a bituminous mixture during combustion and automatically calculates its binder content at the end of the test.

Supplied complete with 2 specimen baskets with a safety cover and a carrying tray, a fork to catch the tray, a cooling cage and 3m metal exhaust pipe. The Metal Stand for CFAS-0060 shoud be ordered seperately.

OVEN AND AFTERBURNER

- High efficiency heating system with afterburner chamber for a total combustion of exhaust fumes to minimize emissions to conform with EU Directives.
- Sample size up to 4500 g for more representative test results
- Maximum power rating is 4,5 kW

HARDWARE

- 16 bit microprocessor with one CPU card controlling test data display, temperature, database and internal functions
- Large permanent memory to store test results
- On board 40 column serial printer
- Weighing system 15000 g capacity, 0.1 g resolution and detecting mass variations of ± 0,1 g
- PID closed loop thermoregulation for both oven and afterburner chamber
- 950 °C Afterburner 540 °C oven set temperature according to standard
- TFT touchscreen with 800x480 resolution and 65000 colors.

FIRMWARE

- Bidirectional real time communication with the weighing system
- Test setting menu with physical and descriptive sample parameters (initial weight, weight loss percentage, correction factor)
- Calibration menu to check and set the temperature and weight calibration for possible manual control of the test performance
- Test performance menu with simultaneous display of all the test data

Internal memory for up to 100 tests.

SAFETY FEATURES

- Automatic door locking after 150 °C
- Automatic monitoring of closed door before test start

Double Sample Basket

The CFU ABA Asphalt Binder Analyzer is supplied complete with;

- Double Specimen Basket with a Safety Cover and a Tray
- Carrying Fork
- A Cooling Cage
- 3m Metal Exhaust Pipe

Dimensions	700x1000x1280 mm
Weight (approx.)	125 kg
Power	4,5 kW

SOLVENT RECOVERY

Product Code

CFAS-0091 Solvent Recovery Unit 10 lt/h Capacity

Models for 220-240V 50-60 Hz, 1 ph.	CFAS-0091
Models for 110-120V 60 Hz, 1 ph.	CFAS-0091-N

Non-flammable solvent liquids used for the binder extraction test can be successfully recovered using the CFAS-0091 Solvent Recovery Unit.

The recovery unit consists of two stainless steel chambers, one for the dirty used solvent and the other for the cleaned recovered solvent. Solvent in the left-hand side chamber is distilled by an electrical heater and then passes through a water cooling system and drops into the second chamber ready for re-use. A temperature switch automatically stops the heating elements when the recovery process is completed. The unit is supplied complete with 3 m plastic tubing, tube clamps, sieve insert 0.6 mm opening and one lid.

The Solvent Recovery Unit is supplied complete with;

- Plastic Tubing, 3 m
- Tube Clamps
- Sieve Insert, 0.6 mm
- Lid

Dimensions	400x320x650 mm
Weight (approx.)	17 kg
Power	1200 W
Max. Temperature	150°C

THEORIC MAXIMUM DENSITY

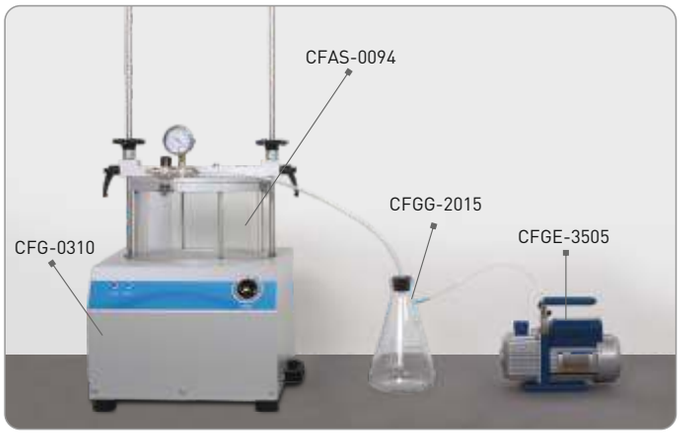
Product Code

CFAS-0093	Vacuum Pyknometer (Yale) 4.3L, Aluminium, for Rice Test
CFAS-0094	Large Size Heavy Duty Vacuum Pyknometer (Yale) 10 lt, for Rice Test
CFG-0310	Vibro-Deaerator, Timer Controlled
CFGE-3505	Vacuum Pump, 51 lt/min Capacity, 220-240 V 50-60 Hz, 1ph
CFGE-3530	Dual Stage Vacuum Pump 128 lt/min Capacity, 220-240 V 50-60 Hz, 1ph
CFGE-3552	Vacuum Gauge, Analog, -100 kPa, 1 kPa graduated, dia: Ø 63 mm,
CFGE-3570	Air Drying Unit/ Water Trap, Vacuum Type
CFGG-2015	Filter Flask 2500 ml

Models for 220-240V 50-60 Hz, 1 ph.	CFG-0310
Models for 110-120V 60 Hz, 1 ph.	CFG-0310-N

Standards

ASTM D2041; EN 12697-5



The Vacuum Pyknometers (Yale Pyknometer) are used for determining the theoretical maximum density of compacted or non-compacted bituminous paving mixtures (voidless mass). The Vacuum Pyknometers are used together with a Vibra-Dearator, Vacuum Pump and filter flask or air drying unit / water trap to complete the test set. Percent air voids in compacted bituminous mixtures and the amount of bitumen absorbed by the aggregates can also be calculated with the test.

CFAS-0093 consists of a 4,3 liter aluminium container, a transparent vacuum lid with vacuum gauge (CFGE-3552) and a transparent volumetric plate.

CFAS-0094 consists of a 10 liter transparent plastic container, a transparent vacuum lid with vacuum gauge (CFGE-3552) and a transparent volumetric plate.

Vacuum Pumps are supplied with 3m plastic tube (Ø8mm OD) and an oto-nipple.

