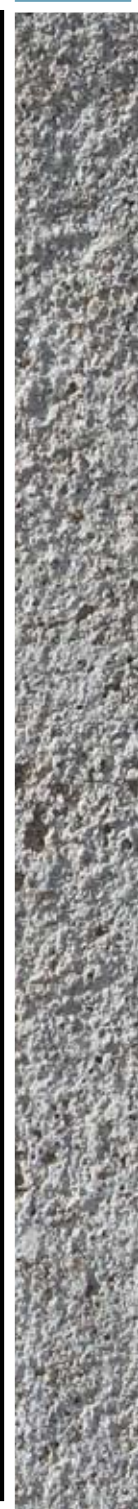
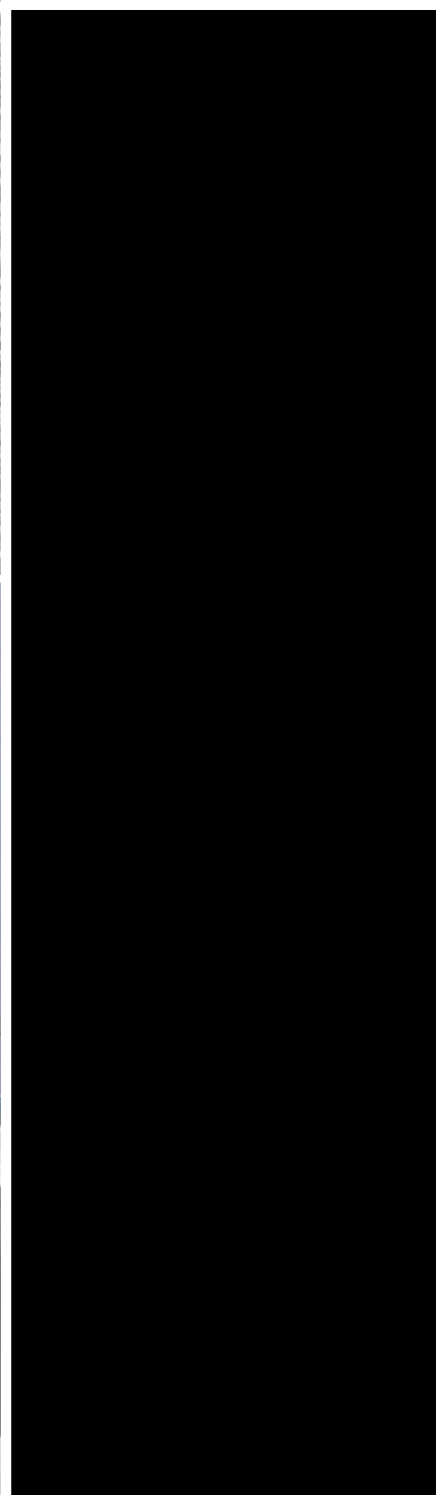


4

CONCRETE



Collecting specimens to test consistency and workability

Standards EN 12350-2; UNE 7103, 83313; ASTM C143; AASHTO T119; BS 1881; DIN 1048; NF P18.305

Strict control of the water-cement ratio and concrete workability is essential to ensure that the concrete attains its maximum strength while remaining easy to pour at the worksite. This is achieved by using the following equipment:

Slump Cone Set

H0001 Slump cone, made of galvanised sheet metal, designed to measure concrete cohesiveness.

Weight: 1.8 Kg

H0002 Rod, made of galvanised steel.

Dimensions: Ø 16 x 600 mm

Weight: 1 Kg

H0003 Cone-filling hopper. Made of aluminium.

H0004 Base plate made of galvanised sheet metal, with a handle.

Dimensions: 60 x 40 cm

Weight: 3 Kg

H0004/2 Base plate measuring 1000x1000 mm with two concentric circles of 200 mm and 500 mm.

H0005 Graduated stainless steel ruler.

Length: 300 mm



Tests for self-compacting concrete

Standards EN 12350-2; RILEM REPORT No.23

Slump flow test

This test method is used to determine the deformability of freshly mixed self-compacting concrete. The deformation speed must be observed, as well as the expanded diameter of the specimen, deformed under its own weight. This test method is used for high fluidity concrete made with super plasticisers. It should not be used for concrete made of aggregate larger than 40 mm

Basic equipment

H0001/1 Cone with interior Ø 200 mm at the base, 100 mm at the top and 300 mm high. No legs

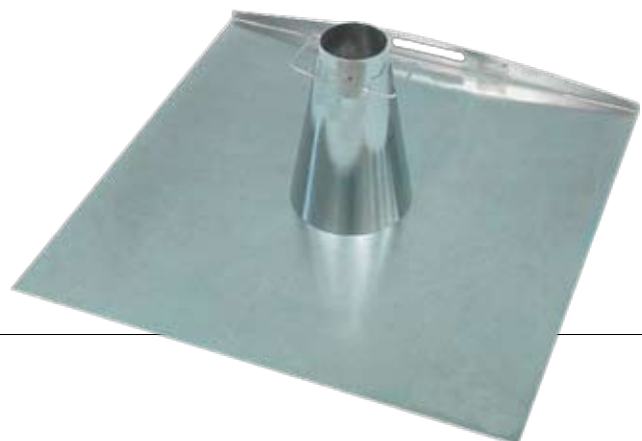
H0004/3 Square seating plate made of non-absorbent material, measuring 800 x 800 mm with two handles and two concentric circles of 200 mm and 500 mm

V0070 Stop watch.

V0047 Curved specimen collector.

V0161 Flexible ruler 1000 mm long

S0254/1 Bevelled screed with handles.





Standards EN 12350-9

"V" funnel test

This apparatus is used to calculate the segregation resistance of freshly mixed self-compacting concrete by observing the flow rate and the length of time that the specimens remain in the funnel. It consists of a stainless steel funnel placed vertically on a support base. The outflow orifice has a cover that can be opened at any time.

Basic equipment

V0070 Stop watch.

V0047 Curved specimen collector

H0010/1 Rigid ruler 900 mm long

S0254/1 Bevelled screed with handles

H0010 V funnel made of sheet metal with a capacity of 10 L, equipped with a seal valve for the outflow orifice

H0010/2 Polyethylene box of approx. 12 L

Approximate weight: 5.6 Kg

Standards EN 12350-10

"L" box test

This method is used to evaluate the self-compactability (confined fluidity) of freshly mixed self-compacting concrete. The "L" box can be used to evaluate several properties, such as filling capacity and segregation resistance.

Basic equipment

V0070 Stop watch.

V0047 Curved specimen collector.

S0254/1 Bevelled screed with handles.

H0011/1 Rectangular ruler 300 mm long

H0011 L box made of sheet metal consisting of:

A container with reinforced interior

A shutter consisting of three vertical bars 16 mm long and a 38 mm span

Front closing trap door.

Two marks at 200 and 400 mm, in the horizontal position of the box.

Approximate weight: 18.2 Kg



Standards EN 12350-12

"J" ring test

This method is used to determine the fluidity, the flow time and the capacity of the SCC to pass through obstacles. Made of galvanised steel with a diameter of 300 mm and 16 simple rods with a diameter of 18 mm.

Approximate weight: 10 Kg

H0013 "J" ring



"U" box test

This method is used to find the confined fluidity and the capacity of SCC to flow in confined spaces. Made of galvanised steel with a frame made of four 10 mm diameter bars and three 13 mm diameter bars.

Approximate weight: 25 Kg

H0009 "U" box

H0011/1 Rectangular ruler 300 mm long





Standards BS 1881 part 103, 5075

H0012 Compaction factor equipment

This equipment is used to determine the compaction factor for concrete with low, medium and high workability. The apparatus is manufactured in painted steel plate and consists of two cone-shaped hoppers with discharge doors assembled vertically on a cylindrical container.

Dimensions: 1310 x 250 x 400 mm

Weight: 40 Kg

Standards EN 12350-3; UNE 83.314; NLT -308; BS 1881:104

H0014 Vebe consistometer

This apparatus is used to determine the degree of consistency or "Vebe degree" of concrete. It consists of a vibrating table at the bottom of which are mounted a vibrator, a container, a cone, a funnel, a transparent plastic disc and a steel tamper with a round end.

Power supply: 380 V. 50-60 Hz.

Weight : 80 Kg

Dimensions: 450 x 450 x 900 mm



Standards EN 12350-4; DIN 1048

H0015 Walz Consistometer

Used to determine the consistency of fresh concrete. The unit consists of a metal container with handles, measuring 200 x 200 mm on each side and 400 mm high, oven-painted.

Weight: 6 Kg



Standards EN 12350-5; BS 1881-105; DIN 1048

H0016 Expansion test table

This equipment is appropriate for testing concrete mixes with high and very high workability. It consists of a double square wooden table measuring 70 cm per side, with a galvanized sheet metal top, and one of the bottom sides fitted with hinges. A galvanized sheet metal cone measuring Ø 130/200 x 200 mm is located on the middle of the table. The test consists of introducing the concrete through the cone and stirring it. Then, the top of the table is lifted and lowered 15 times in 15 seconds to a height of 4 cm. Finally, the concrete that has spread on the table is measured and its workability is evaluated. The equipment is supplied with the cone and a wooden tamper.

Cone dimensions: 130 x 200 x 200 mm

Table dimensions: 700 x 700 x 330 mm



Spare parts:

H0016/1 Cone-shaped mould measuring Ø 130/200 x 200 mm h.

H0016/2 Wooden tamper. Weight: 20 Kg

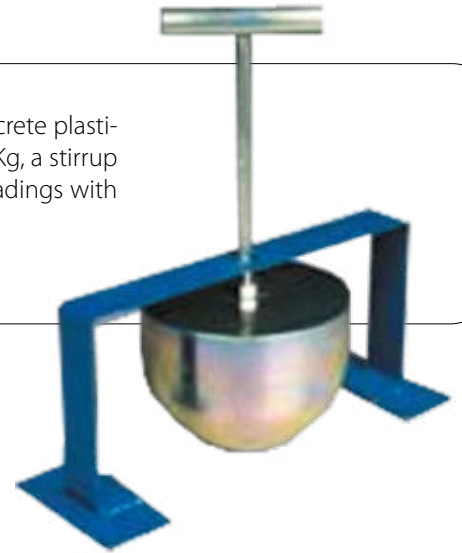
Standards ASTM C360

H0017 Kelly ball penetrometer

This device is used as an alternative to the Abrams Cone to determine fresh concrete plasticity or workability. The apparatus consists of a cylindrical weight that weighs 14 Kg, a stirrup and a graduated handle. The readings correspond to double the value of the readings with an Abrams Cone.

Dimensions: 350 x 150 x 350 mm

Weight: 15 Kg



Standards UNE 13748-1

H0018 Apparatus for testing tile impact resistance

This apparatus consists of a magnetic device that releases a steel sphere with 1 Kg of impact energy, a graduated bar to set the height of the fall and a box at the bottom measuring 50 x 50 cm with a centring device on which the sand is placed to set the test tile.

Dimensions: 800 x 870 x 1327 mm

Weight: 65 Kg

Spare parts

H0018/1 Steel ball 1Kg.



Standards ASTM C1362

H0020 K-Slump test

This test is used to determine the degree of compaction and workability of fresh concrete.

Height: 300 mm

Point diameter: 20 mm

Weight: 0.5 Kg



Standards ASTM C 403; AASHTO T 197

H0021 Concrete pocket penetrometer

Used to determine the setting time of concrete. The test consists of introducing the point of the penetrometer at regular intervals into the concrete to a depth of 25 mm. Concrete strength expressed in Mpa is indicated by a ring on the penetrometer scale.

Weight: 500 g

Dimensions: Ø 30 x 220 mm

Point surface: 32 mm



Standards UNE 83.311; ASTM C 403; AASHTO T 197

H0022 Concrete penetrometer

This device is used to determine the time during which the concrete can be handled. It is supplied with a carrying case, and includes a set of exchangeable points with the following sections: 16, 32, 65, 160, 325 and 650 mm² and an adaptor for small points.

Applicable force: 70 Kg

Dimensions: 440 x 360 x 100 mm

Weight: 4 Kg



Standards NF P18-452

H0025 LCL Plasticimeter

This is used to verify how homogeneous a fresh concrete mix is, depending on its workability, specifically in the case of concrete containing additives. The unit consists of a small rectangular container divided by a removable separator and a vibrator coupled to one of the walls of the container. The test consists of introducing the fresh concrete into the first compartment and removing the spacer that divides the container. This automatically activates the vibrator; the test ends by recording the vibration time required for the specimen to spread homogeneously over the second compartment.

Power supply: 220-240 V. 50 Hz.

Dimensions: 820 x 420 x 410 mm

Weight: 95 Kg



Standard LCPC (French Public Works Research Laboratory) method

H0026 Joisel apparatus

This apparatus is used to separate the various elements that form concrete in order to assess their proportions individually with an accuracy of 2%. The equipment consists of three stainless steel containers.

Dimensions: Ø 150 x 250 mm

Weight: 2 Kg.



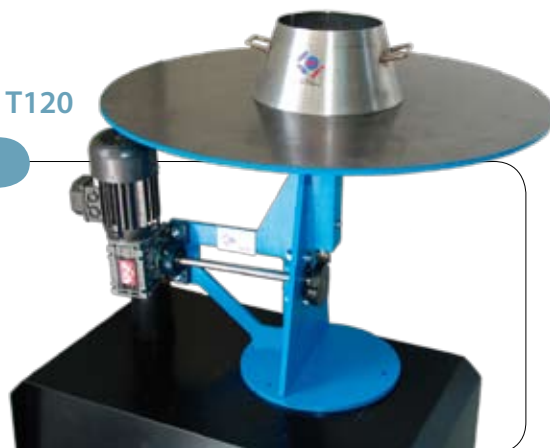
Standards UNE EN 12350-5; ASTM C124; AASHTO T120

H0027 Motor-driven vibrating table

This device is used to determine the fluidity of fresh concrete. It is made up of a round table measuring Ø 762 mm resting on a base. It is supplied with a mould, a brass tamper with a wooden handle, an impact counter and main switch.

