



Soils

GROUP I&S





GROUP I&S

SAMPLE SPLITTERS (RIFFLE BOXES)

UNE EN 933-3 / ASTM C136, 702 / NF P18-553 / BS 1377:2, 812:1, 1924 :1

Sample splitter for classifying samples into representative portions of materials such as: aggregates, sand, gravel and simlae. They are made of sheet steel painted. Supplied with three collecting pans (from ¼ "to 1 ½")

Códe	Slot width	Slot Number
S001	¼" - 6,3 mm	14
S002	½" - 12,5 mm	14
S003	¾" - 19,1 mm	16
S004	1" - 25,4 mm	14
S005	1½" - 38,1 mm	12
S006	2" - 50,8 mm	10
S007	3" - 76,2 mm	8



S010 Large capacity sample splitter

Designed for the reduction of test samples which are too large in volume to be conveniently handled. It handles any material from sand sizes up to dia. 108 mm. Each chute bar is 12 mm wide so that openings of 12-24-36-48-60-72-84-96-108 mm are possible. Complete with two collecting pans.

Clam shell hopper: 30 litres capacity.

Very sturdily constructed, it is totally cadmium plated for rust protection.

Weight: 55 Kg

SOIL SAMPLER

S012 Used to obtain indisturbed soil samples of dia. 1 ½ " (38 mm)

The sampler is formed by:

- T handle with extension rod, 900 mm long
- Jarring link ¾ "
- Stainless sample tube dia. 1 ½ " x 9 " (38 x 230 mm)

Weight: 7 Kg.

Accessories:

S012.01 Hand extruder used to extrude the soil specimens Ø38 mm.(1½") from the sample tube.

S012.02 Stainless simple tube dia 1½"" x 9" (38x230 mm).



**SOIL SAMPLING****ASTM D420, D1452/ AASHTO T86, T202**

Designed for soil investigation and explorations. Complete with "T". handle.

Made of special galvanized steel

S013 Hand Auger Ø80 mm, x 1 m larg.

S014 Hand Auger Ø100 mm, x 1 m long.

S015 Hand Auger Ø150 mm x 1 m long.

S012.03 Extension rod for above 1 m. long



S014 Equipment sampler consists of a cylindrical cutting edge of Ø130x130 mmh. Made of steel with anti-corrosion treatment. Comes complete with wooden mallet to hit.

SURFACE SOIL SAMPLERS**ASTM D2973/ BS 1377:97 CNR N°22**

Surface soil sampler with sampling tube 73 mm inside diameter x 66 mm long and 5 kg. drop hammer.

Used to take field samples of compacted fill or undisturbed soils and to evaluate density of compaction samples as the ground surface.

The set consists of a drop hammer sliding on the drive rod and falling on the drive head where the sampling tube is hold. Steel made, galvanized against corrosion.

S015 Soil sampler tube Ø73x66 with mmh int. And 5kg hammer

**FINE AGGREGATE SURFACE MOISTURE****ASTM C70 / AASHTO T142**

A125 Chapman flask to determine surface moisture in fine aggregate.

Graduated to 200 mL between two bulbs and from 375 to 450 mL from the second bulb.

Weight: 500 g

Accessories:

A125.01 Box for flask chapman

V233 Maximum and minimum thermometer



UNIVERSAL EXTRUDER

UNE 103.400 / ASTM D698 / BS 598, 1377

S123 Hand operated actuated by a 5 tons hydraulic jack. Used to extrude samples having dia. 4", 6", 100 mm, 150 mm. It can therefore extrude CBR, Marshall and Proctor specimens.

The extruder is actuated by a 50 kN hydraulic jack, having ram travel of 190 mm + 170 mm screw. Supplied complete with adaptors.

Dimensions: dia. 300x500 mm

Weight: 30 Kg

UNE 103.400/ ASTM D698, D1587, D1883/ BS 598, 1377:4

S024 Universal Extruders hydraulic piston for soil samples from dia 35 up to 150 mm with different numbers of adaptors to Ø 150 mm. and corresponding piston heads and securing ends.

Technical Feature:

Max. load: 70 KN (7000 Kg)

Maximum sample diameter: 150 mm.

The extraction rate: constant 120 and 1,200 mm / min. dimensions:

Power: 220V, 50 Hz

Weight: 250 kg

The support team has a collection of sample is placed in a horizontal position to keep the sample. Supplied with a head and a diameter collars (to choose). Emergency button has.



Accessories:

Adaptors for Extruders:

S024.01 Ø38,1 mm

S024.02 Ø50,8 mm

S024.03 Ø76,2 mm

S024.04 Ø 101,6 mm

S024.05 Ø 83 mm(disc)

S024.06 Ø100 mm(disc)

S024.07 Ø 35 mm

S024.08 Ø150 mm



S022 Calcium carbide, box 100 ampoules

Determination of Moisture Content

ASTM D4944/ BS 6576/ AASHTO T217

Speedy equipment to determine quickly and accurately the moisture content in soil mixtures and pastes, clay, sand or other granular materials.

The operating principle is based on the reaction between water and calcium carbide, which produces a gas amount directly proportional to the amount of water present in the sample.

Model:

S020 Speedy apparatus complete with pressure gauge, balance, hammer, dishes, cleaning brush and carrying case.

Measuring range: 0-20%

Ability to show: 5-100 g.

Dimensions of case: 450x350x150 mm

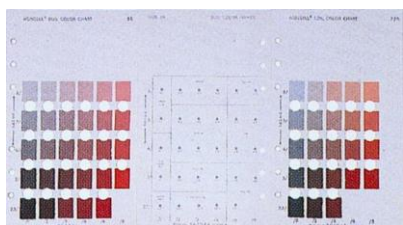
Weight: 5 kg approx.



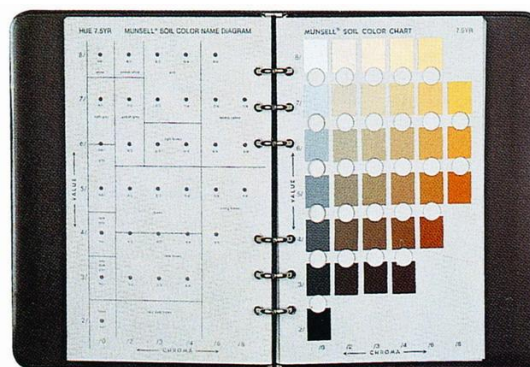
ASTM D1067/ BS 1377

S025 Colour matching charts for identification, The set consists of 7 constant hue charts with 196 colours.

S026 Tropical soil colour chart, Set of 2 cards and colour name diagrams.



S026



PORTABLE PH METER

S028 Accurate, compact model, LCD display, microprocessor controlled. It can measure pH, mV and temperature in the laboratory and in the field. Measuring range of 0-14 pH; 0-1999 mV, temperature 0 ° to 80 ° C. Supplied complete with solutions (pH 4, 7 and KCl) electrode and ATC (Automatic Temperature Compensation) in a carrying case. Dimensions: 185 x 45 x 80 mm.

Accesorios:

- S028.01** Electro glass body, 0 ... 80 ° C
- S028.02** Electro stainless steel

PH METER OF ON-BOARD

S029 Alphanumeric backlit LCD display, microprocessor controlled. Flexible arm. It can measure pH, mV and temperature in the laboratory and in the field. Measuring range of 0-14 pH; 0-1999 mV, temperature 0 ° to 80 ° C. Supplied complete with cable, flexible arm solutions (pH 4, 7 and KCl) electrode, magnetic stirrer and CAT (Automatic Temperature Compensation) in a carrying case.

Dimensions: 230x170x70 mm
Weight: 1.5 kg approx.



V111 Magnetic stirrer with heating maximum temperature over 400 ° C

Furniture injection, which gives great stability to the team, lacquered.

Surface agitation circular stainless steel AISI 304, Ø150mm.

Light switches and independent regulatory controls for the heating and stirring functions located on the front panel.

The stirring capacity is more than 10l. (relative to water).

Stirring speed variable from 30-2100 rpm Power: 220V, 50 Hz

LIQUID LIMIT : Casagrande method

UNE 103.103/ BS 1377:2/ ASTM D4318/ AASHOT T89

Evaluate the relationship between the moisture percentage of a soil sample and the number of blows required to close a groove made into the soil and therefore to determine when a clay soil changes from a plastic to a liquid state

S032 Casagrande apparatus liquid limit the unit comprises a removable brass cup with through a cam device drops on a rubber base (or hard rubber base). Supplied complete with drops counter, but "without grooving tool" which has to be ordered separately.

Dimensions: 150x190x150 mm. Weight: 3 Kg

S033 Casagrande apparatus hand operated with mechanical metered number of strokes, standardized base, bowl (cup) smooth with drop height adjustable handle.

Weight: 3 Kg approx.

S034 Casagrande apparatus motorized drive by an electric motor 120 strokes per minute frequency. Digital display to display the number of hits. Stop Switch.