CFGE-3552 Vacuum gauge, analog, scale range (-100/0 kPa), accuracy (1.0 % of scale range), 1 kPa graduated, Ø63 mm. Supplied with a valve, 4-way dispenser and muffler.

Vibra-Dearator (CFG-0130), Vacuum Pump and filter flask or air drying unit/water trap should be ordered separately.

	CFAS-0094	CFAS-0093
External Dimensions	300x300x450 mm	210x210x350 mm
Capacity (approx.)	10 litres	4,3 litres
Weight (approx.)	7 kg	7 kg

LABORATORY MIXING

Product Code

CFG-0130	Laboratory Mixer 10 L
CFAS-0187	Heating Mantle for CFG-0130
CFG-0131	Spare Bowl for CFG-0130
CFG-0132	Spare Whisk for CFG-0130

Models for 220-240V 50-60 Hz, 1 ph.	CFG-0130	CFAS-0187
Models for 110-120V 60 Hz, 1 ph.	CFG-0130-N	CFAS-0187-N

Standards

EN 12697-35

CFG-0130 with CFAS-0187

CFG-0130

The CFG-0130 10 litre capacity Laboratory Mixer is designed for mixing of soil and asphalt samples to be used for mechanical tests such as compaction, indirect tensile, Marshall etc. The mixing head rotates at speeds of 10 to 240 r.p.m. and the whisk from 20 to 480 r.p.m. The user can adjust rotation speed between given values easily by using a control knob fitted to the front panel.

The bituminous mixture must be prepared at the prescribed temperature according to the EN standard. For this reason the mixer can be equipped with thermostatically controlled heater.

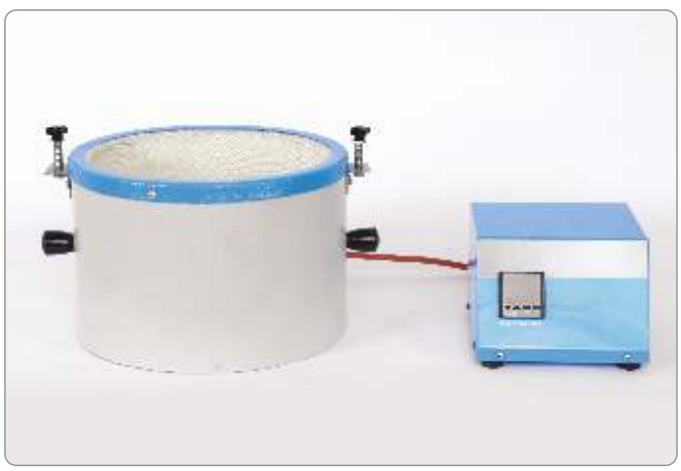
The Heating Mantle (Isomantle heater) is fitted with a digital thermostatic controller and can easily be fitted to the CFG-0131 Mixing Bowl. The Isomantle heater is supplied complete with PT100 temperature sensor.

Heating Mantle should be ordered separately.

The Laboratory Mixer is supplied complete with

- Bowl,10 lt Capacity Stainless Steel
- Mixing Whisk

	CFG-0130	CFAS-0187
Dimensions	700×750×800 mm	300x300x350 mm
Weight (approx.)	75 kg	7 kg
Power	550 W	600 W



CFAS-0187

CFG-0132

CFG-0131

LABORATORY MIXING

Product Code

CFAS-0195 Asphalt Mixer, 7.5 L
CFAS-0196 Spare Mixing Bowl, 7.5 L, for CFAS-0195
CFAS-0197 Spare Mixing Whisk, for CFAS-0195

Standards

EN 12697-35

The mixer has a capacity of 7.5 liters and is designed for mixing of asphalt samples to be used for mechanical tests such as compaction, indirect tensile, and Marshall. The mixer does not contain a heater.

The Laboratory Mixer is supplied complete with

- Bowl, 7,5 lt Capacity, 5,5 kg, Stainless Steel
- Mixing Whisk

Dimensions	450x570x720 mm
Weight (approx.)	75 kg
Power	550 W

CFAS-0196

CFAS-0197

DURIEZ COMPRESSION TEST SETS

Product Code

CFAS-0490	Duriez Compression Test Set, 80 mm dia.
CFAS-0495	Duriez Grooved Piston Set, for CFAS-0490
CFAS-0496	Duriez Non-Grooved Piston Set, for CFAS-0490
CFAS-0503	Duriez Compression Test Set, 120 mm dia.
CFAS-0505	Duriez Grooved Piston Set, for CFAS-0503
CFAS-0506	Duriez Non-Grooved Piston Set, for CFAS-0503

Standards

NF P98-251-1 and 4; EN 12697-12 Method B

The test sets are used to determine the physical and mechanical properties of bituminous mixtures, especially for the water sensitivity of bituminous specimens.

One set for preparing 80 mm. specimens, the second set for preparing 120mm. specimens according to the maximum aggregate upper sieve size.

All parts are made from steel protected against corrosion.

The compression test has to be performed with an electromechanical universal test machine such as UTM-8300.SMDL2 or UTM-8300.SMPR model machine (300 kN Electromechanical Universal Test Machine.

UTM-8300 can also be used for compaction transaction acc. to EN 12697-12 (Method B) for preparation of test specimens.

Grooved or Non-Grooved piston set includes upper and lower pistons.

Grooved piston set for cold mixes and Non-Grooved piston set for hot mixes should be ordered seperately.