Dimensions: Ø 762 x 600 mm

Weight: 90 Kg



H0028 Manual vibrating table

This device is used to determine the fluidity of fresh concrete. It is made up of a round table measuring Ø 762 mm resting on a base. It is supplied with a mould and a brass tamper with a wooden handle.

Dimensions: Ø 762 x 600 mm

Weight: 75 Kg

Specific weight

Standards UNE EN 12350-6; UNE 7286, 83.317; ASTM C29, C138; BS 812, 1881, AASHTO T19

Calibrated volumetric containers

These containers are used to determine weight per cubic metre of fresh concrete. They are made from painted steel sheeting.

Models:

- H0030** 0.5 litre container
- H0031** 1 litre container
- H0032** 2 litre container
- H0033** 3 litre container
- H0034** 5 litre container
- H0035** 10 litre container
- H0036** 14 litre container
- H0037** 28 litre container



Air entrainment in fresh concrete

Standards EN 12350-7; UNE 7141, ASTM C231: BS 1881-106; DIN 1048

Trapped air can be defined as the amount of air that has been introduced into the concrete by airborne agents for particular reasons, in addition to the air already present in the concrete. The main advantages from the use of the trapped air meter are as follows: ice resistance, suitability for a wide range of weather conditions, durability and improved workability. The amount of trapped air should be accurately controlled by specific equipment since excessive air can cause loss of strength.

Air entrainment meters

H0046 Air entrainment meter. This device is designed to determine the amount of air contained in the concrete. The device is made of aluminium and includes a manual pressure pump connected to a pressure gauge.

Volume: 8 litres.

Pressure: 2 bar

Dimensions: Ø 250 x 450 mm

Weight: 12 Kg



H0046 Air entrainment meter. This device is designed to determine the amount of air contained in the concrete. This device is made of a light alloy and supplied with a manual pump.

Volume: 5 litres.

Pressure: 2 bar.

Dimensions: Ø 340 x 630 mm

Weight: 11 Kg



H0046 Electric air entrainment meter. This device is designed to determine the amount of air contained in the concrete. It consists of an 8 L tank, sealed with a lid with three hooks. The compression chamber inside the lid is connected to an electric mini-compressor and a loading electrovalve used to increase the pressure. Each of these components is activated by its corresponding push button. The electric mini-compressor generates pressure quickly and keeps it constant.

Volume: 8 litres.

Measurable air content: 0-100%.

Power supply: Single phase 220-240 V. 50 Hz.

Weight: 18 Kg

Accessories:

H0047/1 Calibration cylinder



H0049 Air in concrete meter. This device is ideal for "in situ" verification of the air content in each fresh concrete mix. The meter is 160 mm long and isopropyl alcohol must be used in carrying out the test.

Weight: 1.8 Kg



Specimen preparation

Standards EN 12390-2

Mixing

The purpose of mixing is to cover the surface of the aggregate particles with cement paste to obtain a uniform mixture. Rotating drum mixers are ideal to mix the small amounts of concrete normally used in a laboratory.

ETI concrete mixers

These mixers have been designed and built for specific use in official laboratories, institutions and universities. They are indispensable for obtaining a perfect mix of concrete and guaranteeing a high degree of homogeneity. Due to the considerable size of the vessel, models with capacity over 50 L are supplied with a cart for transportation and safety protection. Power supply: 220/380 V. 50-60 Hz.

Models

H0050 Laboratory mixer, holds 14 litres. Dimensions: 700 x 600 x 650 mm Weight: 80 Kg

H0051 Laboratory mixer, holds 50 litres. Dimensions: 780 x 700 x 800 mm Weight: 160 Kg

H0052 Laboratory mixer, holds 100 litres. Dimensions: 830 x 800 x 900 mm Weight: 200 Kg

H0053 Laboratory mixer, holds 150 litres. Dimensions: 1700 x 950 x 1180 mm Weight: 290 Kg

H0056 Small, light weight concrete mixer, designed to produce small amounts of concrete "in situ" or in a laboratory. Easy to handle and transport.

Capacity: 100 litres.

Dimensions: 770 x 1320 x 1370 mm

Weight: 55 Kg



Specimen preparation

Standards UNE EN 12390-1; UNE EN 12390-2; UNE 7240; DIN 51.229; ASTM C31, C192; AASHTO T23, T97; BS 1881-108; NF 18-401

Test procedures need specimens to be manufactured in standard sizes that are convenient for determining their compression and flexural strengths. The specific industrial tolerances for mould manufacture are very strict and require interior finish to be of high quality to meet the requirements of a number of international standards. The moulds must not undergo deformation during specimen manufacture.

Moulds for specimen preparation

Cubic moulds

For the preparation of concrete specimens. Made of undeformable steel and easy to disassemble.

Models:

H0060 Dimensions 10 x 10 x 10 cm Weight: 10 Kg

H0061 Dimensions 15 x 15 x 15 cm Weight: 13 Kg

H0062 Dimensions 20 x 20 x 20 cm Weight: 16 Kg

H0063 Dimensions 30 x 30 x 30 cm Weight: 20 Kg

H0064 Dimensions 6" x 6" x 6". Weight: 14 Kg

H0065 Dimensions 50 x 50 x 50 cm Weight: 46 Kg



Three-gang moulds

For the preparation of concrete specimens. Made of undeformable steel and easy to disassemble.

Models:

H0070 Dimensions 10 x 10 x 10 cm Weight: 25 Kg

H0071 Dimensions 20 x 20 x 20 cm Weight: 35 Kg

H0072 Dimensions 30 x 30 x 30 cm Weight: 45 Kg

H0073 Dimensions 15 x 15 x 15 cm Weight: 30 Kg

H0074 Dimensions 6" x 6" x 6". Weight: 32 Kg



Cubic moulds

For the preparation of concrete specimens. Made of epoxy material and easy to disassemble.

Models:

H0080 Dimensions 10 x 10 x 10 cm Weight: 1 Kg

H0081 Dimensions 15 x 15 x 15 cm Weight: 1.5 Kg

H0082 Dimensions 20 x 20 x 20 cm Weight: 3.5 Kg

Accessories:

H0080/1 Filling hopper for 10 cm cubic mould

H0081/1 Filling hopper for 15 cm cubic mould

H0082/1 Filling hopper for 20 cm cubic mould



Moulds for specimen preparation

Prism moulds

For the preparation of concrete specimens. Made of undeformable steel and easy to disassemble.

Models:

H0085 Dimensions 10 x 10 x 40 cm Weight: 20 Kg

H0086 Dimensions 10 x 10 x 50 cm Weight: 27 Kg

H0087 Dimensions 15 x 15 x 60 cm Weight: 45 Kg

H0088 Dimensions 15 x 15 x 75 cm Weight: 60 Kg

H0089 Dimensions 20 x 20 x 80 cm Weight: 90 Kg

H0090 Dimensions 6" x 6" x 18". Weight: 30 Kg

H0091 Dimensions 6" x 6" x 21". Weight: 35 Kg

H0092 Dimensions 6" x 6" x 24". Weight: 46 Kg

H0093 Dimensions 6" x 6" x 30". Weight: 60 Kg

H0094 Dimensions 6" x 6" x 36". Weight: 75 Kg

H0095 Dimensions 6" x 6" x 40". Weight: 140 Kg



Cylinder moulds

Hinged, made of stamped steel for the manufacture of cylinder moulds.

Models

H0100 Dimensions Ø 100 x 200 mm Weight: 7 Kg

H0101 Dimensions Ø 150 x 150 mm Weight: 8 Kg

H0102 Dimensions Ø 150 x 300 mm Weight: 9.5 Kg

H0103 Dimensions Ø 160 x 320 mm Weight: 10.2 Kg



Accessories

H0102/1 Filling hopper for Ø 150 x 300 mm mould

H0102/2 Compaction rod. 50 cm long

H0105 Cylinder mould for the preparation of Ø 150 x 300 mm specimens made of epoxy material, easy to disassemble.

Accessory

H0105/1 Filling hopper

H0102C Calibrated cylinder mould measuring Ø 150x300 mm, in compliance with specifications EN-UNE 12.390-1 section 5.2.5 including a calibration certificate with ENAC traceability.



Compaction

Standards UNE EN 12390-2; ASTM C31, C 192; AASHTO T23, T126; BS 1881:108

When preparing the concrete specimens, it is extremely important that the distribution be homogeneous and as compact as possible. PROETI offers several compaction methods:

H0110 Vibrating laboratory table

To vibrate cubic and cylindrical specimens.

Vibration frequency: 3,000 rpm

Dimensions: 600 x 400 x 410 mm

Power supply: 220-380 V. 50/60 Hz.

Weight: 65 Kg



H0111 One-way vibrating table

Equipped with two vibrating tables placed at a distance from each other, that ensure one-way movement of the aggregates contained in the mix.

Vibration power: 120-260 Kg

Vibration frequency: 3000 rpm

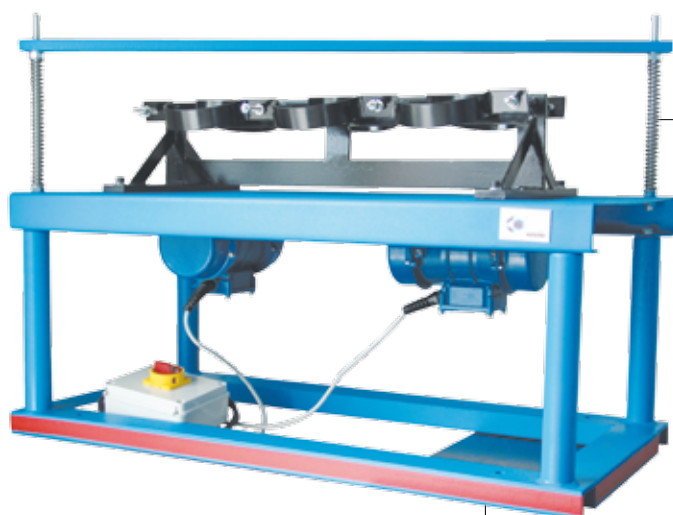
Power supply: 220-380 V. 50/60 Hz.

Dimensions: 1170 x 550 x 500 mm

Weight: 108 Kg

Accessory

H0112 Cylinder mould anchoring device.



H0115 Needle vibrator

With double insulated electric motor, very useful for vibrating the concrete in the mould.

Needle diameter: 22 mm

Cable length: 1.5 m.

Dimensions: 220 x 70 x 630 mm

Power supply: 220 V. / 50 Hz.

Weight: 3 Kg



H0116 Needle vibrator

With internal combustion engine, used to vibrate concrete in the mould.

Needle diameter: 22 mm

Cable length: 1.5 m.

Power supply: 220 V. / 50 Hz.

Weight: 3 Kg



Specimen curing

Standards UNE EN 12390-2; EN 196; AASHTO T23; ASTM C31, C192; BS 1881-111

Curing is an important step in performing tests on concrete specimens. This stage includes the time period from specimen preparation to the beginning of test operations. There are several types of curing procedures available, depending on the purpose of the test; one of these is curing under specific humidity and temperature conditions. In order to control the concrete mix, the specimens must be held at a temperature of $20 \pm 2^\circ \text{C}$ and relative humidity equal to or higher than 95%. The equipment installed by PROETI satisfies the requirements of the specifications that govern the curing process.

H0120 Water bath for curing concrete specimens

Made of galvanized sheet metal, designed for curing both cubic and cylindrical concrete specimens. The equipment is supplied with thermostatically controlled heating elements and a bottom support tray under which the heating element, water inlet and draining tube are placed.

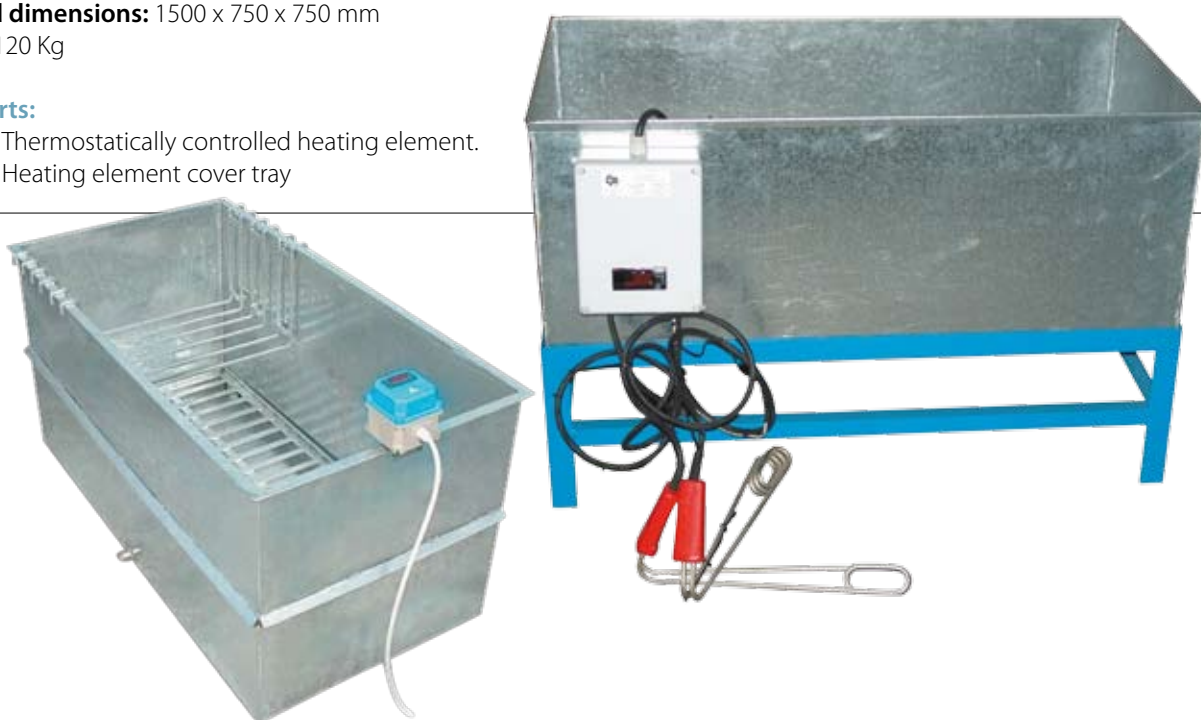
Standard dimensions: 1500 x 750 x 750 mm

Weight: 120 Kg

Spare parts:

H0120/1 Thermostatically controlled heating element.