Weight: 7 Kg approx.

Accessories:

S032.01 Casagrande grooving tool in compliance with ASTM D4318 standard, stainless steel

S032.02 Grooving tool in compliance with UNE, AASHOTO T79 standard

S032.03 Grooving tool Hovany

A032.06 Grooving tool to BS 1377:2 specification

S032.04 Stainless steel spatula with 150 mm blade

S032.05 Glass 300 x 300 x 5 mm one face frosted.

S032.10 Brass cup ASTM, BS, UNE; AASHTO

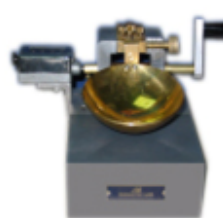
S032.11 Grooving tool, to NF P4-051

S032.13 Chromed cup NF P94-051

S032.14 Rough brass cup, with central smooth band 10 mm wide, as requested by NF P94-051 used for soil having low plasticity



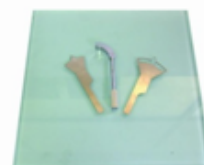
S034



S033



S032



S037 Pocket shear vane device range 0-2 Kg / cm² for rapid determination of cohesive soil.

S038 Pocket shear vane device range 0-1 Kg / cm² for rapid determination of cohesive soil.

S042 Pocket penetrometer, designed for the rapid determination of soil consistency, shear strength and approximate Unconfined. Compression strength. Scale range 0 to 4.5 kg / cm² with direct reading strength values. Plunger dia. 6,35 mm. Weight: 300 g.

C143 Pocket penetrometer range to 0-16 kg / cm²

S036 Geopocket dial penetrometer, designed for a quick determination of the foundation soil, from clay to sandy soils.

It indicates the angle of internal friction (sandy soils) and cohesion (clay soils) and the approx. Unconfined compressive strength.

Peak hold feature; zero setting by push button.

Supplied complete with 5 plungers Ø 6,4 - 10 - 15 - 20 - 25 mm. Weight 400 gr.



C037/38



C042

**HYDROMETER SEDIMENTATION METHOD**

S045 Lomi high speed agitator consisting of an engine that reaches 6,000 rpm, stainless steel propeller placed on the motor shaft. The equipment is supplied complete with holder and stainless steel cup. 0.8 l. capacity.

**S045**

S046 Electronic mixer with digital display, speed control between 200 - 2000 rpm. Supplied with stir, support and locking nut.

**S046**

S047 Immersion thermostat heater

Features:

Resolution: 0.1 ° C

Accuracy: + / - 0.5% FS (full scale)

Temperature display: 4-digit display.

Agitation pump, capable of homogenizing the temperature in containers up to 100 liters (relative to water and the covered container).

Possibility of coupling an output pump for external circulation

Temperature control with digital thermostat.

All parts in contact with liquid are made of stainless steel AISI 304.



V017 Transparent methacrylate tray 300 x 200 x 500 mm.

S048 Soil Hydrometer of 0.980 to 1038 g / liter

S049 Soil hydrometer, range 0 to 60 g / liter

V6747 1000 ml test tube

V6804 Beaker of 250 ml capacity

V435 Digital Timer

V141684.1211 Sodium hexametaphosphate, container 1000 g

**V435****S052**

S052.01 Mechanical Jack 50 KN capacity

Unconfined compression tester

NORMAS: ASTM D2166 / AASHTO T208 / BS 1377:7

S052 is a hand-operated tester, utilized both on site and in laboratory, applies the load by a handwheel and strength is read on a proving ring 200 Kg. capacity.

The apparatus can test samples up to dia. 80 mm. x 200 mm height.

The S052 tester comprises:

S221 Conversion frame

S221-01 Mechanical jack 50 kN capacity

S370-02 Load ring 2 kN capacity

S131-11 Upper+lower compression platens with accessories

S376 Dial gauge 10 x 0,01 mm

S212-03 Dial gauge holder

Dimensions: 380x460x1380 mm . Weight: 68 Kg

NOTE: This machine includes some common component (like for ex. the mechanical jack mod. S052-01). It is therefore possible to combine these components for different machines, with some economical advantage.

CONSISTENCY DETERMINATION, PENETRATION BITUMEN UNE EN 1426 / UNE 104281-1,4 / BS 2000 / ASTM D5, D217 / AASHTO T49 / NF T66-004

B052 Standard penetrometer to determine the consistency of a bituminous sample under fixed conditions of load, time and temperature. The penetration is expressed in distance of tenths of millimeters vertically penetrated by a standard needle. The standard penetrometer is ruggedly constructed, with an aluminium base table with levelling screws, plated vertical rod, “**micrometric vertical adjustment device**”. The dial, graduated in 360° (division 0,1 mm.), has diameter of 150 mm. The penetrometer is supplied with stop and release push button, automatic zero set, micrometer adjustment, set of weights 50 and 100 g. penetration needle, brass sample cups dia. 55x35 mm and 70x45 mm. Dimensions: 220x170x410 mm. Weight: 11 kg

B052.10 Basically structured as mod. B052 but having a magnetic controller device with electronic digital programmable timer that automatically releases the plunger head and ensure free falling of the needle during the 5-seconds test.

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

Dimensions: 220x280x410 mm. Weight: 15 kg.

Accessories:

B052.01 Sample cup, brass made, dia 55x35 mmh.

B052.02 Sample cup, brass made, dia 70x45 mmh.

B052.03 Mirror for easy adjustment of the needle

B052.04 Ø1 Penetration needle, Ø1.00 mm

V9117 Thermometer ASTM 17C (+19 °C to 27 °C).

B052.07 Thermometer IP 38C (+23°C to +26°C) rad 0,1°C



B052 B052.10



B053 B053.10

B052.05 Transfer dish, made from glass, with support

B053 Standard digital penetrometer Used to determine the consistency of a bituminous sample under fixed conditions of load, time and temperature. The penetration is expressed in distance of tenths of millimeters vertically penetrated by a standard needle. The standard penetrometer is ruggedly constructed, with an aluminium base table with levelling screws, plated vertical rod, “**micrometric vertical adjustment device**”.

The slider is brass made with free fall. The digital readout of the penetration values has readings in mm and inch, with 0,01 mm resolution, LCD 5 digits display, with zero set in any position.

Power: 1,5V battery.

The penetrometer is supplied with stop and release push button, automatic zero set, micrometer adjustment, set of weights 50 and 100 g penetration needle, brass sample cups dia. 55x35 mm and 70x45 mm. Dimensions: 220x170x410 mm Weight: 11 kg

B053 Semi-automatic digital penetrometer Basically structured as mod. B053 but having a magnetic controller device with electronic digital programmable timer that automatically releases the plunger head and ensures free falling of the needle during the 5-seconds test.

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

Dimensions: 220x280x410 mm

Weight: 15 kg

LINEAR SHRINKAGE DETERMINATION

UNE 103.104/ ASTM D4318/ BS 1377:2/ AASHTO T90

S054 Mould to produce a specimen of 140 mm.long x 12,5 mm radius.

This test covers the determination of linear shrinkage of soils and indicates the plastic properties of soils with a low clay content.

Weight:500 g





S055 Sulfates shaker for 12 bottles of 1 liter. Its flask fastening system is adjustable and allows placing bottles of different sizes and capacity. Supplied complete with shield with micro aperture.
Speed: 50 rpm
Power supply: 380/220V, 50 Hz
650x600x850 mm

Accessories:

S055.01 Glass bottle, 1 liter capacity



PLASTIC LIMIT DETERMINATION

UNE 103.104/ ASTM D4318/ ASSHOT T90/ NF P94-051/ BS 1377 :2

S056 The plastic limit determines the lowest moisture content of a soil, by which a sample can be rolled into threads 3 mm. dia. without breaking the same neither longitudinally or transversely.

The set complete comprises:

S032.05 Glass plate 300x300x5 mm

S056.01 Rod caliper Ø3 x 100 mm.

V274/40 Mixing porcelain dish 110 mm dia.

S032.04 Flexible spatula 150 mm. blade

B052.01 Aluminium moisture tins dia 55 x 35 mm. (qty 6)



SHRINKAGE LIMIT

UNE 103.108/ ASTM D427/ BS 1377 :2/ AASHTO T92

S057 Used to determine the maximum moisture content at which the soil does not shrink after drying the sample. Complete with carrying case.

The set comprises:

S057.01 Shrinkage prong plate, made from plexiglass material with three metal prongs.

V274/70 Glass evaporating dish, dia. 120 mm flat bottom

S032.04 Flexible spatula, 100 mm. blade

V6100 Crystallizing dish, dia. 57x32 mm

S057.02 Shrinkage dish, dia. 45x12,7 mm (2 pieces)

V6742 Graduated cylinder 25 ml capacity

S075.03 Plastic carrying case

Soil Lathe

S058 Designed to reduce by trimming the diameter of a soil sample unit reaching the desired diameter size by using a wire saw.