Duriez compression test sets are supplied complete with;

- Mould
- Container
- Piston
- 2 pcs Half Spacers

MARSHALL MOULDS

Product Code

CFAS-0641E	Marshall Compaction Mould for Impact Compactor with Wooden Pedestal, EN, 101.6 mm
CFAS-0642E	Base Plate for CFAS-0641E
CFAS-0643E	Collar for CFAS-0641E
CFAS-0644E	Mould Body for CFAS-0641E
CFAS- 0641A	Marshall Compaction Mould ASTM 4"
CFAS-0642A	Base Plate for CFAS-0641A
CFAS-0643A	Collar for CFAS-0641A
CFAS-0644A	Mould Body for CFAS-0641A
CFAS-0646	Marshall Compaction Mould ASTM 6"
CFAS-0664	Marshall Storage Plate for 6 pcs. for 4" (101.6mm) specimens

Standards

EN 12697-30; ASTM D1559, D6926, D5581; AASHTO T245

The Marshall Compaction Moulds are used to produce the Marshall specimens with automatic or manual compactors. The moulds are manufactured using galvanized steel.

The Compaction Moulds consist of a base plate, mould body and a collar. The Marshall Storage Plate is designed to store.

6 pcs , 4" diameter Marshall specimens.

CFAS-0641E

CFAS-0641A

CFAS-0664

	Dimensions	Weight (approx.)
CFAS-0641E	Ø120x170 mm	3,5 kg
CFAS-0646A	Ø175x210 mm	6 kg
CFAS-0664	250x500x70 mm	6 kg

MARSHALL COMPACTION

Product Code

CFAS-0670 Manual Marshall Compaction Assembly, 4", ASTM
CFAS-0671 Marshall Compaction Hammer, 4" ASTM
CFAS-0672 Wooden Compation Pedestal, ASTM for CFAS-0670
CFAS-0674 Marshall Compaction Hammer BS
CFAS-0676 Manual Marshall Compaction Assembly, 6", ASTM
CFAS-0677 Marshall Compaction Hammer, 6"ASTM for CFAS-0676
CFAS-0678 Wooden Compaction Pedestal, 6" ASTM, for CFAS-0676
CFAS-0667 Marshall Steel Block, Ø102mm dia. and 50 mm height
CFAS-0668 Marshall Steel Block, Ø154mm dia. and 50 mm height

Standards

ASTM D6926, D5581; AASTHO T245 (only for CFAS-0071); BS-598

The CFAS-0670and CFAS-0676 Marshall Manual Assemblies are used to prepare Marshall specimens manually.

The Compaction Assemblies consist of a Marshall Compaction Hammer and a Wooden Compaction Pedestal.

The Pedestals are supplied complete with a steel plate, a mould holder and a hammer guide.

CFAS-0667 and CFAS-0668 Marshall Steel Blocks are used for initial heating of the foot of compaction hammer should be ordered separately.

	Dimensions	Weight (approx.)
CFAS-0670	350x400x1600 mm	50 kg
CFAS-0671	100x100x108 mm	8 kg
CFAS-0672	350x400x1600 mm	42 kg
CFAS-0674	100x100x108 mm	8 kg
CFAS-0676	350x400x1600 mm	57 kg
CFAS-0677	100x100x108 mm	14 kg
CFAS-0667	110x110x60 mm	3,5 kg
CFAS-0668	160x160x60 mm	7,5 kg

MARSHALL COMPACTION

Product Code

CFAS-0682E Automatic Marshall Impact Compactor with Wooden Pedestal, EN
CFAS-0683E Automatic Marshall Impact Compactor with Wooden Pedestal and Soundproof Safety Cabinet
CFAS-0667 Marshall Steel Block, Ø102 and 50 mm height

Models for 220-240V 50 Hz, 1 ph.	CFAS-0682E-T	CFAS-0683E-T
Models for 110-120V 60 Hz, 1 ph.	CFAS-0682E-N	CFAS-0683E-N
Models for 220-240V 60 Hz, 1 ph.	CFAS-0682E-K	CFAS-0683E-K

Standards

EN 12697-30, 12697-10, 12687-12

The CFAS-0682E and 0683E Automatic Marshall Compactor with wooden pedestal provides a uniform and even degree of compaction. The unit incorporates a compaction pedestal, comprising a laminated hardwood block secured to a concrete block by a 300 mm square x 25 mm thick steel plate. The mechanism lifts the 4535 g ± 15 g hammer and automatically releases it at the specified height of 457 ± 5 mm.

The conveniently positioned control panel comprises of start/stop button, emergency stop button and a direct reading counter used to set the required number of blows.

The apparatus stops automatically after the preset number of blows. The automatic Marshall compactor includes the laminate hardwood block and concrete block 450x450x200 mm.

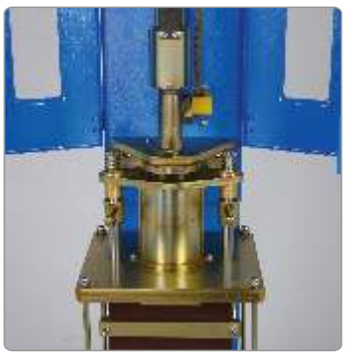
The compactors are equipped with a hand operated mould fixing mechanism which locks the mould in place during compaction and reduces vibration of the mould

The standard model can be supplied with a safety/noise reduction cabinet as a CFAS-0683. The cabinet is lined internally with soundproofing material to reduce sound level conforming to CE directives.

Particular attention has been paid to operator safety by the inclusion of various in-built safety features.

CFAS-0667 Marshall Steel Block which can be used for initial heating of the foot of compaction hammer and Marshall moulds should be ordered separately.

CFAS-0682E



Technical Specifications

Blows Frequency	50 Blows in 55 s to 60 s
Concrete Base Dimension	450x450x200 mm
Laminated Hardwork Block Dimensions	200x200x450 mm

Product Code	CFAS-0682E	CFAS-0683E
Dimensions	520x520x1760 mm	800x800x2200 mm
Weight (approx.)	225 kg	370 kg
Power	370 W	370 W

CFAS-0683E

MARSHALL COMPACTION

Product Code

CFAS-0782A Automatic Marshall Compactor, for 4" dia. Specimens, ASTM
CFAS-0783A Automatic Marshall Compactor, for 4" dia. Specimens with Soundproof Safety Cabinet, ASTM
CFAS-0667 Marshall Steel Block, Ø 102 and 50 mm height

Models for 220-240V 50 Hz, 1 ph.	CFAS-0682E-T	CFAS-0683E-T
Models for 110-120V 60 Hz, 1 ph.	CFAS-0682E-N	CFAS-0683E-N
Models for 220-240V 60 Hz, 1 ph.	CFAS-0682E-K	CFAS-0683E-K

Standards

ASTM D 1559 , ASTM D 6926; AASHTO T245

Automatic Marshall Compactor is designed to provide a stable and rigid mechanism to be used for preparation of bituminous specimens for Marshall Stability tests.