H0120/2 Heating element cover tray



H0121 Thick plastic curing tank

The tank holds 650 litres and is use for curing and storing concrete specimens. It is made of high-strength polyethylene. The tank is fitted with a grille. Accessories that are not included but can be ordered are a thermostat and submersible circulation pump.

Internal dimensions: 1040 x 1040 x 605 mm

External dimensions: 1130 x 1130 x 760 mm

Capacity: 650 litres.

Weight: 30 Kg

Accessories:

H0121/1 Analogue thermostat with heating system.

H0121/2 Digital thermostat with heating system.

H0121/3 Plastic lid for H0121 tank.

H0121/4 submersible circulation pump.



Standards ASTM C684, BS 1881-112

H0122 Rapid curing tank

The tank is airtight, made of oven-painted galvanized steel plate with a stainless steel lid. Water temperature is maintained constant at the preset level by means of a set of resistors placed at the bottom of the bath. The control panel includes a main switch, On/Off push buttons, a timer that can be programmed between 0 and 12 h, a thermoregulator that can be programmed between 30-100°C, a thermostat and switches for the resistors. The tank can hold up to 8 specimens with sides measuring 200 mm or 16 cubic specimens with sides measuring 150 mm or 16 cylindrical specimens measuring Ø 150 mm

Power supply: 220-380 V. 50/60 Hz. 4500 W.

Internal dimensions: 910 x 660 x 680 mm

Weight: 135 Kg

Accessories:

H0122/1 Set of two resistors with a thermostat for specimen curing water baths.



Standards UNE EN 12390-2; EN 196; ASTM C31, C192;

Temperature and humidity control for concrete specimen curing chambers



H0125 Control panel. Including:

- Metal console / machined cabinet.
- Programmable PLC to control 2 channels (humidity and temperature), with digital display.
- 1 set of two PT100 probes for humidity + temperature
- Handling, control and connection elements.

H0127 Heating / cooling equipment. Including:

Air cooled condensation unit.

Incorporated heating unit.

HDN-10N2 ceiling-mounted evaporator

TEX expansion valve.

Liquid visor 8" KAP

KAP163 dehydrator.

DANFOSS KP15 high and low pressure cut-off switch



Humidifying systems

H0129 Humidifier. Sturdy, aesthetic compact sprayer for locations or chambers used for curing specimens, of up to 150 m³. Generates a very fine drop-free aerosol mist. Maintenance-free condensation motor equipped with built-in thermal overload switch. Easy to clean. Low power consumption, for use anywhere

Technical characteristics

Automatic control connected to the water mains and a level adjustment valve.

Humidifying capacity: 0.5 L / h

Calculated air volume: 80 m³ / h

Water tank capacity: 5 L.

Absorbed power: 40 W

Dimensions: Ø 360 x 23 mm (h)

Dry weight: 3.5 Kg

Power supply voltage: 110/220 V; 50 Hz



H0129/1 Humidifying with a nebulizer system including a distribution line of nebulizers connected to the water intake inside the chamber.

Electrovalve system to turn the water supply to the circuit of nebulizers on and off.

220 V / 12 V transformer system to power the electrovalve.



H0130 Humidifier similar to model H0129 but with a humidifying volume of 400 m³.

Capacity: 0.5 - 3.5 L/h.

Data storage system

H0126 Data acquisition system (temperature / humidity) to PC. PLC encoding and configuration and a completely integrated humidity / temperature system. The stored data can be accessed in-situ, by the printer or analysed in the PC. The software is in Spanish and multi-language, output RS232.

V0156 Electronic thermohygrograph data logger. A compact instrument with an integrated humidity / temperature probe that can be installed quickly and directly in-situ. The stored data can be accessed in-situ using the printer or analysed in the PC using the software. It is supplied with an optional sintered head for protection against dusty environments. RS232 interface. Software in Spanish (for Windows).

Technical data:

Probe type: NTC capacitive humidity sensor

Range:

Humidity: 0 100% RH

Temperature: - 10 °C..... + 50 °C

Resolution:

Humidity: 0.1 % RH (0..... + 100 RH)

Temperature: 0.1 °C (- 10 ...+50 °C)

Accuracy:

Humidity: ± 3% HR (+ 2 ... 98% RH)

Temperature: ± 0.4 °C (- 10 ..+ 50 °C)

Memory: 20000 readings

Measuring cycle: 2 s to 24 hours, programmable

Made of anodised aluminium

Operating temperature: - 20 °C + 70 °C.

Storage temperature: - 40 °C + 85 °C

Lithium batteries

Dimensions: 13 x 68 x 84 mm

Weight: 320 g

The equipment is supplied with a magnet, battery, software with interface and a calibration report.



V0156/2 Teflon sintered head. Ø 21 mm, can be threaded to a humidity probe. Protection for heavy mechanical loads and high speeds.

Optional

V0156/3 Digital display to connect to the data logger.

H0123 Partitionable chamber for curing concrete specimens

A partitionable chamber for curing specimens with self-supporting panels, consisting of a nucleus of injected polyurethane with a density of 40 Kg/m³ and covered with 80 mm thick, pre-lacquered steel plate on both sides. Pivoting door leaf injected with high density polyurethane. Double frame for panel assembly. Lacquered sheet metal finish. Stainless steel fastenings. Wide enough for carts.

Door dimensions: 1200 mm x 2200 mm

Chamber dimensions

3600 mm long

2000 mm wide

2500 mm high

Approximate specimen capacity 600

H0123/1 Shelves

Manufactured in galvanized steel, with height-adjustable shelves every 330 mm

The maximum load distributed uniformly on each level is 640 Kg for shelves measuring 1200 mm (length) X 500 mm (depth) and 530 Kg for shelves measuring 1500 mm (length) x 500 mm (depth). Protected against humidity.



Standards UNE EN 1367-1; UNE EN 10345-12

Freeze-thaw test

H0133 Environmental chamber for the freeze/thaw test

Thermostatic climate cabinet, designed for cold and heat testing of any kind of material.

Temperature range: $-20 + 80^{\circ}\text{C} \pm 5^{\circ}\text{C}$.

Humidity: 10 - 90% RH.

Interior made of stainless steel.

Exterior made of stainless steel, fine satin finish.

Internal forced air ventilation.

Useful capacity: 520 litres.

Internal dimensions: 620 x 630 x 1390 mm

External dimensions: 730 x 1000 x 2090 mm

Complete with height-adjustable trays.

Power supply: 220 V. / 50 Hz.

**Accessory**

H0134 Graphic humidity and temperature recorder.

V0200 Freezer chest

Freezer chests with a static evaporating system are attractive options for tests that do not require strict homogeneous results greater than $\pm 3^{\circ}\text{C}$ or where the specimens suffer degradation as a result of the forced air. These are used in tests where the cooling speed is very slow or for long term stability tests performed at constant set point. Maximum energy savings and minimum noise level. Easy-to-open lightweight access door.

Useful Volume: 200 litres.

Temperature range: room temperature to -40°C

Internal dimensions: 660 x 790 x 450 mm

**V0200/A Monoblock freezer chest with forced air cooling and electronic-digital temperature control**

Forced air freezer chests are especially designed to fast freeze liquids and for thermal fatigue studies in construction materials, plastic and rubber. Other than their air circulation design, their great advantages versus static evaporation freezers are their fast-freeze speed and excellent temperature recovery features.

Useful internal volume: 1,000 litres

Temperature range: room temperature to -25°C

Internal dimensions: 800 x 1830 x 700 mm

External dimensions: 1250 x 2750 x 900 mm



Specimen removal

Standards EN 12504-1

The most direct method of evaluating hardness of construction materials such as concrete is to remove a specimen from the area to be tested. The corer provides a fast, simple way to obtain suitably-sized quality specimens.

H0138 Electric Core Drilling Machine

Three speeds, 360° rotation to work at any angle. The steel base holds a column equipped with an adjustable fastening device. The machine has two wheels that make it extremely manageable, and four legs for lifting and positioning. The column includes a guide that is needed both to move the motor /core unit and to remove the unit. Unit movements are controlled by a handle. The motor includes a rapid connector system to cool the bit. Extensions can be attached to the vertical column to increase the depth to 2.7 m.

Power supply: 220-240 V. 50 Hz.

Absorbed power: 2000 W

Dimensions: 700 x 450 x 1200 mm

Weight: 100 Kg



H0139 Core Drilling Machine, petrol engine

Especially recommended for mobile laboratories and highway testing. Powered by a 4-stroke petrol combustion engine, mounted on a wheeled base. The machine head moves between two columns by means of a spindle. Supplied with a water-cooling device.

Motor power: 5 Hp.

Dimensions: 800 x 580 x 1230 mm

Weight: 150 Kg

Diamond crown bits:

H0141 Ø 50 x 350 mm

H0142 Ø 75 x 350 mm

H0143 Ø 100 x 350 mm

H0144 Ø 150 x 350 mm

H0145 Ø 200 x 350 mm

H0146 Extension for diamond crown bits. 500 mm long



Specimen cutting and grinding

For large concrete blocks taken from structures or obtained using a corer, a preliminary set of tasks must be carried out to prepare the specimen so that it complies with the required standard

Specimen cutting devices

These cutting devices are suitable for concrete specimens and construction components. Includes a device for cutting specimens obtained by corers as well as irregular rock specimens. Supplied with disc protection and a submersible pump for water recirculation and cooling. Some models include a pedal to control head movement.

Model	Power	Motor	Disc diameter mm	Length of cut
H0150	3 hp	220-50	300/350-25.4	600 mm
H0151	5.5 hp	220/380-50	400-25.4	600 mm
H0152	5.5 hp	220/380-50	500-25.4	600 mm
H0153	7.5 hp	220/380-50	600-25.4	550 mm

Model	Disc diameter
H0154	300 x 25.4 mm
H0155	350 x 25.4 mm
H0156	400 x 25.4 mm
H0157	500 x 25.4 mm
H0158	600 x 25.4 mm



Standards EN 12390/3

H0161 Specimen grinder

Designed to polish and grind cylindrical and cubic specimens of concrete, stone, and natural rocks with a maximum height of 370 mm. This machine can simultaneously grind:

- 3 cubic specimens with 100 mm side length or
- 2 cubic specimens with 150 mm side length or
- 2 cubic specimens with 200 mm side length or
- 2 cylindrical specimens measuring Ø 100x200 mm, 110x220 mm, 150x300 mm, 160x320 mm

The specimens are fastened to the table using appropriate stirrups that guarantee perfect coupling and locking.

The rotating head has two speeds and moves in both directions powered by a separate motor. The column is completely protected against abrasive dust.

The accuracy of the vertical movement of the head is 0.05 mm. The base of the machine is made of sturdy sheet metal with a large lockable tool compartment.

Work table surface: 680 x 300 mm

Polishing head diameter: Ø 330 mm

Vertical spans: minimum 90 mm / maximum 370 mm

Power supply: 400 V 3ph 50 Hz 1500 W

Dimensions: 1300 x 1040 x 1500 mm

Weight: 430 Kg

The polishing machine is supplied with:

Water collection and decanting tank (50 L), electric pump, water-resistant protection screen, eight abrasion sections, set of locking stirrups for cubic specimens of side length 100 / 150 / 200 mm.



Accessories and spare parts:

H0161/1 Spare abrasion sections (8 units required).

H0161/2 Diamond polishing sections (8 units required), especially effective due to their long working life and good grinding action.

H0161/3 Set of fastening stirrups for cylinder specimens measuring Ø 100 / 110 / 150 and 160 mm

H0161/4 Set of fastening stirrups for simultaneous testing of 3 cubic specimens measuring 100 mm

Cylinder Capping Equipment

Standards UNE EN 12390-3, UNE 7240, 83303; ASTM C617; NF P18-416; BS 1881; AASHTO T23, T126

H0165 Electric vessel for melting sulphur

Rectangular shape with a capacity for 10 L. All stainless steel interior with double lining. Supplied with a thermostat for temperature control up to 300 °C.

Dimensions: 400 x 260 x 280 mm

Weight: 11 Kg



Accessories

H0165/1 Container with 10 litres of heating oil.

H0165/2 Stainless steel ladle to transfer sulphur.

H0165/3 Oil level dipstick.

H0166 Facing machine for cylinder specimens measuring Ø 150 mm

H0166/1 Plate for facing machine for cylinder specimens measuring Ø 150 mm

H0166E Special facing machine for specimens measuring standardised Ø 150 mm, with 60HRC plate hardness, as per Standard 83-303/84.

H0166/1E Plate for special facing machine for specimens measuring standardised Ø 150 mm with 60HRC hardness, as per Standard 83-303/84.