The lathe is hand-operated, the height is adjustable up to 230 mm, and it accepts samples from dia.38 to 110 mm.

Supplied complete with three sets of platens for samples dia.38 50,47 -60 mm, wire saw and 6 wires.

Dimensions: dia.460x720 mm

Weight: 20 Kg.

S058.01 Upper and Lower trimming platen available from dia.38 to 110 mm.

When ordering please specify required diameter.



SAND EQUIVALENT TEST SET (COMPLETE)

EN 933-8 / UNE 103109 / ASTM D2419 / BS 1924 / NF XP18-598

S060 Equipment to determine sand equivalent consists of the following components.

S060.01 Plexiglass measuring cylinder engraved at 2 stripes 100 and 380 mm. square basis

S060.02 Rubber stopper for cylinder

S060.03 Irrigator tube with conical tip and holes

S060.04 Measuring of 125 ml

S060.05 Funnel wide mouth

S060.06 Weighted foot assembly for sand level

S060.07 5 L container with siphon lid

S060.08 Tubo de goma (1,5 m).

S060.09 Mohr clamp

S060.10 Graduated ruler 500 mm stainless steel

V435 Stop watch, digital

S061 Miniature sample splitters 5 mm, with three receivers

S062 Concentrated stock solution, 5000 ml.



S061 Miniature sample splitters 5 mm, with three receivers and dustpan



S062 Concentrated stock solution, 5000 ml.



S063 Motorized sand equivalent shaker

The unit provides a constant uniform shaking with automatic cycle test. Oscillating excursion is 203 mm at 175÷180 adjustable strokes/min. rate. Complete with digital timer that automatically stops the shaker at the end of the test. It cannot be sold in CE markets without security cabinet
Power supply: 230V 1ph 50 Hz 250 W
Dimensions: 700x360x350 mm. Weight: 30 Kg



CONSOLIDATION TEST

UNE-103.405/ ASTM D2435, D4546, D3877/ BS 1377/ AASHTO T216/ NF P94090-1, P94-091

The one-dimensional consolidation test of a soil sample enables to ascertain the settlement characteristic over a given period of time. The soil specimen under test is axially loaded and laterally contained. Loads are applied with progressive increases and the settlement values are read on a dial gauge or on a digital display (through a displacement transducer).

Rigidly manufactured from aluminium alloy casting to provide a high degree of accuracy with any frame distortion under load. The load bridge group is supported in high accuracy self-aligning seat balls. The beam provides three loading ratio: 9:1 - 10:1 - 11:1 . and the beam assembly is fitted with an adjustable counterbalance weight.

Maximum load: 170 Kg of slotted weight, corresponding to 1870 Kg using the beam ratio 11:1

The equipment is supplied complete with Ø50 mm oedometer cell. With porous stones, and support for analog comparator comparators 10 x 0.01 mm.



S065 Central loading oedometer 3 posts

S066 Central loading oedometer 1 post

ACCESSORIES:

S067 Bench holding three apparatus. Made from sturdy structural painted steel.

S068 Bench holding one apparatuses

S069 Set of 50 Kg. Of slotted weights

S070 Consolidation cells 20 cm² for sample of 50.5 x 20 mm.

V364 Dial indicator analogic 10x0,01 mm

V360 Digital indicator 10 x 0,01 mm digital

S072 Data acquisition module 8 channel with conditioners.

S075 Software for oedometer test

S095.05 Linear vertical displacement transducer, 10 mm travel



EDOTRONIC “TOUCH SCREEN HIGH PERFORMANCE” AUTOMATIC CONSOLIDATION APPARATUS (OEDOMETER)

BS 1377:5 / ASTM D2435-80 / CEN-ISO-TS 17892-5 / XP P094-090-I

S077 This automatic consolidation system, ideal for modern and efficient laboratories, has been created to eliminate or reduce to the absolute minimum any forms of manual intervention, which the oedometer test requires. This therefore results in greater efficiency and cost effectiveness.

This appliance is extremely simple and easy to use.

Specifications of the frame:

Edotronic, equipped with two coaxial cylinders, provides a precise and timely weight positioning with two ranges of measurement:

0 – 1499 (N) Newton

1500 – 15000 (N) Newton

Input of compressed air (filtered): Max. 10 Bar

Resolution: 1 Newton

Precision: 1%

Maximum load: 15 kN (with 8 Bar input)

There is no need of weights as the cylinder and pneumatic piston take it to the desired weight in real time.

Weight application and removal are carried out automatically in the test sequences.

The load value is measured by a pressure transducer which is built in the regulation valve.

An additional high precision load cell will detect the effective load value and perform precise control through a closed loop system, granting repeatability and accuracy.

Firmware:

- Electronic control unit Cyber-plus Evolution with “Touch-Screen” color graphic display ¼ VGA, that runs like a standard PC based on Windows operating system, for the management of the data.
- The Touch-Screen icon interface allows an easy set-up of all the parameters and prompt execution of the test. Read value results are immediate and of extreme accuracy.
- The machine can perform the tests without any external PC, because of the “Cyber-Plus” grants performances like a PC.
- Direct connection to Intranet (connection to a LAN network) and Internet to establish a remote communication and receive an immediate diagnosis from Matest technicians, or for upgrades of the Firmware.
- Unlimited memory storage with: 2 USB ports, 1 SD card.
- Simple, rapid linearisation and calibration procedure.
- The appliance comes completely equipped with the relevant software.
- Possibility to select different languages.

The following **“are not included”**: software oedolab connect, consolidation cell, transducer, compressor, filter, that have to be ordered separately (see accessories).

Power supply: 230V 1ph 50/60Hz

Dimensions: 290 x 450 x h 610 mm. Weight: 30 kg.



ACCESSORIES:

V244 Laboratory compressor, tank capacity 50 litres, nominal pressure 10 bar

S077.11 Air filter, auto-draining it reduces up to one micron, complete with discharge.

S077.12 Software oedolab connect

S095.05 Linear displacement-deformation transducer, accurate and versatile. Transducer 10 mm travel Independent linearity < 0,3%

S077.51 Calibration process of the linear displacement transducer combined with the Edotronic

Consolidation cells, different models: see pag. 142

Gauge blocks, Grad 1

Used to calibrate the linear displacement transducers.

S077.41 Gauge blok, nominal length 5 mm

S077.43 Gauge block, nominal length 10 mm.





DIRECT/RESIDUAL SHEAR TEST APPARATUS
UNE-EN 103.401/ ASTM D3080/ BS 1377/ AASHTO T236/
NF P94-07-1,2

S078 Used to determine the resistance to shearing of all types of soil specimens both consolidated and drained, undisturbed or remoulded samples. The machine can accommodate specimens dia. 50, 60, 100 mm, and square 60x60, 100x100 mm. The apparatus is equipped with a control closed loop motor with epicyclic reducers. At the beginning of each test, the machine performs an automatic and complete internal check, a position reset with the elimination of all possible positioning errors and all pauses.

The input of all the test patterns is achieved by the interaction of the keyboard and the alphanumeric display with self-memory, thus granting infinitesimal resolutions in short times.

All data are input and stored when the machine is in stand-by, without affecting the specimen under test with quick machine setting. Possibility to fix maximum excursion of the shear box, so as to interrupt automatically the test.

It is possible to input a different return speed (residual shear) in relation to the one used for the shear test, thus allowing a quick playback to select the residual shear test, saving a lot of time.

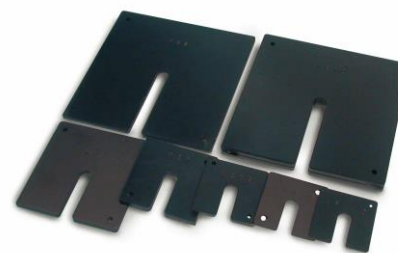
Possibility to identify directly on the consolidation curve the effects of the primary consolidation, only with data acquisition version. Automatic calculation of the appropriate shear velocity by selecting by selecting the optimal consolidation parameter among t50, t90 and t100, improving efficiency and cost effectiveness, only with data acquisition version.

Technical features:

- Display of both speed and displacement with 0.00001 mm resolution
- Shear speed between 0.00001 to 15.0000 mm/minute
- Max shear load: 5000 N possible on the whole speed range
- Possibility of direct vertical load, or with a lever arm ratio 10:1
- Max vertical direct load: 500N; with lever arm: 5500N
- Box group mounted on ball track with high quality antifriction system

Models	Shear box	Spare couple of porous stones
Round specimens dia 50 mm	S282	S286-03 KIT
Round specimens dia 60 mm	S283	S286 KIT
Round specimens dia 100 mm	S281	S286-04 KIT
Square specimens 60x60 mm	S284	S286-01 KIT
Square specimens 100x100 mm	S285	S286-02 KIT

Models	Hollow Punch	Tamper
Dia 50 x h 25 mm	S222-08	S223-08
Dia 60 x h 25 mm	S222-09	S223-09
Dia 100 x h 25 mm	S222-10	S223-10
Aquare 60x60xh25 mm	S222-11	S223-11
Aquare 100x100xh25 mm	S222-12	S223-12



- Extremely easy and practical use, not requiring qualified staff.