CFAS-0782A Compactor for compaction of 4" dia. specimens features a heavy-duty design, which stands up well to the constant jarring caused by the compaction process.

The compactors are equipped with a hand operated mould fixing mechanism which locks the mould in place during compaction and reduces vibration of the mould

The conveniently positioned control panel comprises of start/stop button, emergency stop button and a direct reading counter used to set the required number of blows.

The operator can keep track of the number of blows on an LCD display.

The apparatus stops automatically after the preset number of blows.

The standard models can be supplied with a safety/noise reduction cabinet. The cabinet is lined internally with soundproofing material to reduce sound level conforming to CE directives

CFAS-0667 Marshall Steel Blocks which can be used for initial heating of the foot of compaction hammer and Marshall moulds should be ordered separately.

Drop Numbers	55 ± 5 blow/min
Sliding Weight	4536 ± 9 gr
Falling Height	457±3 mm
Tamping Face Dia.	98,5 mm

	CFAS-0782A	CFAS-0783A
Dimensions	380x430x1560 mm	610x650x2000 mm
Weight (approx.)	110 kg	145kg

VIBRATORY COMPACTOR

Product Code

CFS-0680-T Vibratory Hammer for Compaction of Bituminous and Soil Mixtures, 220-240V, 50 Hz, 1ph.
CFS-0681 Supporting Frame for Vibratory Hammer
CFS-0682 Large Tamping Foot, Ø146 mm
CFS-0684 Shank for CFS-0680
CFAS-0885 P.R.D. Split Mould and Base Plate

Standards

EN 12697-32, 12697-9, 12697-10, 13286-4; BS 1377-4

The CFS-0680 Vibratory compaction apparatus are used for preparing the test specimens of bituminous mixtures and soils.

P.R.D. (Percentage Refusal Density) Split Mould is split verticially on one side, attached to the base plate with clamp. Plated against corrosion.

CFAS-0885 The split mould and base plate should be ordered separately.

Supporting frame for vibratory hammer (CFS-0681), shank (CFS-0684), Ø146 mm large tamping foot (CFS-0682) should be ordered separately when ordering the vibratory hammer.

Dimensions	510x300x1120 mm
Weight (approx.)	75 kg (complete set)
İmpact Rate	1500-3000/min
Power	1150 W

MARSHALL COMPACTION

Product Code

CFGE-0080 Marshall / CBR / Proctor Specimen Extruder, 30 kN Capacity

Standards

EN 12697-30, 13286-2, 13286-47; AASTHO T245, T134, T180,T193; ASTM D1559, D698, D1557, D1883; BS 598-107, 1377-4, 1924-2

The specimen extruder is designed to easily extrude specimens from Marshall, CBR, standard and modified Proctor Moulds. The capacity of the extruder is 30 kN. Supplied complete with a manual hydraulic jack and 2 pcs. adaptor to extrude specimens from 100mm (4 "), 150 mm (6") inner diameter marshall, CBR, standard and modified proctor moulds.

Ram Travel	130 mm
Screw Travel	90 mm
Dimensions	280x280x520 mm
Weight (approx.)	28 kg

MARSHALL STABILITY

Product Code

CFAS-1052	Marshall Stability Test Machine with Proving Ring, 50 kN
CFAS-1057	Breaking Head (Stability Mould) for Ø4" Specimen
CFAS-1058	Breaking Head (Stability Mould) for Ø6" Specimen
CFAS-1063E	Indirect Tensile Strength Test Jig with Steel Loading Strips for Ø100 mm Compacted Bituminous Specimens
CFAS-1064E	Pair of Loading Strips for Ø150 mm Bituminous Specimens. For CFAS-1063E
CFAS-1065E	Pair of Loading Strips for Ø160 mm Bituminous Specimens. For CFAS-1063E
CFAS-1063A	Indirect Tensile Strength Test Jig with Steel Loading Strips for Ø4"(101,6mm) Compacted Bituminous Specimens.
CFAS-1066A	Pair of Loading Strips for Ø6"(152,4mm) Bituminous Specimens. For CFAS-1063A
CFAS-1086	Marshall Penetration Piston for StabilityTest

Models for 220-240V 50-60 Hz, 1 ph.	UTC-1052
Models for 110-120V 60 Hz, 1 ph.	UTC-1052-N

Standards

EN 12697-34, 12697-23, 12697-12 (Method A);
ASTM D1559, D5581, D 6927, D 6931; AASHTO T245

The CFAS-1052 50 kN capacity Marshall Stability Test Machine with Proving Ring is used to determine the maximum load and flow values of bituminous mixtures.

The CFAS-1052 comprises a robust and compact two column frame with adjustable upper cross beam. The unit is a bench mounted compression frame with motor and worm gear housed within the base unit.

The mechanical jack raises the lower platen at a constant speed of 50.8 mm/min as required in the relevant standard. For safety, the up and down travel of the lower platen movement is limited by limit switches. Rapid adjustment of the platen is also provided using the control buttons on the front panel of the machine.

The measuring system consists of a 50 kN capacity load ring, digital flow meter (dial gauge) fitted to the breaking head. The CFAS-1052 Marshall Stability Machine is also suitable for testing 6" dia. specimens (152.4 mm) conforming to ASTM D5581.

The machine can be hand operated by a lateral hand wheel for calibration purposes; the hand wheel is supplied complete with the machine.