H0167 Facing machine for cylinder specimens measuring Ø 100 mm

H0168 Facing machine for cylinder specimens measuring Ø 75 mm

H0169 Micronised sulphur, 40 Kg package

H0171 Lampblack container, 11.5 Kg



Compression Testing Machines

A model for every need

Models designed to comply with the requirements of the most important international standards.

Wide range of models developing force ranging from 1500 to 6000 kN. A variety of measurement and control systems.

- *Manual models with analogue or digital display of force.*
- *Automatic models with manual loading speed control and digital display of force.*
- *Servo-controlled models with computer controlled digital display of speed and force.*

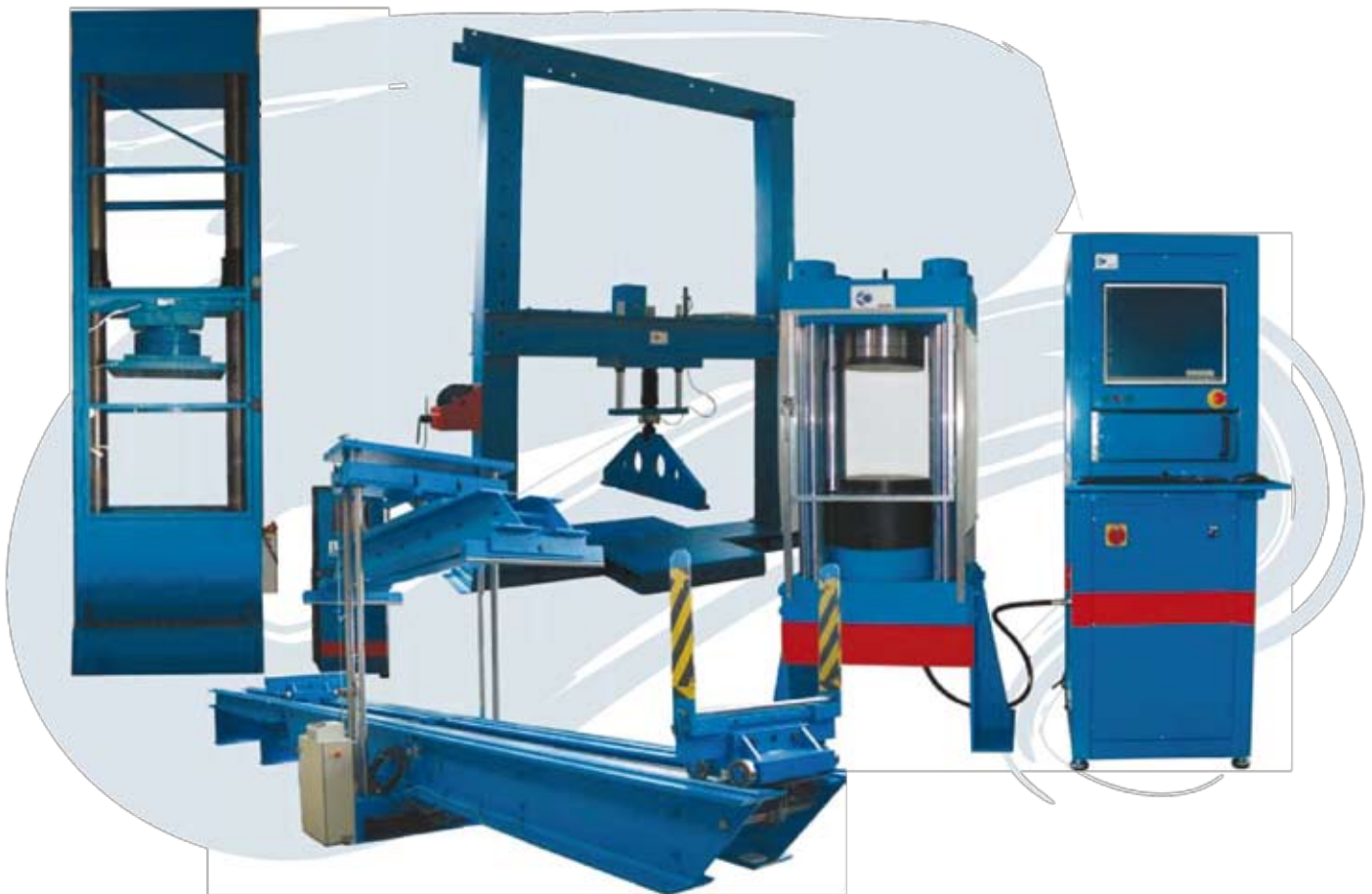
These models can be used for the following test specimen types:

- Concrete: cubic, cylinder, prism, bending tests, indirect tensile tests, etc.
- Flagstones.
- Ceramic test specimens.
- Rock and granite.

Wide range of test accessories.

Our machines are suitable for and cover the needs of our customers, from quality control laboratories to universities and research centres.

Our quality standards allow us to build sturdy, long-lasting, high-precision machinery capable of performing all types of tests.



Compression Testing Machines

Standard UNE EN 12390-3, 12390-4; UNE 7281, UNE 83304; ASTM C39, E4, BS 1610; AASHTO T22, T71; DIN 51.220, 51.223; NF P18-411; BS 1610

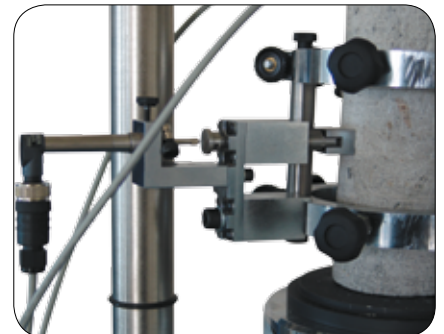
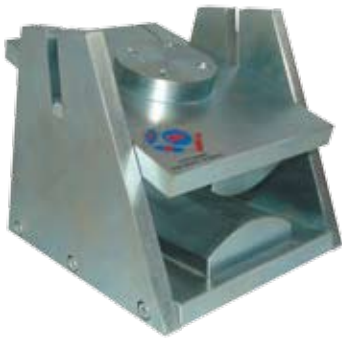
This series of machines is designed to meet the needs of any compression test on concrete test specimens performed either in a laboratory or at a worksite. Class 1 construction with accuracy better than $\pm 1\%$ in compliance with international standards. This series features: sturdiness, measurement precision, easy handling, easy transportation and compliance with current standards. The rigid body structure in a weld-free frame ensures perfect repeatability and precision in test results. These machines can perform tests on the following types of test specimens, depending on their capacity and design:

Concrete test specimens:

Cubic specimens.
Cylindrical specimens.
Prism specimens.
Indirect tensile (Brazilian test).

Stone and concrete flagstones.

Ceramic test specimens.
Rock and granite.



Testing area



This area consists of a compact, attractive, mechanically stable assembly of metal sections. The compression plates are tempered and ground, the bottom plate has concentric markings that are helpful for correct placement of test specimens. The upper plate includes a ball joint for perfect seating.

Hydraulic power pack

Powered by an electric motor with an oil tank and connections to the compression machines.



Pressure gauge

High precision, calibrated with maximum error under $\pm 1\%$.



Digital display with microprocessor

The display shows the load reading and the thrust unit value, works as a timer. Highly stable reading. When the test is finished, all the parameters can be seen on the screen and/or be sent to a printer.



Machines have display of force on a pressure gauge

Measurement and control systems

These machines are divided in groups according to capacity: 1200, 1500, 2000, 3000, 5000 and 6000 kN (other capacities on request). There are several options for load control and reading: pressure gauge, digital display, or PC

Compression test machines, capacity 1200 kN



H0200 Compact machine for 1200 kN hand powered, for compression tests in cylindrical, cubic, prism specimens and indirect tensile test. High precision pressure gauge reading, with reading error under $\pm 1\%$. Supplied with ENAC calibration certificate and instruction manual.

Compression test machines, capacity 1500 kN

H0210 Compact machine for 1500 kN hand powered, for compression tests in cylindrical, cubic, prism specimens and indirect tensile test.

High precision pressure gauge reading, with reading error under $\pm 1\%$. Supplied with ENAC calibration certificate and instruction manual .

H0212 Compact machine for 1500 kN motorised, for compression tests in cylindrical, cubic, prism specimens and indirect tensile test.

High precision pressure gauge reading, with reading error under $\pm 1\%$. Supplied with ENAC calibration certificate and instruction manual.



Compression test machines, capacity 2000 kN

H0220 Compact machine for 2000 kN hand powered, for compression tests in cylindrical, cubic, prism specimens and indirect tensile test. High precision pressure gauge reading, with reading error under $\pm 1\%$. Supplied with ENAC calibration certificate and instruction manual.

H0222 Compact machine for 2000 kN motorised, for compression tests in cylindrical, cubic, prism specimens and indirect tensile test. High precision pressure gauge reading, with reading error under $\pm 1\%$. Supplied with ENAC calibration certificate and instruction manual.

Compression test machines, capacity 3000 kN

H0230 Compact machine for 3000 kN hand powered, for compression tests in cylindrical, cubic, prism specimens and indirect tensile test. High precision pressure gauge reading, with reading error under $\pm 1\%$.

Supplied with ENAC calibration certificate and instruction manual.

H0232 Compact machine for 3000 kN motorised, for compression tests in cylindrical, cubic, prism specimens and indirect tensile test. High precision pressure gauge reading, with reading error under $\pm 1\%$. Supplied with ENAC calibration certificate and instruction manual.



Model	Capacity	Piston stroke	Free lateral spacing	Useful compression distance	Frame dimensions (mm)	Plate dimensions (mm)	Weight	Power supply
H0200	1200 kN	80 mm	230 mm	320 mm	460 x 600 x 810	190 x 190 x 50	280 Kg	Manual
H0210	1500 kN	80 mm	230 mm	320 mm	460 x 600 x 810	190 x 190 x 50	304 Kg	Manual
H0212	1500 kN	80 mm	230 mm	320 mm	460 x 600 x 810	190 x 190 x 50	344 Kg	220/380 V 50/60 Hz
H0220	2000 kN	80 mm	270 mm	320 mm	410 x 670 x 880	260 x 260 x 50	447 Kg	Manual
H0222	2000 kN	80 mm	270 mm	320 mm	410 x 670 x 880	260 x 260 x 50	487 Kg	220/380 V 50/60 Hz
H0230	3000 kN	80 mm	270 mm	320 mm	410 x 670 x 880	260 x 260 x 50	447 Kg	Manual
H0232	3000 kN	80 mm	270 mm	320 mm	410 x 670 x 880	260 x 260 x 50	487 Kg	220/380 V 50/60 Hz

Machines with digital display of force

Compression test machines, capacity 1500 kN

H0211 Compact machine for 1500 kN, hand powered, for compression tests in cylindrical, cubic, prism specimens and indirect tensile test. H0206/1 **digital display**. Supplied with ENAC calibration certificate and instruction manual.

Compression test machines, capacity 2000 kN

H0221 Compact machine for 2000 kN, hand powered, for compression tests in cylindrical, cubic, prism specimens and indirect tensile test. H0206/1 **digital display**. Supplied with ENAC calibration certificate and instruction manual.

Compression test machines, capacity 3000 kN

H0231 Compact machine for 3000 kN, hand powered, for compression tests in cylindrical, cubic, prism specimens and indirect tensile test. H0206/1 **digital display**. Supplied with ENAC calibration certificate and instruction manual.



Model	Capacity	Piston stroke	Free lateral distance	Useful compression space	Frame dimensions (mm)	Plate dimensions (mm)	Weight	Power supply
H0211	1500 kN	80 mm	230 mm	320 mm	450 x 600 x 810	190 x 190 x 50	304 Kg	Manual
H0221	2000 kN	80 mm	230 mm	320 mm	410 x 670 x 880	260 x 260 x 50	447 Kg	Manual
H0231	3000 kN	80 mm	230 mm	320 mm	410 x 670 x 880	260 x 260 x 50	447 Kg	Manual

Compression test machines, capacity 1500, 2000 and 3000 kN

H0213 Compact machine of 1500 kN capacity, motorised, for compression tests in cylindrical, cubic, prism specimens and indirect tensile test. H0206/1 digital display. Supplied with ENAC calibration certificate and instruction manual.

Technical characteristics

Capacity: 1500 kN.

Piston stroke: 80 mm

Free lateral distance: 270 mm

Distance between compression plates: 320 mm

Frame dimensions: 400 x 330 x 880 mm

Plate dimensions: 210 x 210 x 50 mm

Weight: 343 Kg approx

Power supply: 220/380 V. 50-60 Hz. Three phase.



H0223 Compact machine of 2000 kN capacity, motorised, for compression tests in cylindrical, cubic, prism specimens and indirect tensile test. H0206/1 digital display. Supplied with ENAC calibration certificate and instruction manual.

Technical characteristics

Capacity: 2000 kN.

Piston stroke: 80 mm

Free lateral distance: 270 mm

Distance between compression plates: 320 mm

Frame dimensions: 400 x 330 x 880 mm

Plate dimensions: 210 x 210 x 50 mm

Weight: 343 Kg approx

Power supply: 220/380 V. 50-60 Hz. Three phase.



H0233 Compact machine of 3000 kN capacity, motorised, for compression tests in cylindrical, cubic, prism specimens and indirect tensile test. H0206/1 digital display. Supplied with ENAC calibration certificate and instruction manual.

Technical characteristics

Capacity: 3000 kN.

Piston stroke: 80 mm

Free lateral distance: 270 mm

Distance between compression plates: 320 mm

Frame dimensions: 400 x 330 x 880 mm

Plate dimensions: 210 x 210 x 50 mm

Weight: 343 Kg approx

Power supply: 220/380 V. 50-60 Hz. Three phase.