- Power supply: 220 V, 50 Hz single phase

- Dimensions: 1350x1050x420 mm. Weight: 120 kg approx.

Shear box, hollow punch and tamper **are not included** in the standard supply and have to be ordered separately.

S082 Set of 50 Kg of slotted weight, made of painted steel (4x10 kg, 1x5 kg, 2x2 kg, 1x1 kg)



The direct/residual shear testing machine is available in “THREE” VERSIONS:

S078 Digital basic version

S084 Digital Shear Testing Machine, with incorporated Data Acquisition System and Basic Firmware, comprising:

S084.10 Shear Frame with digital “Touch-Screen” microprocessor, complete with beam loading device, shear box case with adaptors, transducers supports.

S084.20 Load Cell, electric, 3000N capacity, complete with cable.

S088 Linear vertical transducer, 10 mm travel.

S089 Linear horizontal transducer, 25 mm travel.

S090 Firmware activating 3 connectors for basic data acquisition.

S082 Set of 50 kg of slotted weights.

NOTE: Shear box, hollow punch, tamper and Software “are not included” and have to be ordered separately.

S086 Data acquisition version

S085 Digital shear Testing Machine, with incorporated Data Acquisition system and basic firmware, comprising:

S084.10 Shear Frame with digital “Touch-Screen” microprocessor, complete with beam loading device, shear box case with adaptors, transducers supports.

S084.20 Load Cell, electric, 3000N capacity, complete with cable.

S088 Linear vertical transducer, 10 mm travel.

S089 Linear horizontal transducer, 25 mm travel.

S090 Firmware activating 3 connectors for basic data acquisition.

S082 Set of 50 kg of slotted weights.

NOTE: Shear box, hollow punch, tamper and Software “are not included” and have to be ordered separately.

S335.15 Universal coupling pliers for dial gauge/transducer. It accepts all Group I&S displacement transducers and dial gauges (dia. from 8 to 20 mm).

S087 Data acquisition console 8 channel

S336.31 Extension cable 5 meters long.

LAMBE TEST (INDEX POTENTIAL EXPANSION AND VOLUME CHANGE). UNE-103.600

S092 "LAMBE" apparatus. The apparatus comprises a base frame for accommodating the test cell, and with two parallel bars perpendicular to each other, linked to a loading bridge provided with upper lower device for fixing and centering ring with dynamometric millesimal comparator to perform test measurements. the machine is also equipped with a test cell with porous plate and rubber O-ring for airtight fit. Ring Capacity: 2 KN.

Dimensions: 550x300x300 mm. Weight: 26 kg approx.

Accessories:

S013 Compaction hammer, 2.5 Kg. type Army



S084



S280.15 Mounting device between the universal coupling block S335.15 and the shear machine S078 to fix the vertical displacement transducer or dial gauge.

S280.16 Mounting device between the universal coupling block S335.15 and the shear machine S078 to fix the horizontal displacement transducer or dial gauge.





TRIAXIAL TEST EQUIPMENT

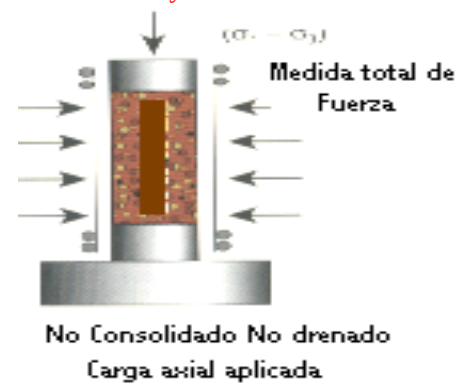


Triaxial equipment originally designed in Harvard university

UU - Unconsolidated Undrained Test

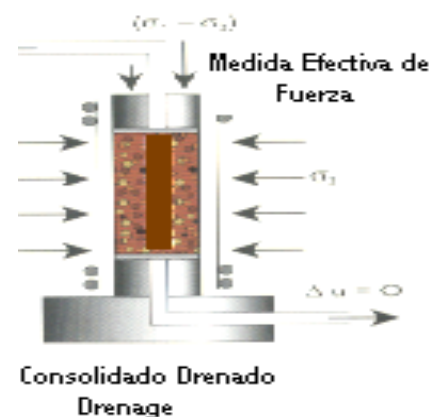
Determines the shear strength in undrained conditions. No structural variation is allowed. When pressure in the cell has been achieved, no specimen volume decrease is allowed. The same specimen is then stressed up to the failure.

This test is normally performed on three specimens taken from the same sample and subjected to three different confining pressures. Load and settlement values of the specimen, normally required to evaluate the soil, features in the foundation works, bearing piled foundations, diaphragms, shear angle, slopes stability can be determined.



CU - Unconsolidated Undrained Test

Determines the characteristics of the resistance to shearing stress according to the foundations effective and verify the improvements due to compaction, pre-consolidation and stabilization. Unlike the test "UU", allowing variation of the volume of sample until the pressure is stabilized consolidation. This test is normally performed on three samples.



CD - Unconsolidated Undrained Test

This test is similar to the "CU", since the shear strength can be calculated and related to the applied voltage level. It applies very permeable grounds, where they are usually geotechnical problems. This method requires a very slow, once the axial load applied is avoided increased interstitial pressure in the sample. This test is normally performed on three samples.



METHODS FOR CALCULATING THE MECHANICAL PROPERTIES OF SOIL

TRIAXIAL TEST

ASTM D2850, D4767/ NF P94-070, P94-074/ BS 1377:7, 8/ CEN-ISO TS 17892-8,9

S095 This versatile, compact, heavy duty load frame has been designed for routine tests, for central laboratories, but also for research purposes. The frame is of rigid chromed steel twin column construction. The electronic color digital “touch-screen” display with microprocessor control system allows to perform tests within a speed range of 0,00001 to 12 mm/min.

The maximum load capacity is 50 kN, and it is suitable either for cells S105 (max. specimen size 70x140mm) and S106 (max. specimen size 100x200mm). The system guarantees high resolutions in real time.

The load plate is foreseen of electric end of stroke, to save the machine from wrong manipulations.

Specifications of the frame:

- Maximum load capacity: 50kN
- Infinitesimal testing speed: from 0,00001 to 12 mm/min.
- Minimum vertical clearance: 400mm (140mm with ring)
- Maximum vertical clearance: 1100mm (840mm with ring)
- Horizontal clearance: 380 mm
- Platen diameter: 177 mm

Firmware:

- Electronic control unit “Cyber-plus Evolution” with Touch-Screen color graphic display ¼ VGA, that runs like a standard PC based on Windows operating system for the management of the data. (Analysis of the data, test results, graphs with S085 software; optional accessory).
 - The Touch-Screen icon interface allows an easy set-up of the parameters and immediate execution of the test.
 - The machine can perform the tests without any external PC, because of the “Cyber-Plus” grants performances like a PC.
 - Direct connection to Intranet (connection to a LAN network) and Internet to establish a remote communication and receive an immediate diagnosis and for upgrades of the Firmware.
 - Unlimited memory storage with: 2 USB ports, 1 SD card.
 - Possibility to select different languages.
 - The machine is equipped with 8 connectors for the acquisition and data processing system up to 8 analogical/digital channels (that is activated with the S095.15 optional firmware) for load cells and transducers. Extra slot available to expand the on-board channels to 16 (with S095.16)
- The frame is supplied with loading ram and sphere, but **“without”** load rings, dial gauges, electric load cells or displacement transducers that “have to be ordered separately”.

Power supply: 230V 1ph 50/60Hz 600W

Dimensions: 490 x 510 xh 1800 mm

Weight: 115 kg

Accessories:

S086 Data acquisition module 16 channel

S087 Data acquisition module 8 channel

S088.01 Transducer cable connection

S085 Triaxial testing software

S095.15 Firmware for acquisition and data processing system up to 8 analogical/digital channels for load cells and transducers.

Graphic and numbers visualization, processing, printing and storing of the test results. This software activates the 8 connectors foreseen on the load frame.

S095.16 8-channel internal module, for system expansion to 16 channels of the triaxial load frame. This upgrade is possible only in I&S factory.

S095.10 Load ring 50 KN capacity



S095 with data acquisition



S095 with load ring





- S095.10** load cell 2,5 KN capacity
- S095.11** load cell 10 KN capacity
- S095.12** load cell 25 KN capacity
- S095.13** load cell 50 KN capacity



A196 This unit provides an infinitely variable constant pressure from 0 to 3500 kPa by using a motorized hydraulic pump, an oil/water interchange vessel, piston/spring, valves, and high viscosity oil. Supplied complete with test pressure precision gauge, range 0-3500 KPa.