CFAS-1052

The CFAS-1052 Marshall Stability Test Machine is supplied complete with;

- Load Ring, 50 kN
- Penetration Piston for Marshall Stability Test (CFAS-1086)
- Digital Dial Gauge 25x0.01 mm (CFGM-0148) with holder (CFAS-1059)
- Hand Wheel for Manual Control

Dimensions	550x700x1200 mm
Weight (approx.)	103 kg
Power	1100 W

MARSHALL STABILITY

Product Code

CFAS-1056.ACPR	Automatic Marshall Stability Test Machine with U-Touch PRO Control Unit, 50 kN
CFAS-1057	Breaking Head (Stability Mould) for Ø4" specimen
CFAS-1058	Breaking Head (Stability Mould) for Ø6" specimen
CFAS-1063	Indirect Tensile Strenght Test Jig with Steel Loading Strips for Ø100mm Compacted Bituminous Specimens, EN, ASTM, AASHTO
CFAS-1064E	Pair of Loading Strips for Ø150 mm Bituminous Specimens. EN, for CFAS-1063
CFAS-1065E	Pair of Loading Strips for Ø160 mm Bituminous Specimens. EN, for CFAS-1063
CFAS-1066A	Pair of Loading Strips for Ø6"(150 mm) Bituminous Specimens. ASTM, AASHTO for CFAS-1063
CFAS-1088	Marshall Penetration Piston for Stability Test, for CFAS-1056
CFAS-1081E	Semi-Circular Bending / SCB Test Jig, EN
CFAS-1082E	Specimen Bearing Strips (two), Metal, for CFAS-1081E

Models for 220-240V 50-60 Hz, 1 ph.	UTC-1056.ACPR
Models for 110-120V 60 Hz, 1 ph.	UTC-1056.ACPR-N

Standards

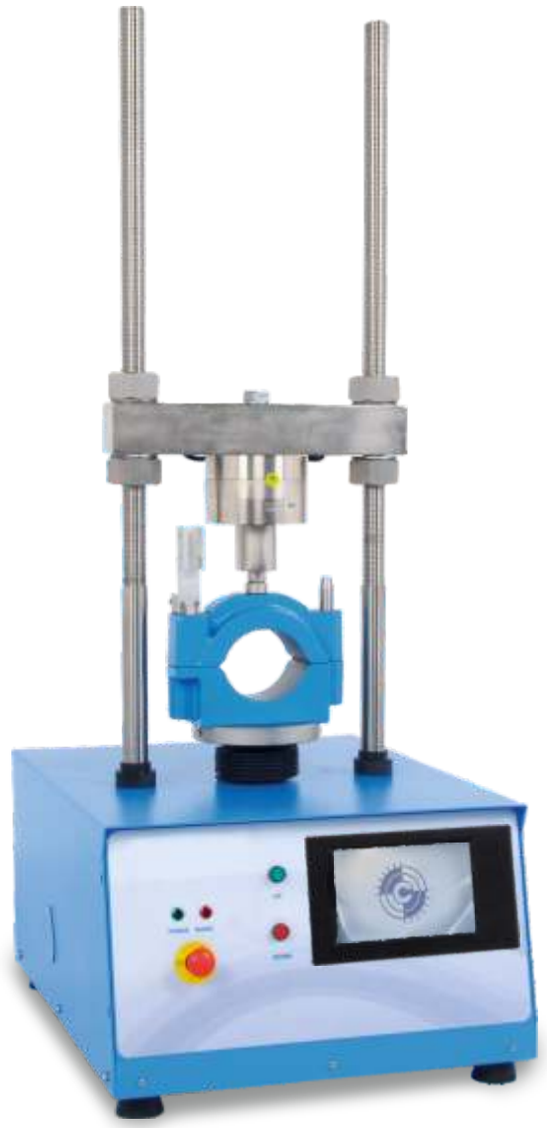
EN 12697-34, 12697-23, 12967-12 (Method A)
ASTM D1559, D5581, D6927; D6931; AASHTO T245, T283
EN 12697-44; NF P98-251-2

The CFAS-1056.ACPR 50 kN Capacity Automatic Marshall Stability Test Machine with U-Touch PRO Control Unit is designed to determine the maximum load and flow values of bituminous mixtures. With suitable accessories CFAS-1056.ACPR can also perform semi-circular bending test and indirect tensile strength of bituminous specimens.

The machine comprises of a robust, compact two column bench type compression frame with adjustable upper cross beam. Motor, worm gear system and U-Touch PRO Control Unit are housed within the base unit.For safety, up and down travel of the lower platen is limited by limit switches mounted on the gear system. Rapid adjustment of the platen can be done by using the up and down buttons located on the front panel. The machine can be hand operated by a lateral hand wheel for calibration purposes.

Breaking head/s, indirect tensile strength test jig/s, semi-circular bending test jig and computer should be ordered separately.

CFAS-1081E supplied complate with 2 pcs. specimen bearing strips and a metal loading strip.



UTC-1056.ACPR

The Automatic Marshall Stability Test Machine is supplied complete with;

- Load Cell, 50 kN
- Penetration Piston for Marshall Stability Test (CFAS-1088)
- Linear Potentiometric Displacement Transducer, 25 x 0.001 mm (CFGM-0062) with holder (UTM-0114)
- CFU Software
- Ethernet Cable for Connecton PC
- Hand Wheel for Manual Control

Capacity	50 kN
Dimensions	550x700x1200 mm
Weight (approx.)	103 kg
Power	1100 W

Main Features

- 50 kN capacity
- Stand alone fully automatic test execution
- For marshall, indirect tensile and semi-circular bending tests.
- Flow and stability values are automatically calculated and saved
- Touchscreen graphic diplay 800x480 pixel, user-friendly menu consisting of icons, figures and diagrams.
- High resolution: 32 bits
- Large storing capacity on internal memory and data export function to usb stick drive
- Ethernet port for connection to PC
- Language and unit system selection

U-Touch PRO Control Unit

U-Touch PRO Control and Data Acquisition Unit is designed to control and process data from the loadcell and displacement transducers fitted on Marshall Stability test machine. CFAS-1056.ACPR can perform marshall, indirect tensile and semi-circular bending tests according to EN,ASTM/AASHTO standards listed above.