Standard UNE EN 12390-3 for hardened concrete tests

Testing of specimen compression strength

These machines are designed to meet requirements for material compression tests, specifically on standard concrete test specimens: cubic, cylindrical and prism, as per standards EN 771/3, 12390-4, 12350; BS 1610, 1881; DIN 51220, 51302; NP 18411, 18412; ASTM C-39, E447; UNI 6686. Machine dimensions and design are suitable for performing other tests (bending, indirect tensile, etc) with the corresponding accessories. This equipment features high quality, sturdy construction, high precision, easy handling and compliance with current standards.

Testing area

This area consists of a compact, attractive, mechanically stable assembly of metal sections. The machine bed houses the unit, which consists of the sleeve with the piston on the lower bridge, including the pressure sensor; the upper crossbar closes off the test frame. Equipped with a user safety protection device, in compliance with standard CE 89/392.

The compression plates are tempered and ground in compliance with ISO 6507-1, the bottom plate has concentric markings that are helpful for correct placement of test specimens. The upper plate includes a ball joint for perfect seating.

Hydraulic motor pump group

The hydraulic pressure power pack is attached to the side of the machine and mounted on an anti-vibration system. The power pack is airtight and anti-pollutant with low noise level emission. It is equipped with a fine adjustment valve that acts on the oil flow through the circuit and facilitates selection of test speed. The unit is equipped with a device that shuts the system down automatically when specimen failure is detected.

Displays

H0206/1 digital display.

General Characteristics

14-bit Microprocessor board

Backlit alphanumeric display with 9 mm characters. Equipped with two data collection channels for connection to force, pressure or displacement transducers.

RS232C output for printer or PC.

Stores data in Excel format. (*.xls)

Measurement units available: N; daN; KN; Kgf; Nm; g; Kg; bar; mbar; Mpa; atm; V; mV; mV/V; mm; μ m.

Auto calibration key (zero)

Peak activation key.

Key for data transfer to PC or printer.

PROETI software for test data collection and transfer to a PC for printing or saving.

Power supply: 220 V. 50/60 Hz.

Dimensions: 200 x 80 x 130 mm

Weight: 1 Kg



H0206/PLUS Digital Force Display Module with UDI 16/4 PLUS Microprocessor

General characteristics

16-bit microprocessor board
 Back-lit LCD display with 240 x 128 pixel.
 Four programmable data collection channels for connection to force, pressure or displacement transducers.
 Two RS232C outputs for connection to a printer or PC.
 Stores data in Excel format. (*.xls)
 Measurement units available: N; daN; KN; Kg; Nm; g; Kg; bar; mbar; Mpa; atm; V; mV; mV/V; mm; μm .
 Menu available in 4 languages (Spanish, English, Portuguese and Italian).
 PROETI UDI16/4PLUS software for data/curve collection in real time.
 Choice of the specimen area to test.
 Choice of degree of load (N/s; Mpa/s; Kg/cm²*s) and tolerance $\pm$ % of value entered
 User selectable measurement channels.
 Automatic calculation of Maximum Force (Fm), Unit Load (Rm), average Degree Value.
 Recording of data in EXCEL format.
 Allows data saved in EXCEL format to be uploaded to a PC.



Power supply: 220 V 50/60 Hz.

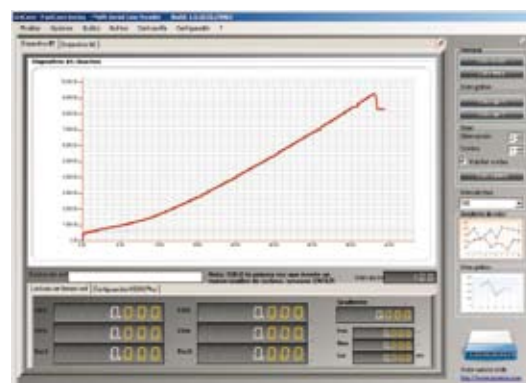
Dimensions: 230 x 145 x 180 mm

Weight: 2 Kg

Software indicators

General Characteristics

Allows the test to be followed from a PC and displays the test on the screen. The tests and curves can be saved in Excel format.
 Shows the characteristic load/time or load/deformation curve, depending on how the unit is set up and the configuration selected by the operator.
 Allows selection of a wide range of units of measurement for load gradient and test speed. (depending on the measurement transducer that is connected).
 Automatic mode peak function at the beginning of the test.
 View of the measurement channel/s chosen by the operator.
 Automatic calculation of Fm, Rm average gradient value and Lu values (when channel 2 is used for a displacement transducer).
 Stores data in Excel format. (*.xls)
 Easy to install PROETI computer software, allows test data to be collected and transferred to a PC (RS232C output), for printing or saving.
 View of data collection channel chosen by the operator.
 RS232C COM2 printing channel.
 RS232C COM1 PC connection channel.
 Operating temperature: + 10 °C to + 35 °C.



Machines with speed servo-control and digital force display

Standard UNE EN 12390-3 for hardened concrete tests Testing of specimen compression strength

This machine is designed to meet requirements for material compression tests, specifically on standard concrete test specimens: cubic, cylindrical and prism, as per standards EN 771/3, 12390-4, 12350; BS 1610, 1881; UNE 83304, 7242; DIN 51220, 51302; NP 18411, 18412; ASTM C-39, E447; UNI 6686. Machine dimensions and design are suitable for performing other tests (bending, indirect tensile, etc) with the corresponding accessories. This equipment features high quality sturdy construction, high precision, easy handling and compliance with current standards.

Testing area

This area consists of a compact, attractive, mechanically stable assembly of metal sections. The machine bed houses the unit, which consists of the sleeve with the piston on the lower bridge, including the pressure sensor; the upper crossbar closes off the test frame. Equipped with a user safety protection device, in compliance with standard CE 89/392.

The compression plates are tempered and ground in compliance with ISO 6507-1, the bottom plate has concentric markings that are helpful for correct placement of test specimens. The upper plate includes a ball joint for perfect seating.

Computerised servo-controlled group

A hydraulic unit that is servo-controlled by H0206 Plus module or by PC software. This unit was designed for complete control the machine and tests. The system is capable of performing compression and flexural strength tests adapted to any standard. The standard version consists of a unit connected to the loading piston. The machine is controlled by software that manages the tests, prepares graphs and presents the results.

The load control system is completely new and emulates a servo-valve using a pump that accurately controls oil flow to the piston, controlling the speed of rotation of the pump motor. This new system developed by Proetisa guarantees reliability and productivity, accurate results, repeatability and extreme precision.

Another very significant characteristic of this new system is its low noise level. The unit is extremely quiet.

The complete unit consists of:

PC with Windows XP and 19" TFT monitor or higher.

HP deskjet printer.

High pressure connection tube from the unit to the test frame/ piston.

Multilingual servo-control software to perform tests in compliance with EN 12390-3, EN 12390-5 and EN 196-1.

All test data and the failure curves are saved in *.mdb format to facilitate export to databases (Access, Excel) for custom management by the client.



H0260 Servo-controlled unit

H0261 Computer + Printer

H0209 Software

Servo-control software

The servo-control software has been designed for total control of the machine and the tests it performs.

The system is capable of performing compression and flexural strength tests adapted to any standard.

The press is controlled by the H0206 Plus module, equipped with four channels. These four channels can be dedicated and configured for all the possible options:

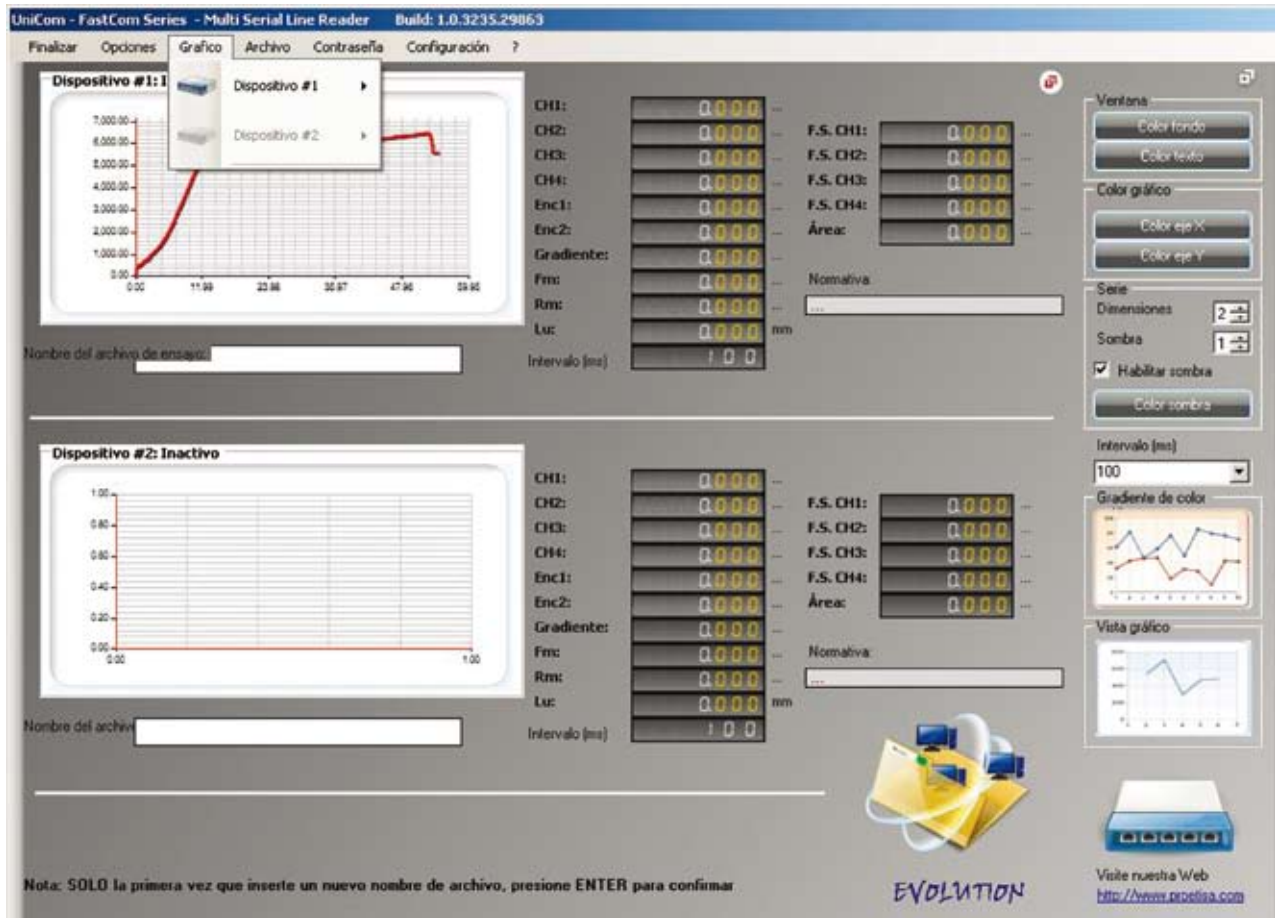
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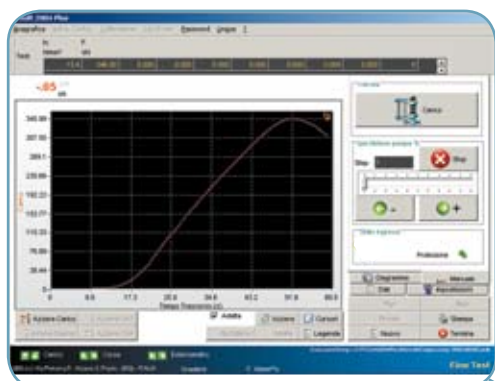
As many as four measuring bridges can be connected with a single module and the software. A combination press for concrete test specimen compression tests, plus a measuring bridge to test cement compressive strength failure, plus another measuring bridge to test cement flexural strength failure. The software manages all the tests, generates charts and presents the results.

The load control system software is completely new and emulates a servo-valve using a pump that accurately controls oil flow to the piston, controlling the rotation speed of the pump motor. This new system developed by Proetisa guarantees high reliability and productivity, precise results, repeatability and extreme accuracy.



ETIMATIC

This unit is used for completely automatic test performance. All that is required is the push of a button and ETIMATIC does the rest.





The **ETIMATIC** module includes a servo-assisted system that completely controls the load gradient. The operator simply has to choose the type of test specimen, its dimensions and start the test. The press and ETIMATIC will do the rest. The ETIMATIC unit can be installed in any measuring bridge in both concrete and cement machines. You can increase the productivity of your laboratory by purchasing this unit and modernising your old manual or motor powered press.

All cement, mortar and concrete tests are included in the internal firmware. Simply choose the Standard to apply.

Compression testing in concrete.	Compression testing in mortar / cement.
Flexural testing in concrete.	Flexural testing in mortar / cement.
Indirect tensile testing in concrete.	

ETIMATIC will continuously display the load, the failure load and the strength calculation in the selected units in real time. ETIMATIC can be used with more than one measuring bridge.

For example, a rack for bending tests and another rack for compression tests can be connected.

The unit will control and perform the tests according to the Standard chosen.

The load control system is completely new and emulates a servo-valve using a pump that accurately controls oil flow to the piston, controlling the rotation speed of the pump motor.

This new system developed by Proetisa guarantees reliability and productivity, accurate results, repeatability and extreme precision. Another very significant characteristic of this new system is its low noise level. The unit is extremely quiet.



H0206/PLUS Universal digital display

The press is controlled by the H0206 Plus module, equipped with four channels. These four channels can be dedicated and configured for all the possible options:

FORCE – FORCE – FORCE – FORCE
 FORCE – DEFORMATION – FORCE – DEFORMATION
 FORCE – FORCE – FORCE – DEFORMATION
 FORCE – DEFORMATION – DEFORMATION – DEFORMATION
 FORCE – DEFORMATION – FORCE – DEFORMATION

As many as four measuring bridges can be controlled with a single module and the software.

A combination press for concrete test specimen compression tests, plus a measuring bridge for cement compressive failure, plus another measuring bridge for cement / concrete flexural failure.