Power supply: 230V 1ph 50 Hz
Dimensions: 320x320x410 mm
Weight: 20 Kg



A196



S101 It provides a water pressure up to 1700 kPa. Simple, practical and extremely accurate system used to select test pressures, it can also offer the possibility to further system expansions. The use of deaerated water is recommended. It must be connected to a pneumatic compressor as mod. V244. **The cell set is equipped with an inlet high pressure air valve and 2 outlet valves for pressurized water and water.**

Dimensions: 270x300x425 mm

Weight: 9 kg

Accessories:

- S101.01** Membrane for air / water cell. Pack of 2 pieces.
- S101.02** Pressure regulator, high accuracy model
- S101.02** Filter unit (water trap) composed by filtering device and interchangeable cartridge, used to collect condensed water.
- S101.04** Nylon tube dia 6x4 mm on 20 m roll.

V244 Laboratory air compressor, max. pressure 10 bar
Reservoir capacity: 50 liters
Power supply: 220V, 50 Hz





TRIAXIAL CELLS

Made aluminum corodal alloy and the cell can be easily assembled and disassembled by means of quick clamping rods. In order to reduce as much as possible friction, a particular care is deserved during loading ram realistion. The low cell cap is supplied with **“four inlet valves”** back pressure, low drainage, pore pressure, cell pressure. In order to measure the specimen axial deformation, an adjustable dial gauge or a displacement transducer is also provided.

NOTE: No top caps, base adaters, rubber membranes and sealing rings, prorous stones, dial gauges, etc. are included and **“should be ordered separately”** in the table all accessories for triaxial cells are listed.

* Note: Cell S105can be also used also for specimens dia 50x100 and 38x76 mm with accessories of suitable diameter. But it is not suitable for 100x200 mm samples.

**Note: Cell S106 can be also used also for specimens dia 50x100 and 38x76 mm with accessories of suitable diameter.

Code	S105	S106
Dimensions Max. sample (dia. x h) mm	70x140	100x200
maximum pressure	1700 kPa	1700 kPa
Overall dimensions (dia. x h) mm	280x480	310x540
Weight Kg	8	16



S110 Top cap with drainage

Made of anodized aluminum, suitable for force on the specimen. Can be used for both trials as drained and undrained.

S110.05 Top head undrained

Made of anodized aluminum, suitable for use drained tests.

S111 Base Adapters for cell

Anodized aluminum manufactured to adapt the cell to the size of the specimen. It has hole for drainage and pore pressure.



S113 Porous disc

Manufactured quartz conglomerate. Assays used drained and placed on the sample. Thickness: 10 mm.



Triaxial cell Accessories	Ø38x76 mm	Ø50x100 mm	Ø70x140 mm	Ø100x200 mm
Top cap	S110.01	S110.02	S110.03	S110.04
Adapters base	S111.01	S111.02	S111.03	S111.04
Base disc	S112.01	S112.02	S112.03	S112.04
Porous disc (2)	S113.01	S113.02	S113.03	S113.04
Membrane (Pack 10)	S114.01	S114.02	S114.03	S114.04
O-ring (pack of 10)	S115.01	S115.02	S115.03	S115.04
Tensor membrane	S116.01	S116.02	S116.03	S116.04
Tool placement of O-ring	S117.01	S117.02	S117.03	S117.04
Tripartite moulde	S118.01	S118.02	S118.03	S118.04
Bipartite moulde	S119.01	S119.02	S119.03	S119.04
Drain filter paper (50)	S120.01	S120.02	S120.03	S120.04
Filter paper (100)	S121.01	S121.02	S121.03	S121.04

S114 Rubber membrane

It serves to cover the specimen to isolate lateral pressure.
Supplied in packs of 10.



S118 Tripartite mould, made of steel in three parts for ease of stripping. Is used to prepare specimens and compact.

S122 Core cutter Ø38,1 mm samples, made of tubular stainless steel cutting edge and a wooden cylinder to draw the sample.



PROCTOR TEST: MOISTURE-DENSITY RELATIONSHIP DETERMINING THE RELATIONSHIP BETWEEN DRY DENSITY, MOISTURE CONTENT AND COMPACTION

EN 13286-2, 103.501/ ASTM D558, D698, D1557/ AASHTO T134, T180/ BS 1377:4, 1924:2/ NF P94-093, P94-066

S125 Standard P.N. Mould. Made of tubular steel and hinged open by generatrix, with corrosion protection.

Supplied complete with base and collar.

Dimensions: $\varnothing 102 \pm 0.4$ mm int. X 122.4 ± 0.1 mm.

S126 Standard P.N. Mould. Made of closed steel tube with corrosion protection. Supplied complete with base and collar.

Dimensions: $\varnothing 102 \pm 0.4$ mm int. X 122.4 ± 0.1 mm.

Accessories:

S128 Straight edge with handle



DETERMINE THE RELATIONSHIP BETWEEN THE DENSITY OF DRY SOIL COMPACTED WITH DIFFERENT MOISTURE CONTENTS.

MODIFIED PROCTOR TEST EQUIPMENT

S129 Standard P.M.Mould. Made of tubular steel and hinged open by generatrix, with corrosion protection.

Dimensions: 152.5 ± 0.7 mm $\varnothing$ int. X 127 ± 0.1 mm in height.

S129.01 Base without hole for mold proctor modified.

S129.02 Collar for Modified proctor mould.

S128 Straight edge with handle



**CALIFORNIAN BEARING RATIO - CBR****GRADE DETERMINATION LOAD RESISTANCE OF SOILS AS FLEXIBLE PAVEMENT**

EN 13286-47, EN 13286-4/ UNE 103.502/ ASTM D1883/ AASHTO T193/ BS 1377:4, 1924:2/ NF P94-078, P94-093, P98-231

S130 C.B.R. mould made of tubular steel and hinged open by generatrix, with corrosion protection. Dimensions: dia. 152.5 ± 0.3 mm int. X 177.8 ± 0.1 mm in height.

S130.01 Perforated base plate for C.B.R.

S129.02 Collar for mould C.B.R.

S131 Spacer disc with "T" handle dia. 151 ± 0.3 and 50.8 ± 0.1 mm thick.

S132 Perforated (Sweel) plate

S133 Tripod (dial gauge support)

V364 Dial gauge 10 mm range 0,01 mm subd.

S134 Slotted surcharge weight 10 lb.

S135 Slotted surcharge weight 5 lb.

S136 Annular surcharge weight 10 lb.

S137 Annular surcharge weight 10 lb

S138 Filter paper dia. 150 mm (pack of 100)

S128 Straight edge 300x30x3 mm.

S139 CBR penetration piston



S140 Compaction rammer type "Army" of 4.535 ± 0.01 kg . Made of steel with corrosion protection.

S140.01 Rammer dia. mm $50 \pm 0,5$. Fall height mm 457 ± 3 . Rammer weight Kg $4,5 \pm 0,04$. Total weight kg 8

S141 Compaction rammer type Army of 2.5 kg dia. 50, 8mm. Made of steel with corrosion protection.

S141.01 Rammer dia. mm 50,8. Fall height mm 304,08 Rammer weight Kg 2,495. Total weight kg 6.

**HARVARD TEST**

S142 Harvard bipartite mold for soils with particles smaller than 5 mm., Made of steel with anti-corrosion treatment. Supplied whit base and collar Dimensions: 33.3 x 71.5 mmh interior.

S143 Harvard rammer

S144 Support Harvard

PROCTOR/CBR UNIVERSAL COMPACTOR
EN 13286-2/ ASTM D698, D1557, D1883/ NF P94-093, P94-066/ AASHTO T99, T180, T193/ BS 1377 S146

Universal electromagnetic compactor Fully automatic regulation of rotation for adjustment to the various tests you can perform. Designed for compaction testing samples: Normal Proctor, Modified Proctor, CBR, soil cement and gravel-cement, as standard. Equipped with control panel on which are located the developer of the number of strokes with automatic stop, counter tiers, both electronic type with digital display, switch-off, pilot lights, stop and emergency protective screen area drive hub. Manufactured in steel frame and ready to host the Marshall test pedestal (not included). The machine is supplied complete with bases to Proctor, CBR, bar and game two clubs (feet) hardened. No accessories included trials NLT-159 (Marshall)
 Power: 220 V - 380 V three-phase, 50 Hz
 Speed: 40 strokes per minute
 Dimensions: 680 x 650 x 1570 mm high.

Accessories:

B022.05 Accessories NTL-159 test, formed a pedestal by wood and steel base plate for mold clamping device.

B022.02 Tube or hammer for the Marshall test

B022.03 Special hardened steel hammer stand for Marshall

S146.01 Tube or hammer for CBR, Standard Proctor and Modified Proctor tests

S146.02 Safety protection test area



VIBRATING COMPACTION HAMMER

EN 13286-4/ BS 1377:4, 1924:2, 1924 :2/ UNE EN 12697-32

S147 It provides an alternative method for the compaction of soil samples in the determination of dry density/moisture content relation (called Proctor), unconfined compressive strength of stabilized soils and CBR tests. This hammer is also used for the compaction of asphalt in the percentage refusal density. Supplied without tampers and support frame which must be ordered separately.