The Unit can perform tests stand-alone fully, automatic without the need of a PC or USOFT-1056 software. Software can be used to get additional advanges described in the section below.

U-Touch PRO incorporates a user-friendly interface that shows all existing menu options as buttons and tabs. Users can activate or deactivate certain functions easily and input test data by using touch keyboard. Parameters such as test information, user information, sample information and test parameters can be modified and saved for later use by operators.

Control Unit offers many additional unique features. Utouch Pro enables the users to display current memory usage and test results with its advanced data and memory management interface. U-Touch PRO can export, copy, or delete the test data saved in its internal memory.

Results and additional information for previous tests can be recalled using U-Touch PRO. Test reports can be instantly printed using an (optional) thermal printer. U-Touch Pro TFT can simultaneously display machine status, test values, warnings during operation and test graphs in real time.

PLEASE see the pages of "U-Touch PRO Control Units" for details of the properties of software and hardware of the Unit.

USOFT-1056 CFU Software for Marshall Stability Test

USOFT-1056 Marshall Stability Test Software is developed for Marshall stability tests in accordance with EN 12697-34, ASTM D 1559, D5581, D 6927, AASHTO T 245, NF P98-0251-2 indirect tensile tests in accordance with EN 12697-23 EN 12697-12 (method A), ASTM 6931, AASHTO T283 and semi-circular bending tests in accordance with TS EN 12697-44.

The software includes control of machine, acquisition of load and displacement data, saving them and generating reports.

The software accepts specimen diameter and height as an input parameter. It automatically calculates correction factor coming from the standards with respect to specimen thickness. The stability value is calculated regarding this factor.

The software continously updates load and displacement until the end of test. When the test is completed, the sharpest slope of the graph is calculated. The sharpest slope is shifted 1.5 mm to the right side of the graph and the intersection between 2nd slope and original test data is recorded as the stability value for the test.

The horizontal distance between the intersection of first slope and X axis and intersection of test data with 2nd slope is recorded as "flow" value.

The point that this line crosses displacement axis is commented as an offset. This offset is subtracted from the displacement value at peak point and called as flow.

The report includes all results for 9 samples. The user can see 9 of the results on the same screen for easy comparision. The software supports SI, Imperial and kgf unit system.

See the pages of " CFU "USOFT Series Softwares" for detailed properties of the software.

SAMPLING by CORING

Product Code

CFAS–2101	Core Drilling Machine
CFGD–0330	Coring Bit for Asphalt 50 mm dia. x 400 mm length
CFGD–0332	Coring Bit for Asphalt 75 mm dia. x 400 mm length
CFGD–0334	Coring Bit for Asphalt 100 mm dia. x 400 mm length
CFGD–0336	Coring Bit for Asphalt 150 mm dia. x 400 mm length

Standards

EN 12697-27, ASTM D 5361

Machine is designed to cut cores up to 150 mm diameter from concrete, asphalt and similar hard construction materials.

The machine comprises a vertical support column which carries the drill head/motor assembly.

The motor assembly comprises a 6.5 Hp petrol engine.

A ball screw mechanism enables close control of the drilling pressure and rapid return when drilling is completed.

A water spraying assembly is mounted on the machine.

The complete assembly is supplied on a rigid wheel mounted metal base frame with leveling and fixing facility during the operation.

Coring Bits should be ordered separately.

CFGD–0336 CFGD–0334 CFGD–0332 CFGD–0330

Dimensions	500x900x1100 mm
Weight (approx.)	95 kg
Power	6.5 Hp

SAMPLING by CORING

Product Code

CFAS–2105	Core Drilling Machine on Trailer
CFGD–0330	Coring Bit for Asphalt 50 mm dia. x 400 mm length
CFGD–0332	Coring Bit for Asphalt 75 mm dia. x 400 mm length
CFGD–0334	Coring Bit for Asphalt 100 mm dia. x 400 mm length
CFGD–0336	Coring Bit for Asphalt 150 mm dia. x 400 mm length

Standards

EN 12697-27, ASTM D 5361

Portable CFAS-2105Core Drilling Machine is designed to cut cores up to 150 mm diameter from concrete, asphalt and similar hard construction materials.

The machine comprises a vertical support column which carries the drill head/ motor assembly. The motor assembly comprises a 6.5 hp petrol engine.

A ball screw mechanism enables close control of the drilling pressure and rapid return when drilling is completed. A water spraying assembly is mounted on the machine.

The drilling machine is installed in a trailer for fast and precise sampling on-site. 100 litre water tank provides continuous lubrication during drilling to save time.

The two-wheeler taut liner trailer is fully equipped with brake lamps/hazard lashers/retro reflectors conforming to road traffic regulations.

The trailer is designed with a space to be used for storing the core samples. The two fixing legs are robustly designed for improved stabilization.

Coring Bits should be ordered separately.

Dimensions	1600x2600x2000 mm
Weight (approx.)	300 kg
Power	6.5 hp

ASHALT TEMPERATURE MEASUREMENT

Product Code

CFGT-1350	Hand Type Digital Thermometer, -50° C to 1350° C
CFGT-1370	200 mm Hand-Held Penetration Probe for Tempereture Mesurement (Ø6mm), with 1.5m cable and connector, up to 1200° C, Type: OM07-K160-20 M 1K
CFGT-1371	300 mm Hand-Held Penetration Probe for Tempereture Mesurement (Ø6mm), with 1.5m cable and connector, up to 1200° C, Type: OM07-K160-30 M 1K
CFGT-1372	500 mm Hand-Held Penetration Probe for Tempereture Mesurement (Ø6mm), with 1.5m cable and connector, up to 1200° C, Type: OM07-K160-50 M 1K

Digital thermometer and penetration prıobes are used together for measuring the delivery and compaction temperatures of bituminous mixtures.