Machines with speed servo-control and digital force display - ETIMATIC Series

Compression testing machines, capacity 1500, 2000, 3000 and 5000 kN

H0214 Servocontrolled Compac Compression Testing Machine, 1500 KN capaci-

For compression tests in cylindrical, cubic, prism and indirect tensile test specimens. H0206 PLUS digital display reading with microprocessor. Supplied with ENAC calibration certificate and instruction manual.

The ETIMATIC module includes a servo-assisted system that completely controls the load gradient. The operator simply has to choose the type of test specimen, its dimensions and start the test. The press and ETIMATIC will do the rest. The display will continuously show the load, the failure load and the strength calculation in the selected units in real time.

The load control system is completely new and emulates a servo-valve using a pump that accurately controls oil flow to the piston, controlling the rotation speed of the pump motor. This new system developed by Proetisa guarantees reliability and productivity, accurate results, repeatability and extreme precision. Another very significant characteristic of this new system is its low noise level. The unit is extremely quiet. Press performance can be expanded by adding a rack for bending tests.

Technical characteristics

External unit dimensions: 720 X 420 X 1600 mm

Frame dimensions: 390 x 300 x 870 mm

Plate dimensions: 190 x 190 x 50 mm

Capacity: 1500 kN.

Piston stroke: 80 mm

Free lateral distance: 230 mm

Distance between compression plates: 320 mm

Weight: 344 Kg approx.

Power supply: 220/380 V 50-60 Hz. Three phase.



H0224 Servocontrolled Compac Compression Testing Machine, 2000 KN capaci-

For compression tests in cylindrical, cubic, prism and indirect tensile test specimens. H0206 PLUS digital display reading with microprocessor. Supplied with ENAC calibration certificate and instruction manual.

The ETIMATIC module includes a servo-assisted system that completely controls the load gradient. The operator simply has to choose the type of test specimen, its dimensions and start the test. The press and ETIMATIC will do the rest. The display will continuously show the load, the failure load and the strength calculation in the selected units in real time.

The load control system is completely new and emulates a servo-valve using a pump that accurately controls oil flow to the piston, controlling the rotation speed of the pump motor. This new system developed by Proetisa guarantees reliability and productivity, accurate results, repeatability and extreme precision. Another very significant characteristic of this new system is its low noise level. The unit is extremely quiet. Press performance can be expanded by adding a rack for bending tests.

Technical characteristics:

Capacity: 2000 kN

Piston stroke: 80 mm

Free lateral distance: 270 mm

Distance between compression plates: 320 mm

Frame dimensions: 390 x 300 x 870 mm

External unit dimensions: 720 X 420 X 1 600 mm

Plate dimensions: 260 x 260 x 50 mm

Weight: 487 Kg approx.

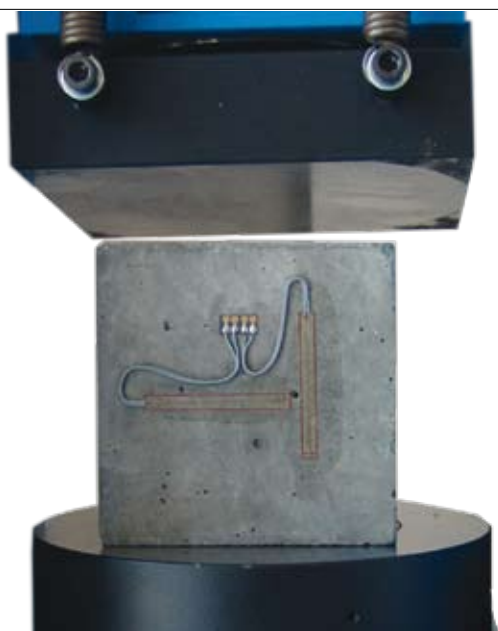
Power supply: 220/380 V. 50-60 Hz. Three phase.

H0234 Servocontrolled Compac Compression Testing Machine, 3000 KN capaci-

For compression tests in cylindrical, cubic, prism and indirect tensile test specimens. H0206 PLUS digital display reading with microprocessor. Supplied with ENAC calibration certificate and instruction manual.

The ETIMATIC module includes a servo-assisted system that completely controls the load gradient. The operator simply has to choose the type of test specimen, its dimensions and start the test. The press and ETIMATIC will do the rest. The display will continuously show the load, the failure load and the strength calculation in the selected units in real time.

The load control system is completely new and emulates a servo-valve using a pump that accurately controls oil flow to the piston, controlling the rotation speed of the pump motor. This new system developed by Proetisa guarantees reliability and productivity, accurate results, repeatability and extreme precision. Another very significant characteristic of this new system is its low noise level. The unit is extremely quiet. Press performance can be expanded by adding a rack for bending tests.



H0254 Servocontrolled Compac Compression Testing Machine, 5000 KN capaci-

For compression tests in cylindrical, cubic, prism and indirect tensile test specimens. H0206 PLUS digital display reading with microprocessor. Supplied with ENAC calibration certificate and instruction manual.

The ETIMATIC module includes a servo-assisted system that completely controls the load gradient. The operator simply has to choose the type of test specimen, its dimensions and start the test. The press and ETIMATIC will do the rest. The display will continuously show the load, the failure load and the strength calculation in the selected units in real time.

The load control system is completely new and emulates a servo-valve using a pump that accurately controls oil flow to the piston, controlling the rotation speed of the pump motor. This new system developed by Proetisa guarantees reliability and productivity, accurate results, repeatability and extreme precision. Another very significant characteristic of this new system is its low noise level. The unit is extremely quiet.

Press performance can be expanded by adding a rack for bending tests.

Technical characteristics

Capacity: 5000 kN.

Piston stroke: 80 mm

Free lateral distance: 280 mm

Distance between compression plates: 320 mm

Frame dimensions: 390 x 300 x 870 mm

External unit dimensions: 720 X 420 X1 600 mm

Plate dimensions: 260 x 260 x 50 mm

Weight: 580 Kg approx.

Power supply: 220/380 V. 50-60 Hz. Three phase.



Accessories for testing machines

Accessories

H0270 A bending test frame with 150 kN capacity, designed to work jointly with compression test machines. This machine can perform bending tests on prism test specimens measuring 150 x 150 x 600 or 750 mm and 100 x 100 x 400 or 500. The upper and lower rollers can be easily adjusted to the dimensions of the test specimen. A single hydraulic unit with a hydraulic distribution valve acts on the compression or bending test frame.



Technical characteristics

Load capacity: 150 kN.

Maximum vertical span: 160 mm

Upper roller length: between 100 and 455 mm

Roller diameter: 160 mm

Maximum distance between upper rollers: 40 to 155 mm

Piston stroke: 50 mm

Power supply: 220/ 380 V. 50/60 Hz.

Dimensions: 540 x 460 x 1120 mm

H0205/4 High strength pedestal made of painted sheet metal, reinforced on the inside by electrically welded corners. To support presses of 1500/3000 kN capacity, external dimensions of 600 x 700 x 450 mm

S0360 150 mm deformation or displacement meter



Automatic computer-controlled machines

Automatic Compression Testing Machines 2000 to 6000 kN capacity, computer-controlled with ETIWIN system.

This type of machine has been specifically designed and built to meet the requirements of users that need to test material strengths at the worksite or in a laboratory. Class 1 construction with accuracy better than $\pm 1\%$ in compliance with international standards: UNE EN 12.390; AASHTO T22; ASTM E4

This series features: sturdiness, measurement precision, easy handling, easy transportation and compliance with current standards. The rigid body structure in a weld-free frame ensures perfect repeatability and precision in test results.

The machine consists of two parts:

The test frame.
The control desk.

Test Frame

The frame consists of an attractive, mechanically stable, compact, undeformable system of 4 columns. The bottom machine bed houses the sleeve and piston unit; the upper crossbar closes off the test frame.

The compression plates are tempered and ground in compliance with the requirements for hardness, flatness and smoothness described in standard UNE EN 12.390. The bottom plate has concentric markings that are very helpful for correct placement of the test specimens. The top plate includes a self-locking ball joint for perfect seating of the specimen.

Machine capacity and design allow it to be used to perform tests on the following types of test specimens:

Concrete test specimens

Cubic specimens measuring 10, 15 and 20 cm
Cylinder specimens measuring $\varnothing 15 \times 30$ y 16×32 cm
Prism specimens measuring up to $350 \times 500 \times 250$ mm
Indirect tensile test (Brazilian test)*.
Prism test specimen bending test*.
(With use of the corresponding accessory)*

Stone and concrete flagstones.

Ceramic test specimens.

Rock and granite.

Prefabricated blocks.



The top plate includes a round self-locking ball joint with its centre of rotation on the base of the plate to prevent lateral stresses and the resulting application of axial forces on the test specimen.

The test frame includes a locking transparent FRONT DOOR for protection of the user against pieces of the specimen being ejected during the test. This complies with E.C. directives.

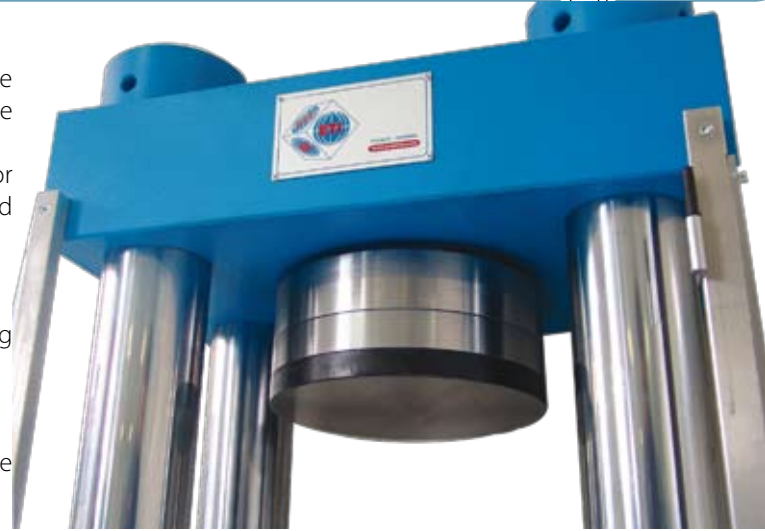
Control desk

Made of oven-painted steel sheet metal, consisting of the following basic components:

Hydraulic unit.

Computer system for test measurement, control and recording.

The test frame includes an emergency stop device and low voltage conditioners.



Desk dimensions: 1430 x 600 x 930 mm

Weight: 200 Kg approx.

The hydraulic unit is mounted on an anti-vibration system and housed in the lower part of the control desk. This high pressure hydraulic unit is airtight, anti-pollutant and with very low noise emission. It is powered by an electric motor and equipped with an on-off switch. The servo-control performs an automatic closed loop control of loads from 2000 Kg, to ensure that load application is constant and uniform.

The hydraulic cylinder and piston are made of special ground steel. An end-stop device restrains the piston. Given the high pressures that occur during compression tests, an O-ring has been placed in one of the grooves of the cylinder to reduce friction to a minimum.

The unit is equipped with a series of safety accessories:

Anti-overpressure valve.

Magnetic anti oil pollution filter.

Protection device against power anomalies.



System for test measurement, control and recording.

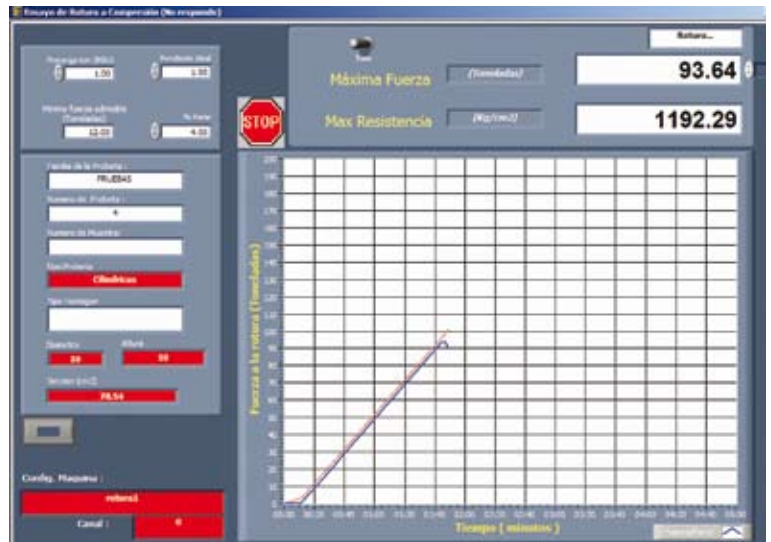
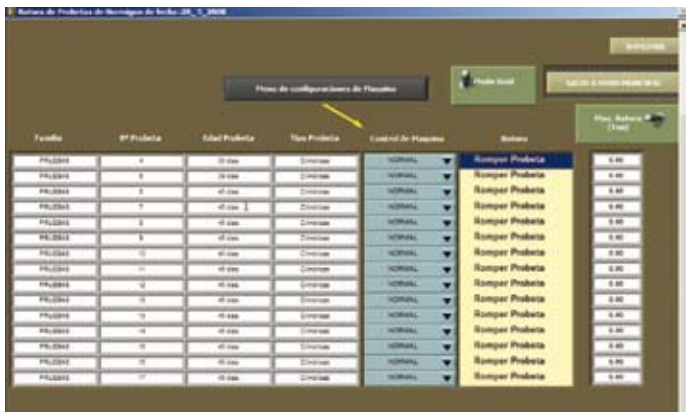
The system for data control, acquisition and collection is completely automatic and carried out by the following equipment and components.

Compatible PC.

National Instruments 16 channel card.

ETIWIN software.