Power supply: 230 V 1ph 50/60 Hz 750 W

Dimensions: 105x430x270 mm

Weight: 7 kg

Accessories:

S147.01 Tool carrier

S147.02 CBR and proctor tamping foot, 146 mm dia., complete with shank

S148 Supporting frame for vibrating hammer. The sliding mass has a total weight (including hammer and tamping foot) of 37 kg as requested by EN Spec.

Steel made, plated against corrosion.

Weight: 70 kg



Automatic, programmable PROCTOR / CBR Compactor with microprocessor, “high technology”

EN 13286-47 / CNR UNI 10009 / CNR N. 29, 69 / ASTM D698, D1557, D1883 / AASHTO T99, T180, T193 BS 1377:4, 1990, 1994 / NF P94-093, P94-066 / DIN 18127 / UNE 7365, 7255, 103-501-94 / DUTCH RAW y la mayoría de la Normas Internacionales.

S149 Designed to compact Proctor and CBR specimens, it ensures an extremely uniform compaction degree, granting reliable and repeatable test results.

The microprocessor software allows to select and to perform different compaction cycles in a fully automatic system, by strictly meeting the mentioned International Standards.

The blows are automatically distributed as requested by the selected Standard, with turntable rotation and rammer displacement through photoelectric cell sensors and microprocessor. Top quality components and high accuracy mechanical workings grant very long life also under intensive utilizations.

The digital control panel is separate from the machine and it can be fixed to the wall or mounted on a bench. The high resolution graphic display (blue negative) 320x240 pixels visualizes selected Standard, total number of blows, effected and remaining ones to end the test, and execution of each layer.

The compactor is easy to use, friendly menu driven, of simple and practical maintenance.

The user can “**select and memorize up to 10 personalized test cycles**”, that can be later on modified or replaced by other ones.

This is a very important function, because it allows updating the Compactor to new Standards, or any Standard not included in the microprocessor, or for research purposes.

The original lift system of the rammer can be selected at 12” or 18”, or at 300 or 450 mm, granting a correct and constant fall height.

Rammer drop speed: 1 blow each 2 seconds.

The compactor accepts moulds having dia. 4” and 6”, 100 and 150 mm, both Group I&S made or from other producers, thanks to its universal mould fixing system.

The machine is supplied “**without rammers**” to be ordered separately and selected according to the desired Standard (rammers are interchangeable).

Not sellable in CE markets

Power supply: 230V 1ph 50Hz 500W

Dimensions: 610x470xh1710 mm

Weight: 165 Kg

NEDDED ACCESSORIES :

S149.06 Standard rammer 50 ±0,2 mm dia. and 2500 ±10 g weight

S149.07 Modified rammer 50 ±0,2 mm dia. and 4535 ±5 g weight. Conforming to: EN 13286-47 / BS 1377:4 UNE 7255, 7365, 103-501 / DIN 18127

S149.08 Standard rammer 50,8 ± 0,13 mm dia. and 2491,25 +/- 1,25 g weight

S149.09 Modified rammer 50,8 ± 0,13 mm dia. and 4537 ±3 g weight. Conforming to: ASTM D558, D559, D698, D1557, D1883 NF P94-066/93 / CNR UNI 10009 CNR N. 69 / AASHTO T99, T180, T193

S149.13 Standard rammer, 50 ± 0,4 mm dia. and 2700 ± 10 g weight.

S149.14 Standard rammer, 50 ± 0,4 mm dia. and 4900 ± 10 g weight. Conforming to: AS 1289 (Australian) Standard



ACCESSORIES:

S149.11 Safety guards to CE Directive. If the door is opened when the Compactor is working, it stops automatically.

S149.12 Soundproof security CABINET, steel made with microswitch, complying to CE Safety Directive, lined with sound-proofing material for noise reduction. If the door is opened while the Compactor is working, it automatically stops.

Dimensions: 740x730x1900 mm

Weight: 80 kg approx.

APARE PARTS:

S149.22 Calibrated rod holding the rammer.

S149.23 Kit of devices fixing the mould to the table

UNIVERSAL CBR/MARSHALL 2 SPEEDS FRAME 50 KN

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

1,27 mm/min for CBR tests

50,8 mm/min for Marshall tests

The load is measured by an electric 50 KN cell with high precision strain transducers. the deformation (flow) is measured by a displacement transducer 50 mm stroke and $\pm 0,1\%$ indendent linearity.

Display system , measures and displays at the same time the load (stability) in KN and the deformation (flow) in mm with pick hold features and possibility to print certificates and graphics directly on a laser printer via USB or to transfer them to PC via Ethernet.

Supplied complete with control system "Cyber-Plus 8 Evolution" , load cell and displacement transducer, but "without" accessorioies and Software for CBR and Marshall tests, to be ordered separately.

Power supply: 230V I ph 50/60 Hz 750 W

Dimensions: 450x400x1200 mm

Weight: 130 Kg



Accessories:

S150.03 Metal structure for the machine placement

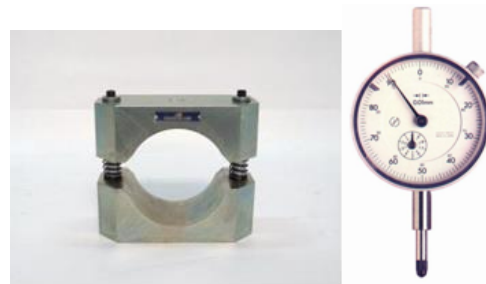
S139 Penetration piston CBR test

B036 Load piston Marshall test

S150.08 Upper + lower compression plates, 100 mm dia + distance piece with rod

S150.09 Software UTM2 (Universal Testing Machine 2) Licence for **CBR** test. Standards: EN 12697-34 / ASTM D1559 / BS 598:107 / NF P98-251

S150.10 Software UTM2 (Universal Testing Machine 2) Licence for **MARSHALL** test. Standards: EN 13286-47 / ASTM D1883 / BS 1377 / NF P94-078



B035 Marshall stability mould

V364 Analog gauge 10 x 0.01 mm



V370 Magnetic base with articulated and adjustable arm for gauge holding

**CBR TESTING MACHINES**

STANDARDS: EN 13286-47 / ASTM D1883 / BS 1377:4 / AASHTO T193 / NF P94-078

Used to load the penetration piston into the soil sample at a constant rate of 1,27 mm/min, and to measure the applied and piston's penetrations at determined intervals.

Group I&S proposes a wide range of machines: hand operated, motorized, dual speed, universal multispeed, load measurement by load ring or by electric load cell and digital unit with X/Y graphic recorder of load/penetration through RS 232 port to PC.

CBR loading machine, hand operated, laboratory model

S152 Load is applied through a mechanical jack and handwheel. Upper beam can be adjusted in height. Foreseen of fast approach device of the base plate.

The CBR machine comprises:

S152-01 CBR laboratory frame

S139 CBR penetration piston

S153.11 Load ring 50 kN capacity

V364 Dial gauge 10 x 0,01 mm

V364.03 Dial gauge holder

Dimensions: 430x380x1180 mm

Weight: 80 Kg

**ACCESSORIES:**

S210-02 Used to apply the correct rate of 1,27 mm/min penetration.

Power supply: 220-240 V 1ph 50 Hz



S364.01 Brake device, it holds the max. applied load on the dial gauge of the ring, with manual zero setting. Suitable for S152 and S153 machines.

CBR loading machine motorized, 50 kN ASTM version - 1,27 mm/min

S153 Load is applied through a screw jack driven by an electric motor at a constant penetration rate of 1,27 mm/min achieved by a built in gear box and “**assured also under load**”.

Upper beam can be adjusted in height.

Foreseen of fast approach device of the base plate and electric end of stroke switches of the load plate to save the machine from wrong manipulations.

The CBR machine comprises:

S153.10 CBR motorized frame

S139 CBR penetration piston

S153.11 Load ring 50 kN capacity

V364 Dial gauge 10 x 0,01 mm

S364.03 Dial gauge holder

Power supply: 230 V 1ph 50 Hz 750 W

Dimensions: 430x380x1180 mm

Weight: 98 Kg



S364.02 Electric device for automatic stop of the CBR machine when reaching the max. capacity load. To prevent any overload damage this device is mounted on the proving ring of the S153 machine.

UNIVERSAL MACHINES (MULTIPURPOSE) ELECTROMECHANICAL FLEXURAL, COMPRESSION AND TENSILE TEST

EN 13286-47, EN 196-1/ UNE 103.502, 67100-85/ ASTM D1833/ AASHTO T193/ BS 13772:4/ NF P94-078

Electromechanical multitest load, automatic compact to 200 or 300 KN capacity for compression-deflection tests mortar specimens CBR and Marshall tests, compression tests on flexural materials and vials, with load cell, microprocessor console managed by latest computer. Actuating speed is adjustable between 0.1 mm. / Min and 100 mm. / Minute and 0.1 Kg. / Sec. and 1000 Kg. / sec. The machine has an on-off switch, limit switch and emergency stop button.