Preffered penetration probe should be ordered with CFGT-1350.

ADHESION PROPERTY of AGGREGATE to BITUMEN

Product Code

CFAS-2112 Vialit Plate (Adhesion Test) Apparatus
CFAS-2113 Steel Ball, 512gr, for CFAS-0112
CFAS-2114 Mechanical Aggregate Deployment for CFAS-0112 for 100 chippings

Standards

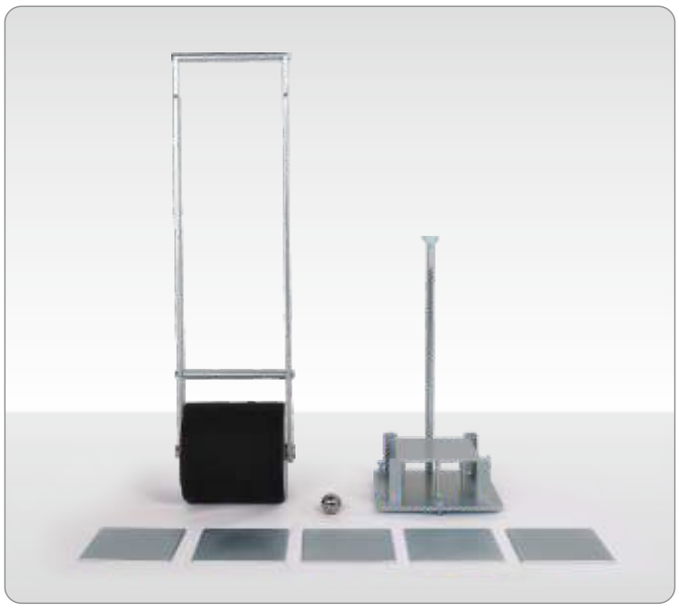
EN 12272-3; NF P98-274-1

The CFAS-2112 Vialit Plate Apparatus is used to assess the adhesion property of aggregates to bitumen.

Supplied complete with a metal basement with three vertical pointed rods to hold the flat steel plate, 50 cm. high vertical rod with a slot at the upper end for the steel ball to drop, a 512 g steel ball, 6 metal test plates and a hand operated rubber wheel roller. The mechanical aggregate deployment should be ordered seperately.

The test plate, coated by bitumen on one face and spread with the aggregate chippings in a standard way is rolled using the roller and then placed on the three-point support base.

The steel ball drops three times from the slot, and the chippings that become loose after the three impacts are counted and checked.



CFAS-2112

CFAS-2114

The Vialit Plate (Adhesion Test) Apparatus is supplied complete with;

- Flat Steel Plates, 6 pcs.
- Steel Ball, 512 g
- Rubber Wheel Roller, hand operated

Dimensions	400x1400x400 mm
Weight (approx.)	45 kg

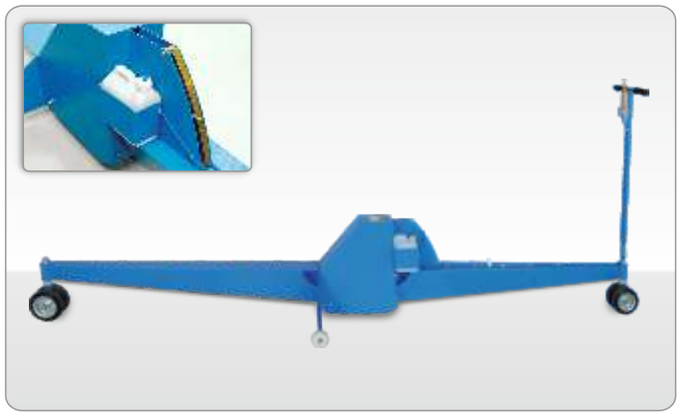
SURFACE IRREGULARLY

Product Code

CFAS-2125 Travelling Beam Device

The CFAS-2125 Travelling Beam Device is used to check for any irregularities in both concrete and bituminous road surfaces.

Deviation of the surface from a straight-line is shown on a scale calibrated in increments of 2 mm in the 0-10 mm range and 5 mm increments in the 10-25 mm range It. comprises a manual dye marker which is used to mark irregular surface sections when found.



Dimensions	720x1600x500 mm (packed)
Weight (approx.)	55 kg

SURFACE IRREGULARLY

Product Code

CFAS-2127 MOT Straightedge, EN
CFAS-2128 Wooden Carrying Case, for CFAS-2127

Standards

EN 13036-7

The straightedge is used for measuring single irregularities attributable to quality defects in new surface course(s) of roads, airfields and other trafficked surfaces as well as in-service surfaces.
CFAS-2127 is supplied with two steel wedges. Wooden carrying case should be ordered separately.

Dimensions	3150x160x130 mm (for case)
Weight (approx.)	17 kg (with case)

INDENTATION TESTING MACHINE

Product Code

CFAS-2130	Automatic Asphalt Indentation Penetrometer, EN
CFAS-2134	Spare Indentor Pins (100mm2 and 500 mm2) for CFAS-2130
CFAS-2135	Adjustable mould for the test cube (69mm) for CFAS-2130
CFAS-2136	Metal Intermediate Plate for CFAS-2130
CFAS-2137	Calibration Block for CFAS-2130
CFAS-2138	The appartus for preparing the test cubes for CFAS-2130
CFCM-0926	Cube Mould 70.7 mm, BS, steel, for CFCM-0930 and CFAS-2130

Models for 220-240V 50-60 Hz, 1 ph.	CFAS-2130
Models for 110-120V 60 Hz, 1 ph.	CFAS-2130-N

Standards

TS EN 12697-20

CFAS-2130 Automatic Indentation Penetrometer determines the resistance of an asphalt cube and cylindrical specimens to indentation when force is applied to them using a cylindirical pin in a defined period.