The machine is controlled by software. The software was developed by our own IT department. Programming, in a Labview environment, enables the machine to be controlled via the National Instruments card (installed in the PC). The card, the software and the servo-control allow precise control of the test with capacity for collecting up to 100,000 data items per second. As a result, the applied force is controlled very effectively and real test result charts can be obtained.

Prueba	Prueba	Prueba	Prueba	Prueba	Prueba	Prueba
PRUEBA	1	12.00	12.00	12.00	12.00	12.00
PRUEBA	2	12.00	12.00	12.00	12.00	12.00
PRUEBA	3	12.00	12.00	12.00	12.00	12.00
PRUEBA	4	12.00	12.00	12.00	12.00	12.00
PRUEBA	5	12.00	12.00	12.00	12.00	12.00
PRUEBA	6	12.00	12.00	12.00	12.00	12.00
PRUEBA	7	12.00	12.00	12.00	12.00	12.00
PRUEBA	8	12.00	12.00	12.00	12.00	12.00
PRUEBA	9	12.00	12.00	12.00	12.00	12.00
PRUEBA	10	12.00	12.00	12.00	12.00	12.00
PRUEBA	11	12.00	12.00	12.00	12.00	12.00
PRUEBA	12	12.00	12.00	12.00	12.00	12.00
PRUEBA	13	12.00	12.00	12.00	12.00	12.00
PRUEBA	14	12.00	12.00	12.00	12.00	12.00
PRUEBA	15	12.00	12.00	12.00	12.00	12.00
PRUEBA	16	12.00	12.00	12.00	12.00	12.00
PRUEBA	17	12.00	12.00	12.00	12.00	12.00



In addition, the 16 channel card can be used to add new transducers to the machine to perform new tests such as elastic modulus calculation, Poisson coefficient, etc.

The control of the machine makes it easier to perform dynamic tests. For example, the application of a load during a period of time without breaking the specimen, reducing the load and holding it steady for a period, applying a second load (equal to or greater than the first load) and so on while programming as many loading and unloading cycles as desired.

One of the advantages of this equipment is that it is completely automatic. A single push of a button instigates the following steps:

- The test is performed.
- The failure is detected.
- The results are saved.
- The equipment returns to its original position at maximum speed.
- The graph is displayed.
- The test is printed, etc.

The machine according to the description, consists of the following components:

- Test frame
- Compression plates
- Control desk
- Computer
- Printer
- ETIWIN programme

Quality

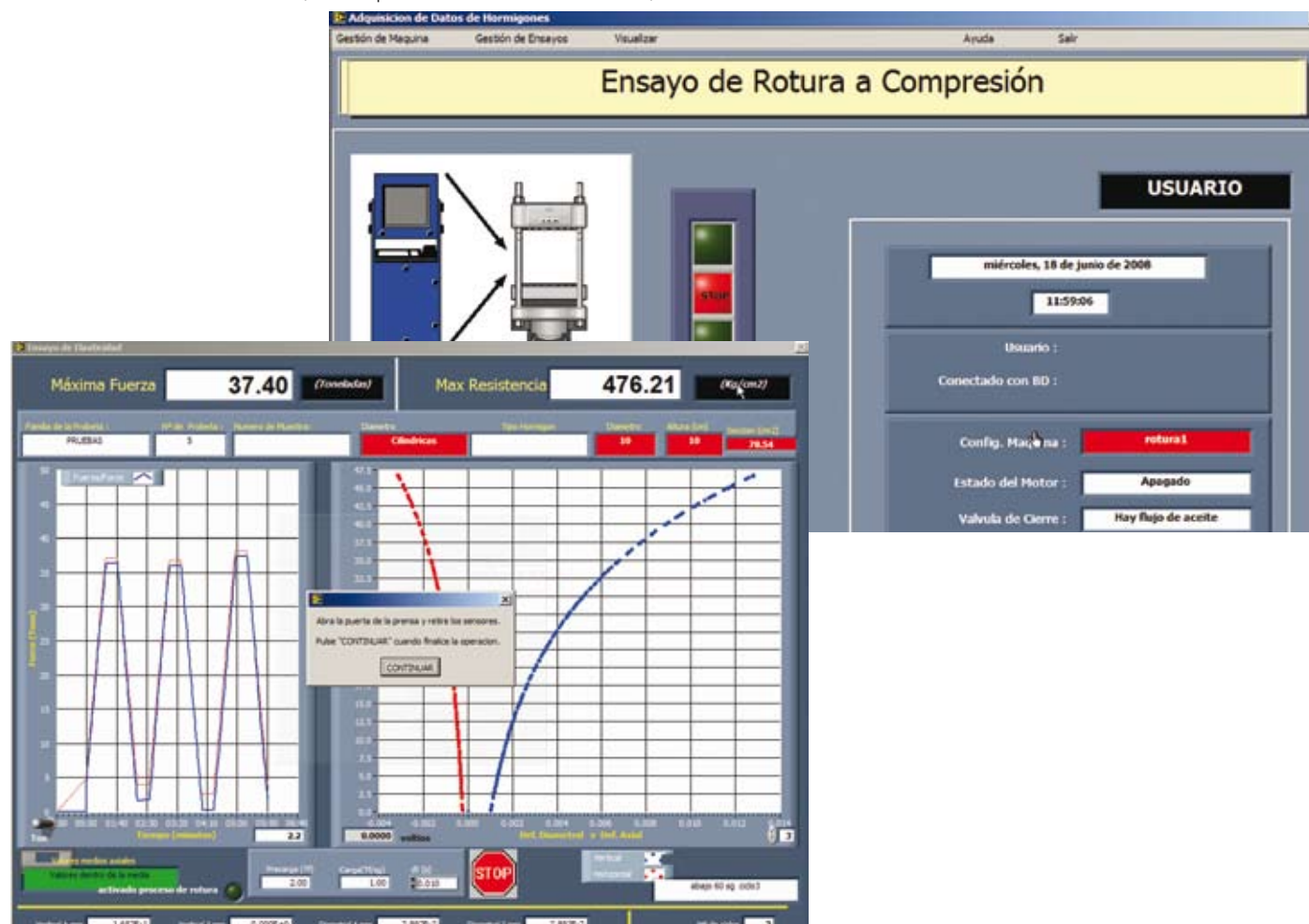
Our company has been awarded the UNE-EN-ISO 9001:2000 Quality Certificate. Our system and process controls guarantee the quality of the equipment we manufacture. The press is subject to strict controls during the manufacturing process, to guarantee the quality of the final product. The product is delivered with the following certificates:

ENAC calibration certificate for force measuring instruments ISO 7500-1

Plate hardness certificate. (in compliance with UNE EN 12.390).

Plate flatness certificate. (in compliance with UNE EN 12.390).

Plate smoothness certificate. (in compliance with UNE EN 12.390).



H0225 Automatic Compression Testing Machine, 2000 KN capacity

For material testing, computer-controlled by ETIWIN.

Description:

Computer-controlled compression testing machine with 2000 kN capacity. This machine can be used for compression tests in cylindrical, cubic, prism and indirect tensile test specimens. Computer control is provided in a separate module. The machine is supplied with ETI-WIN software, ENAC calibration certificate and instructions.

Technical characteristics:

Maximum force: 2000 kN.

Cylinder stroke: 150 mm

Cylindrical compression plates:

Bottom plate: Ø 350 mm

Top plate: Ø 285 mm

Supplementary plate: 50 mm x 300 mm

Test frame dimensions:

1730 x 950 x 490 mm

Distance between compression plates:

410 mm

Free lateral distance: 360 mm

Approximate frame weight: 1,500 Kg



H0235 Automatic Compression Testing Machine, 3000 KN capacity

For material testing, computer-controlled by ETIWIN.

Description:

Computer-controlled compression testing machine with 3000 kN capacity. This machine can be used for compression tests in cylindrical, cubic, prism and indirect tensile test specimens. Computer control is installed in a separate module. The machine is supplied with ETI-WIN software, ENAC calibration certificate and instructions.

Technical characteristics:

Maximum force: 3000 kN

Cylinder stroke: 150 mm

Cylindrical compression plates:

Bottom plate: Ø 350 mm

Top plate: Ø 285 mm

Supplementary plate: 50 mm x 300 mm

Test frame dimensions: 1730 x 950 x 490 mm

Distance between compression plates: 410 mm

Free lateral distance: 360 mm

Approximate frame weight: 1,500 Kg

H0255 Automatic Compression Testing Machine, 5000 kN capacity

For material testing, computer-controlled by ETIWIN.

Description:

Computer-controlled compression testing machine with 5000 kN capacity. This machine can be used for compression tests in cylindrical, cubic, prism and indirect tensile test specimens. Computer control is installed in a separate module. The machine is supplied with ETI-WIN software, ENAC calibration certificate and instructions.

Technical characteristics:

Maximum force: 5000 kN.

Cylinder stroke: 150 mm

Cylindrical compression plates:

Bottom plate: Ø 350 mm

Top plate: Ø 285 mm

Spare plate: 50 mm x 300 mm

Test frame dimensions: 1850 x 1050 x 540 mm

Distance between compression plates: 410 mm

Free lateral distance: 360 mm

Approximate frame weight: 1,860 Kg



H0265 Automatic Compression Testing Machine, 6000 kN capacity

For material testing, computer-controlled by ETIWIN.

Description:

Computer-controlled compression testing machine of 6000 kN capacity. This machine can be used for compression tests in cylindrical, cubic, prism and indirect tensile test specimens. Computer control is installed in a separate module. The machine is supplied with ETI-WIN software, ENAC calibration certificate and instructions.

Technical characteristics:

Maximum force: 6000 kN.

Cylinder stroke: 150 mm

Cylindrical compression plates:

Bottom plate: Ø 350 mm

Top plate: Ø 285 mm

Supplementary plate: 50 mm x 300 mm

Test frame dimensions: 1850 x 1050 x 540 mm

Distance between compression plates: 410 mm

Free lateral distance: 360 mm

Approximate frame weight: 1,860 Kg

Accessories

H0253 Compressometer, to determine the elastic modulus (Young). This instrument is used to measure vertical deformation in cylinder test specimens measuring $\varnothing 150 \times 300$ mm during the compression test. It requires two LDVT displacement sensors (S0237/0) and two signal converters (S0238/0) neither of which are included.

H0253/1 Diameter deformation measuring device, to determine the elastic modulus (Young, Poisson and rigidity or shear modulus) if used together with the H0253. This machine is used to measure horizontal and vertical deformation (H0253) in cylinder test specimens measuring $\varnothing 150 \times 300$ mm. It requires two LDVT displacement sensors (S0237/0) and two signal converters (S0238/0), neither of which are included.

H0253/1



H0253

S0238/0



S0237/0



H0253/2



H0253/2 Compressometer-extensometer, to determine the elastic modulus (Young, Poisson and rigidity or shear modulus). This instrument is used to measure horizontal and vertical deformation in cylinder test specimens measuring $\varnothing 150 \times 300$ mm and 160×320 mm during the compression test. It requires four LDVT displacement sensors (S0237/0) (two for vertical deformation and two for diameter deformation), not included and four signal converters (S0238/0). (V0024 digital comparators or V0015 analogue comparators can be used.)

V0015



V0024



H0253/2



H0253/2



Accessories II

H0253/3 Compressometer, to determine the elastic modulus (Young). This instrument is used to measure thrust and deformation in cubic test specimens measuring 150 mm per side during the compression test. It requires two LDVT displacement sensors (S0237/0), not included, and two signal converters (S0238/). (V0024 digital comparators or V0015 analogue comparators can be used.)



H0237/0

V0015



H0253/3



V0024



H0256 Bending device, adapted for prism test specimens measuring 150 x 150 x 600 mm. Supplied with steel rollers



EN 12390-6; ASTM C446; NF P18-408

H0257 Indirect tensile test device (Brazilian test), adapted for test specimens measuring $\varnothing 150 \times 300$ and 160×320 mm. The device consists of a bottom supporting plate with a self-centring system and a top supporting element for the compression plate

H0273 Indirect tensile test device

Adapted for cubic test specimens measuring 100 and 150 mm

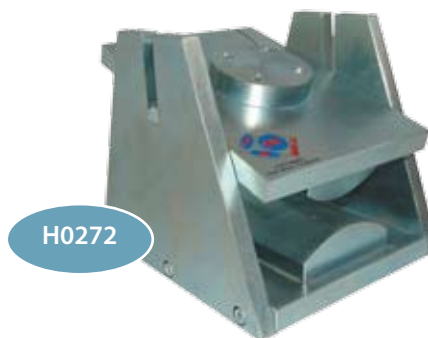
Dimensions: 350 x 250 x 264 mm

Accessories III

H0272 Device for kerb bending tests



S0237



H0272

H0290 Brick facing machine



H0290

H0258 Bending test machine for ceramics, terrazzo, roof tiles, baked clay and brick, in compliance with standards UNE 127.006, 67-035, 67-03767-042,67100

S0237 LDVT displacement sensors (2 mm)

H0238/0 Signal converters



H0238/0

H0250
H0251



H0252



H0250 Reducing plate measuring 180 x 50 mm, made of steel.
Thickness: 50 mm

H0251 Reducing plate
measuring 180 x 75 mm, made of steel.
Thickness: 75 mm

H0252 Safety protection.

ETI-WIN software

Standards UNE EN 12390, EN 10002.2; ASTM C42; BS 1610

Software for concrete

The machine is delivered with the H0240 FAILURE PROGRAM. This software can be used to carry out all types of tests and efficient machine control. A series of software packages are available for automatic carrying out and calculations in respect of the following tests:

Calculation of elastic modulus (Young, Poisson and shear).

Flexural strength test.

Indirect tensile failure test, Brazilian method.

Our test specimen management system is also available for purchase. A database for joint processing of test specimens using the failure software.

H0240/1 Elasticity programme

Calculation of elastic modulus (Young, Poisson, shear).