Supplied complete with microprocessor management module, computer and manual (grips for tensile trial not included).

- External dimensions: 2200 x 1200 x 500 mm.
 - Distance between plates: 700 mm.
 - Distance between columns: 620 mm.
 - Piston stroke: 0-400 mm.
 - Maximum force: 200 to 300 KN.
 - Resolution of force: 1 N
 - Displacement resolution: 0.01 mm.
 - Magnetothermal switch
 - Power indicator light.
 - Frame Weight: $\approx$ 900 kg approx.
- Power supply: 220V AC, single phase over ground

S155 Universal machine capacity of 200 KN

S156 Universal machine capacity of 300 KN

Accessories:

S155.05 ENAC certificate calibration with issuance "in situ" for machines (budget request).

S155.01 Load cell 50 KN capacity on machines for coupling with corresponding couplings.

E015 Set manuals holder jaws. This equipment is designed to be used with the multiensayos presses depending on the capacity of each machine.

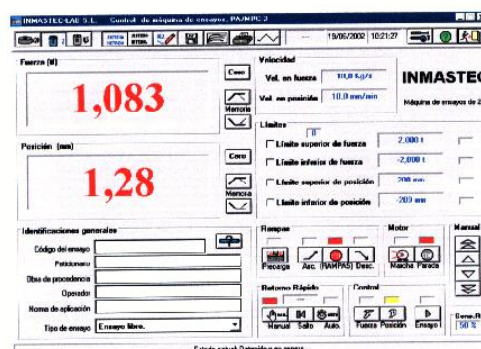
Supplied with two sets of pliers, one flat and one round for V.

Forceps flat: for flat specimens of 0 to 10 mm thick

Round tongs: 0 to 7 mm in diameter.

Tweezers in V: for round specimens from dia 8 to 14 mm.

Note: The machine does not include flexural device, which must be ordered separately





UNIVERSAL MACHINE (MULTIPURPOSE) TESTING A FLEXURAL, COMPRESSION AND TRACTION OF FOUR COLUMNAS.

S157 Electromechanical multitest machine 400 kN capacity, compact automatic for flexural-compression tests and test specimens of mortar Marshall CBR, compression tests and construction materials Vials with cell load of 500 kN. capacity with managed controlled console by microprocessor and computer latest generation. Actuating speed is adjustable between 0.1 mm. / Min and 100 mm. / Minute and 0.1 Kg. / Sec. and 1000 Kg. / sec. The machine has an on-off switch, limit switch and emergency stop button.

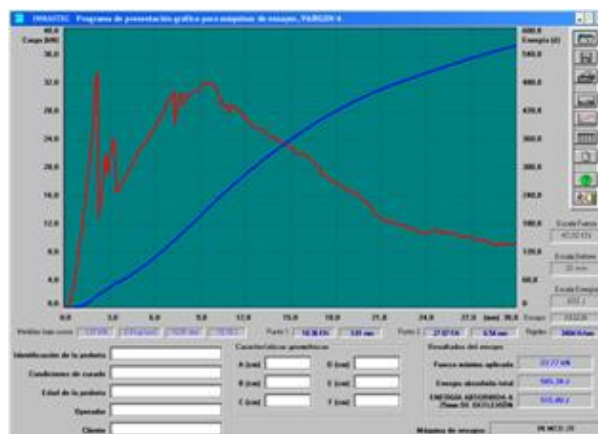
Supplied complete with microprocessor management console, computer and manual (jaws for tensile testing not included) and load cell of 500 kN with a corresponding coupling.

Tecnical Feature:

- External dimensions: 2200 x 1200 x 600 mm.
- Distance between plates: 600 mm.
- Distance between columns: 420 mm.
- Piston stroke: 0-400 mm.
- Maximum force: 400 kN.
- Resolution of force: 1 N
- Displacement resolution: 0.01 mm.
- Magnetothermal switch.
- Power indicator light.
- Frame Weight: $\approx$ 1200 kg approx.

Power supply: 220V AC, single phase more grounded.

S157.05 Certificate ENAC calibration with issuance "in situ" Machine 400 kN





UNIVERSAL TESTING MACHINE

S160 Electromechanical machine double piston

Automatic testing machine and servo twin screw latter governed by computer generation, comprising a rigid structure with loading bridge motherboard movable bridge guided by two columns of chrome steel. Serv-electromechanical drive engine by two ball screws and re-circulating provide outstanding smoothness of operation and a constant speed during the test.

Rigid inner bridge high resistance load houses the assembly formed by the screw, the electromechanical group and press control module.

Load cell (tension-compression) mounted on the upper bridge, which the control module transmits the force exerted at each test point. The regulation of the travel speed and the loading speed of the spindle is processed by the electronic module.

The compression plates are hardened and ground, the bottom of Ø 220 mm. is marked concentric, very helpful for correct positioning of the jaw Marshall, among other applications. The system includes an upper ball joint that allows perfect fitting.

TECHNICAL FEATURES:

Capacity: 300 KN.

Resolution of force: 1 N

Displacement resolution: 0.01 mm.

Useful light horizontal: 620 mm

Sandy Bridge mobile standard: ± 1500mm.

Stiffness test frame (combined) exceeding 1 mm. / 300KN.

Power supply: 220V AC, single phase more grounded.

Power: 1500 W

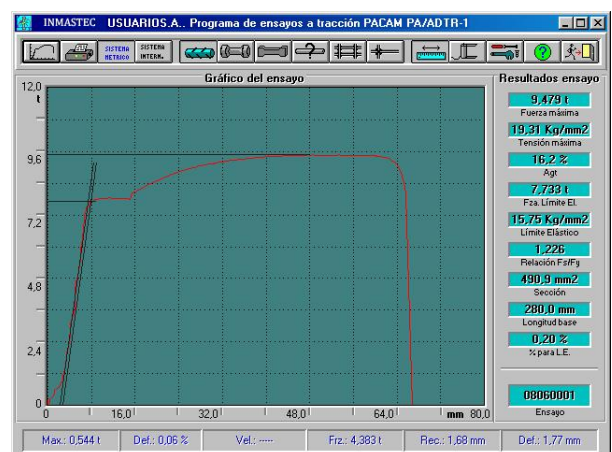
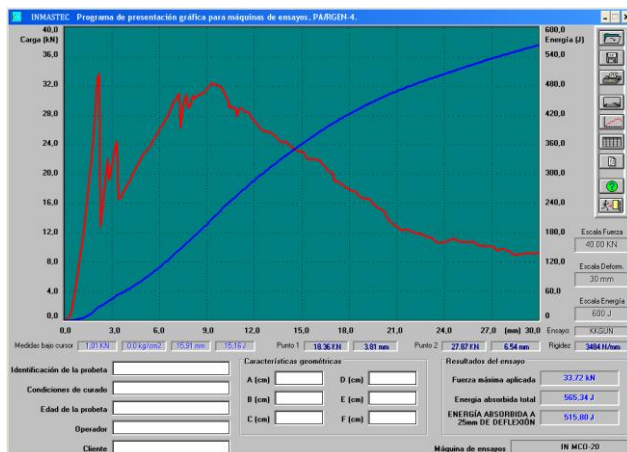
Weight: 700 kg approx.

The machine is supplied complete with load cell of 300 kN.

General Testing Software, last generation computer flat screen and user manual in english.

This machine has the possibility of coupling a variety of devices for both compression tests, flexural tests as for traction. (See accessories).

S162 Electromechanical machine double screw model similar to S160, but of 200 KN





S166 Flexural testing device. Equipment that can be attached to a multitester machine That allows testing transverse curbs and tiles, flat blocks, tiles flexural, etc..
Weight: 210kg.

S160.04 Screen protection for area and perimeter security test support multitester machine.

UNIVERSAL TESTING MACHINE

S164 Electromechanical machine servo automatic double piston, ruled last generation computer model similar to S160, but with flexural device for curbs and tiles, flat blocks, roof tiles bending, etc..