Maximum nominal size of the aggregates should be less or equal to 16 mm.

CFAS-2130 can apply a 25 N prelaminary force and than 525N total force without touching the test weights with electromechanical method acc. to TS EN 12697-20.

CFAS-2130 consists of a four-columns frame combined with an assebly for force application and a stainless steel 25L water bath with drain facility, a digital control unit with immersion type heater-agitator, 50 x 0.01 mm displacement transducer with holder, calibration block, interchangeable indentor pin with 100 mm² and 500 mm², an adjustable mould 69mm, a metal intermediate plate and a free software.

Cube mould and the appartus for preparing the test cubes should be ordered seperately.

Software

CFAS-2130 is supplied with software developed by CFU that allows automatic capture to PC of test data. Software is capable of showing the test data in real time, storing the results and real time temperature monitoring.

Key Features

- Stainless steel
- Temperature control
- Digital indicator
- Ethernet connection

Dimensions	590x485x1040 mm
Weight (approx.)	200 kg

CFAS-2130

Technical Specification

Preliminary Force	(25 ± 1) N
Total Test Force	(525 ± 1) N
100 mm² Diameter Indentor Pin	(11.3 ± 0,1)mm
500 mm² Diameter Indentor Pin	(25.2 ± 0,1) mm
Deformation of Apparatus Upon Application and Removal of Forces	←0.01 mm
Water Tank Capacity	25 litres
Water Temperature Range	Ambient to the test temperatures
Water Temperature Stability	Accuracy of ± 1 °C.
Digital Indicator Resolution	0.01 mm

NON-NUCLEAR ASPAHLT DENSITY GAUGE

Product Code

CFAS-2160 Non-Nuclear Asphalt Density Gauge

Standards

ASTM D7113; AASTHO T 243-12

Non-Nuclear Asphalt Density Gauge is used for determination of density of asphalt specimens with non nuclear method. CFAS-2160 is equipped with a touch screen and user friendly graphical menu interface, running Microsoft Windows silently in the backround for flawless operation, easy software are upgrades and enchanced user support.

The instrument general specifications are;

- Full colour graphics driven interface, 480 x 640 VGA touch screen display with LED backlight for easy visibility.
- Displays GPS status, available battery voltage, low battery and date/time,
- Rugged case design made from aluminum, powder-coated gloss black with orange reflective vinyl graphics increasing driver awareness to road workers at night
- Data Management Feature, quickly access, can be downloaded and deleted project data,
- Required files can be downloaded to CFS-1280 via. USB,
- Fast, reliable, accurate, and repeatable in real time, User Friendly and cost effective.
- The most impoftant point is; Non-Nucleer means no Badges or licences and no storage or transport concerns.

OPERATIONAL FEATURES

- **Display:** Full color graphics driven user interface, 480x640 VGA touch screen display with LED backlight for easy visibility in daylight or dark environments.
- **Status Bar:** Displays GPS status, Data Save status, battery voltage, low battery, date and time
- **Project Details:** Stores up to 20 projects with details,
- **Mix Details:** Stores up to 20 mixes, details include (MTD, Mix Name, Stone Size, Depth, Offset, Operator Name)
- **Data Logging:** When enabled, stores all measurements taken in single or average modes, (Status Bar Icon)
- **Reports:** Easily download data to be imported into Excel
- **GPS Control:** When activated will display latitude and longitude positions, number of satellites the gauge is connected to as well as the UTC date and time, also available in UTM format. GPS information will store with each measurement when Data Save and GPS feature is enabled, (Status Bar Icon)
- **Update Software:** One touch upload of new software using a USB memory stick
- **Data Management:** Quickly access, download or delete your project data
- **Set Time & Date:** Quick time and date setup, MM/DD/YY and DD/MM/YY formats
- **Units:** Interchangeable settings for Density (kq/rn^3, Ib/ft^3), Temp (°C, °F), Depth (in, mm) and Stone Size (in, mm)
- **Standardization:** While gauge is still in the case, a quick one touch measurement will ensure the gauge is still in proper working mode
- **Calculator:** Built in four function calculator
- **Enhanced Customer Support:** Diagnostic screen to aid in factory support
- **User Programmable Target Density:** Used for calculating compaction %
- **User Changeable Battery:** Easily change batteries in the field

Operational Specification	
Mode	
• Single	Reading time less than five (5) seconds. Stores Data
• Average	Averages five (5) readings and stores data including date and time. Stores thousands of records
• Continuous	Instantaneous density readings.
• Segregation	Identifies variations in material density associated with segregation.
Function	
• Density	% Compaction
• Integrated Temperature Sensing	Real time temperature display 0° F to 350 °F (-17.7° C to 177.6° C)
Calibration Mode	
• Normal	Correlation offset to cores

Measurement Specification	
• Sensing Area	11 in. (27.9cm) dia. base allows optimum measurement on fine and coarse material types.
• Measurement Depth	User selected and adjustable from 1 in. to 4 in. (2Smm to 100mm)
• Measurement Display	Density, % Compaction, Surface Temperature, Mix Name & Project Name

Mechanical Specification	
• Unit Weight	6.44kg (14.2 lbs)
• Unit Dimensions	27,9 cm x 27,9 cm x 30,4 cm (11"x11"x12" High) with handle extension 73,6 cm High (29")
• Shipping Weight w/ Case	19,27 kg (42,5 lbs)
• Shipping Dimensions	63,5 cm x 50,8 cm x 35,5 cm (25" x 20" x 14")

Electrical Specification	
• Microprocessor Controlled	
• CE Mark	Complies with EN 61000-4-2, 61000-4-3, 61000-4-8
• Battery	14.0 Amp-hr NiMH, 7.2 V
• Recharge Time	4 hours
• Battery Charger	Self Contained CE & UL Certified Universal AC Charger, DC Charger
• Computer Ports	1 USB Port