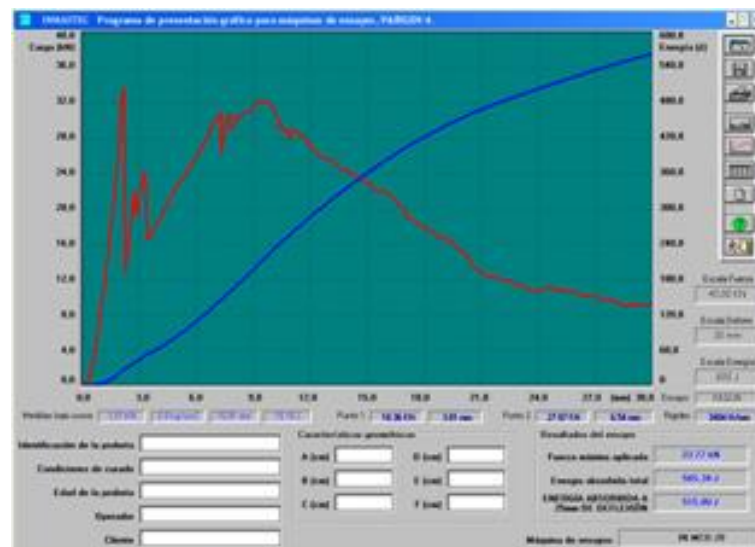


PLATE BEARING TEST EQUIPMENT

UNE 103.308 / NLT-357/98 / UNE 7391 / ASTM D1194, D1195, D1196 / BS 1377-9

Plate bearing test equipment 200 KN capacity

This test is performed for the determination of the bearing capacity of a soil in-situ on load constructions, foundations, road subgrades, airport and highway pavements.

Wide ranges of plate bearing test equipment are available, together with many accessories according to the different Standards and specific enduser needs.

S170 Hydraulic jack 200 KN capacity, complete with hand pump, rubber pipe with fast connector, set of extension rods of different lengths and carrying case.. The device consists of the following elements:

- load plate 300 mm dia, surface plate 700 mm².
- Pressure gauge 0-200 KN div. 1 KN.
- Upper spherical seat.
- Intermediate plate 160 mm dia

S170.03 Datum bar assembly 2,5 m long. Telescopic, aluminium made, adjustable in height, complete with base supports, plumb and spirit level. Packed separately. (Alternative solutions S170.03 "Y" measuring system, Swiss method)

- 3 dial gauge 25x0,01 mm
- 3 articulated dial gauge supports with adjustment device.

Weight: 70 Kg approx..

ACCESSORIES:

S171 Load cell capacity of 200 KN and engageable in the module plate with display and buttons of force membrane (TM or KN) pressure (Kg / cm² or mPa) and button size of the plates 300, 600 and 762 mm. has reset button. Direct reading and rechargeable

S172 Module 4 channel control with display and membrane buttons for strength (TM or KN), pressure (Kg / cm² or MPa) and deformation to the plates 300, 600 and 762 mm. has reset button, memory, rechargeable battery and direct reading

S170.01 Bearing plate 600 mm dia. Standard NF P94-117-1

S173 Bearing plate 762 mm dia. for load plate with handles

S174 Square plate 300 mm. according to UNE 7391

V361 Digital Comparator 0-30 mm capacity and resolution 0.01 mm.

V360 Digital Comparator 0 to 12.5 mm capacity and resolution 0.01 mm. with data output

S175 Potentiometric sensor tip 25 mm and spring

S170.05 Officially certified calibration ENAC for the load cell load plate.





SAND DENSITY CONE APPARATUS
UNE 103-503/ ASTM D1556/ AASHTO T191/ NF
P94-061-3

- S180** Metal double cone assembly with calve, Ø 6" (152 mm),
S181 Metal base with fixed centre hole for cone housing
S182 Plastic bottle 5 l.
S183 Calibrated sand for density test (25 Kg sack)



Tools for "in situ" density tests

- V300** Rubber mallet
V301 Density chisel 300 mm long
V302 Density pick, small sized
V303 Ladle, stainless steel
V304 Rubber bucket, 15 litres
V305 Rubber bucket, 22 litres
V306 Wooden handled pot
V307 Small round stainless steel
V308 Medium round stainless steel
V309 Large round stainless steel
V310 Trowel



PERMEAMETER STAND 4 CELLS CAPACITY FOR
CONSTANT AND FALLING HEAD TESTS

S185 This 4 cells capacity stand is designed to perform both constant head and falling head permeability tests on compacted granular soil samples.

The stand consists of a metal frame with water tank adjustable in height between 1350 and 3450 mm for constant head tests. Supplied complete with tubes, graduated rules, piping, connectors and cocks; but without permeameters mould to be ordered separately.

The stand can hold up to 4 permeameters having dia. 4" and 6" to perform different types of tests at the same time.

Dimensions: 1050x900x2000/3850 mm

Weight: 75 Kg

Accessories:

S186 Compaction permeameter 4" dia. The permeameter body is the same of a Proctor Standard mould. Weight: 8 Kg

S186. Plein base and collar for compaction tests.

S186.02 Mould body with two lateral water inlet/outlet

S187 The permeameter body is the same of a CBR or Proctor Modified mould. Weight: 16 Kg

S187.01 Plein base and collar for compaction tests.

S187.02 Mould body with two lateral water inlet/outlet

S186.03 Piedras porosas de Ø 100 mm.

S187.03 Piedras porosas de Ø 150 mm.



BALLOON DENSITY METHOD

NF P94-061-2/ ASTM D2167

S190 Used to determine the in-situ density of fine graded compacted or bonded soil, this unit has the same test system of mod.S191, but with a capacity of 3000 ml as requested by French Specification.

A hand-driven piston forces the water into the rubber membrane.

A dial gauge measures the water pressure so to execute all the test at the same pressure.

An index engraved on the stem of the piston measures the volume of water filling the hole.

The unit is supplied complete with 6 reinforced rubber membranes, 4 locking clamps, base plate and accessories. Dimensions: 360x360x700 mm

Weight: 10 Kg

S193 Identical to Mod. S190, but with capacity of 6 litres.

Weight: 18 Kg

Accessories:

S190.03 Reinforced rubber membrane, pack of 6



Balloon Density apparatus 1600 ml capacity

S191 Used to determine the in-situ density of fine graded compacted or bonded soil.

The apparatus is placed over the hole excavated in the soil, and water is pumped into a rubber balloon and forced into the hole. The amount of water displaced into the balloon is measured from the graduation of the scale.

The instrument consists of a graduated plexiglass cylinder 1600 ml. capacity housed within an aluminium alloy casting, a rubber pump with stop valve, a density plate and 12 rubber balloons.

Dimensions: 340x340x700 mm

Weight: 8 Kg

Accessories:

S191.03 Rubber balloons, pack of 12



Pinhole test equipment

S192 Utilized to evaluate the erosion on soil samples having high degree of sodium content, the Pinhole apparatus reproduces the water flowing in a cavity obtained from a soil specimen.

The apparatus consists of a cylindrical container equipped at its ends of water inlet/outlet connectors, tube with graduated scale, base support with rod.

Weight: 4 kg approx.

Accessories:

S192.04 Constant level tank, made from acrylic plexiglass, wall mounting. The inlet, outlet and overflow pipes can be adjusted for height within the tank.

Weight: 3 Kg.

S192.06 Tubing, inside dia. 8 mm, 5 m long.



**D016 Baroid mud balance**

The balance consists of a base and graduated arm with cup, lid, knife edge, rider, built-in spirit level and counter-weight, carrying case . The constant volume cup is affixed to one end of the graduate arm and the counter-weight on the opposite end.

Weight: 5 Kg

**Sand Content of Drilling Muds**

D018 The Sand Content Kit is a simple, accurate and inexpensive sieve analysis apparatus for determining the sand content of drilling muds. The kit consists of a special 200-mesh sieve 2,5" in diameter, fastened inside a collar upon which a small funnel is fitted on either end.

This is used with a 10ml glass measuring tube, graduated to read from 0 to 20% the percentage sand by volume.

The collar and funnel are made of polyethylene and the screen is made of brass. A 500ml wash bottle and carrying case are included.

Weight: 1500 g

B117 Marsh cone to determine the viscosity of sludge. Manufactured of durable plastic mesh of 2 mm light on top and outlet orifice of 4.7 mm, Supplied complete with 1 liter container.

Dimensions: Ø160 x 370 mm

Weight: 1 Kg approx..



S036 Geopocket dial penetrometer, designed for a quick determination of the foundation soil, from clay to sandy soils.

It indicates the angle of internal friction (sandy soils) and cohesion (clay soils) and the approx. Unconfined compressive strength.

Peak hold feature; zero setting by push button.

Supplied complete with 5 plungers Ø 6,4 - 10 - 15 - 20 - 25 mm. Weight 400 gr.

S042 Geopocket dial penetrometer, designed for a quick determination of the foundation soil, from clay to sandy soils.

It indicates the angle of internal friction (sandy soils) and cohesion (clay soils) and the approx. Unconfined compressive strength.

Peak hold feature; zero setting by push button.

Supplied complete with 5 plungers Ø 6,4 - 10 - 15 - 20 - 25 mm.

Weight 400 gr.

C143 Pocket penetrometer, identical to mod. S042 but having a range of 0-16 Kg/cm². suitable for very compacted soils. Weight: 800 g.



S042

**Torvane shear tester**

S194 Designed to quickly determine shear strength of cohesive terrain. It can be used both in the laboratory and in the field, with winch is supplied standard 25 mm in diameter, range 0-10 N / cm², windlass adapter sensitive scale 0-2 N / cm² and windlass adapter 0-25 scale high-capacity N / cm² molinete de gran capacidad escala 0-25 N/cm²