H0240/2 Flexural strength program

H0240/3 Indirect tensile strength program (Brazilian)

H0240/4 Database program (management)



Determining the elastic modulus and strength characteristics of concrete specimens and test specimens in single axis conditions

Determining the elastic modulus, Poisson coefficient and shear modulus.

Standards ASTM D3148, D2938, D5407, D2664

The single axis test is carried out by applying an increasing load at a constant stress rate of between 0.5 and 1.0 MPa/s. Axis and diameter deformation must be measured with great precision (approx. 5×10^{-6}). Afterwards, loading and unloading cycles are applied to determine compressibility properties. These tests require the use of a servo-controlled force application system. The system should be servo-controlled and not simulated, since the tests require application of very precise loads during very precise time periods.

The machine is controlled by the software installed. The software was developed by our own IT department. Programming, in a Lab-view environment, enables the machine to be controlled via the National Instruments card (installed in the PC). The card, the software and the servo-control provide precise test control, to ensure gradients are controlled during both loading and unloading processes. The system captures up to 100,000 data items per second. As a result, the applied force is controlled very effectively and real test result graphs can be obtained. In addition, the 16 channel card can be used to add new transducers to the machine to carry out new tests such as elastic modulus calculation, Poisson coefficient, etc.

The control of the machine makes it easier to perform dynamic tests. For example, the application of a load during a period of time without breaking the specimen, reducing the load and holding it steady for a period, applying a second load (equal to or greater than the first load) and so on while programming as many loading and unloading cycles as desired.



Single axis tests with extensometric bands

The purpose of the test is to establish a method to determine stress-deformation curves, elastic modulus (Young) and Poisson coefficient in single axis compression of a regular cylindrical specimen.

The extensometric bands must be previously installed on the specimen to be tested. The orientation and position of the bands is very important because they will condition the results of the test. The extensometric bands must be chosen according to the grain size of the rock to be tested. Four bands should be placed on each specimen, two for axial deformation and two for diametral deformation.

To obtain optimal results, each band should be installed in a complete Wheatstone bridge. Data is collected by a computer, although it is first passed through a signal conditioner.

The software performs the entire process automatically, starting the test, controlling the cycles, collecting data, etc. The data can be viewed in real time while the test is being performed.



Equipment required

The system is exportable, i.e., these tests can be performed with other concrete presses other than those manufactured by our company.

Computer-controlled 2000 kN to 3000 kN press. The press has to be servo-controlled. Ideally, it should allow gradient control during loading and unloading (see concrete section). In many cases, electro-mechanical multi-purpose testing machines can be used for these tests, depending on the specimen section to be tested (concrete specimens)

Extensometric bands.

Signal conditioner with capacity for 16 bands

Compatible PC

Data collection card

Elasticity software.

H0235 3000 kN press

S0373 Multipurpose 300 kN testing machine

H0561 Extensometric bands with 10 mm base length

H0562 Extensometric bands with 20 mm base length

H0563 Extensometric bands with 30 mm base length

H0564 Extensometric bands with 60 mm base length

H0560 Signal conditioner with capacity for 16 bands

H0235PC Compatible PC

H0240/1 Elasticity software



Single axis tests with LVDT sensors

The purpose of the test is to establish a method to determine stress-deformation curves, elastic modulus (Young) and Poisson coefficient in single axis compression of a regular cylindrical specimen.

LVDT sensors are the best option when the nature of the rock does not allow for placement of extensometric bands. This occurs with highly porous specimens.

A compression gauge is required to position the LVDTs. Two LVDTs are positioned to measure diametral deformation and another two are placed to measure axial deformation. Data is collected by computer, although the data from the LVDT first passes through a data collection box that carries out the conversion.



The software performs the entire process automatically, starting the test, controlling the cycles, collecting data, etc. The data can be viewed in real time while the test is being performed.

Equipment required

The system is exportable, i.e., these tests can be performed with other concrete presses other than those manufactured by our company.

2000 kN to 3000 kN press with computer control. The press has to be servo-controlled. Ideally, it should allow gradient control during loading and unloading. In many cases, electro-mechanical multipurpose testing machines can be used for these tests, depending on the specimen section to be tested. (concrete specimens)

LVDT sensors

Data collection box with 16 channels

Compatible PC

Data collection card

Elasticity software.

H0235 3000 kN press

S0373 Multipurpose 300 kN testing machine

S0237 LVDT 2 mm sensor

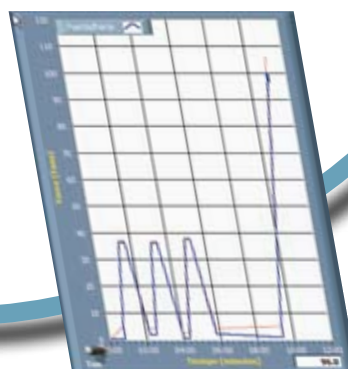
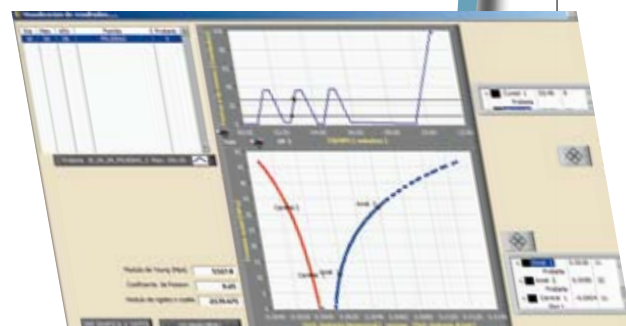
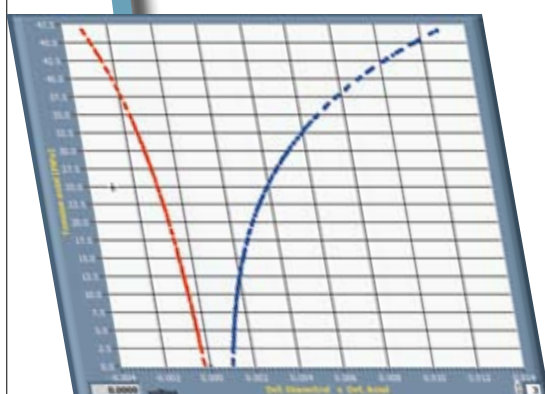
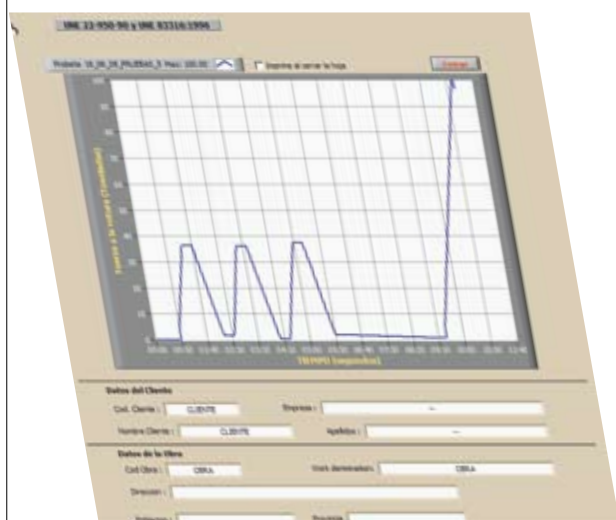
S0200 Data collection box

H0254 Compressometer versus extensometer

H0235 Compatible PC

H0240/1 Elasticity software





Machine for flexural testing of roof tiles, floor tiles and plaster boards

H0235 Electromechanical machine, suitable for flexural strength tests in roof tiles, floor tiles, plaster boards in tests that call for light loads applied gradually. Capacity: 30kN.

The rack is very stable and consists of two sturdy chrome steel columns joined by the machine bed at the bottom and an adjustable cross-head at the top.

The bottom area houses the direct current 0.33 V motor that drives the thrust spindle with a maximum stroke of 12 cm

The system includes protection measures against overloads, as well as an end-stop.

In the test area there are 2 lower supports on the spindle, one of which swivels, as does the top or loading roller to guarantee ideal load application.

The front part has a main on/off switch, a keypad for raising or lowering, test speed preselection and indicator lights.

Technical characteristics:

• Capacidad	30 kN x 125 mm
• Drive	Electromechanical by DC servo-motor and a ball screw shaft
• Controlled speeds	0 - 100 mm/min approach speed.
• Controlled speeds	100 mm/min return speed.
• Test speeds	0 - 300 N/s (0 to 100% speed).
• Control	CR-S Electronic with manual speed selection
• Approach system	Forward speed adjustment only.
• Spindle stroke	> 125 mm
• Force transducer	AEP TC-4 model for Tension/Compression.
• Overload capacity	150%.
• Linearity	0.10 %.
• Force precision	PROETI, S.A. guarantees better than 0.5% precision.
• Power supply	220 V. single phase + ground.
• Tools for flexural strength test in floor tiles:	Support rollers on mobile bottom platform. Two bottom supports measuring $\varnothing 40 \times 610$ mm, the lowest of which is a swinging support. Adjustable distance of up to >650 mm Dancing top roller $\varnothing 40 \times 610$ mm
• Dimensions:	1040 x 1220 x 850 mm (height x width x depth)
• Weight:	180 Kg

Supplied as per description with ENAC calibration certificate and instruction manual.



Standards EN 12390-5, EN 1340, UNE 83305; ASTM C78; AASHTO T97; BS 1881; NF P18-407; DIN 5 1227

Flexure strength test frame with capacity for 1500 kN

Sturdy frame designed for flexural strength tests on prism specimens measuring 10 x 10 x 40 or 50 cm and 15 x 15 x 60 or 75 cm, kerbs and beams. It can be used alone or in combination with any of the compression machine models described in this section.

The distance between the top and bottom rollers can be adjusted conveniently to the dimensions of the test specimen. The top rollers are hinged so they can be applied appropriately to the load.

Technical characteristics:

Roller length: 165 mm

Roller diameter: 16 mm

Piston stroke: 100 mm approx.

Dimensions: 1100 x 800 x 360 mm

Weight: 80 Kg

Models:

H0270 Flexural strength test frame for 150 kN, equipped with manual load degree adjustment and analogue display.

H0271 Flexural strength test frame for 150 kN, equipped with manual load degree adjustment and digital display.



Compression test machine for pipes

These diameter compression test machines for concrete pipes are made up of a sturdy frame of steel beams joined by high strength bolts that allow easy disassembly. The upper cross-head is moved by a manual winch (motorised on request), and locked at the desired height with pins that pass through the two vertical columns. The motorised hydraulic unit includes manual load adjustment, fast approach valves and flow adjustment.

H0280 Machine of 200 kN capacity for compression tests on pipes,

supplied with a hydraulic power pack and manual approach winch for the top cross-head. The applied load display is digital. The distance between the bottom supports can be adjusted.

Maximum pipe dimensions: 900 x 1800 mm

Dimensions: 3000 x 2300 x 4500 mm

Power supply: 220-240 V. 50 Hz Single phase.

H0281 Machine with 400 kN capacity for compression tests on pipes, supplied with a hydraulic power pack and manual approach winch for the top cross-head. The applied load display is digital. The distance between the bottom supports can be adjusted.

Maximum pipe dimensions: 2850 x 2000 mm

Dimensions: 3200 x 2500 x 5500 mm

Power supply: 220-240 V. 50 Hz Single phase.



Calibration instruments

Reference	kN	Dimensions
H0305	50	120x63 mm
H0306	100	120x44 mm
H0307	300	140x200 mm
H0308	600	140x200 mm
H0309	1000	140x200 mm
H0310	2000	140x200 mm
H0311	3000	140x200 mm
H0312	5000	170x280 mm

H0315 Digital force display, designed and manufactured for connection to load cells for test machine control and calibration. Built with state-of-the-art digital microprocessor technology to provide highly stable readings and long-term calibration. Supplied with accessories and a carrying case.

Dimensions: 450 x 350 x 160 mm

Weight: 8 Kg



Load cells consisting of a steel block on which the extensometers are mounted, all within a protective casing. The force to be measured acts on the sensitive element and slightly deforms it. The variations in resistance of the extensometers are directly proportional to the applied load and measured by an instrument with a digital display. The advantages of these force transducers are their high precision and repeatability. These components are supplied with a calibration certificate, connectors and 2 m of cable.



H0316 Portable printer

ENAC calibration laboratory The machine should be checked with standard equipment at regular intervals to guarantee reliability of results and accuracy of force precision to the materials during testing. PROETI has a laboratory certified by ENAC for force tests.



Concrete permeability and water absorption

Standards UNE EN 12390-8, EN 12364; DIN 1048; ISO 7031; ENV 206

Concrete water penetration test

Concrete permeability can be determined in a laboratory by applying water to the surface of concrete test specimens with specific dimensions at a controlled pressure and subsequently measuring the amount of water that has penetrated into the specimen.

The test is carried out by placing the specimen in a special chamber with adjustable height and locating the specimen between the top plate and bottom joint that delimit the test surface. Then the surface (100 mm) is subjected to water pressure for the time period specified in the standard. A precision pressure gauge is used to control the water pressure applied by a 10 bar compressor that can be ordered separately.

PROETI has several versions available for the test, for carrying out on cubic specimens with sides measuring 20, 15 or 10 cm.

H0330 Water penetration testing equipment for three specimens.

Equipment for testing cylinder specimens with sides measuring Ø 150, 100 and 75 mm or cubic specimens with sides measuring 150 and 100 mm and the following construction characteristics:

Compact construction.

Threaded rods to attach test specimens. These elements guarantee perfect securing to the test bench.

Rust proof material on parts in contact with water:

Stainless steel fixing rods.

Stainless steel fastening plate.

Stainless steel water collector

A simple control for each testing unit.

Retainer valve with 2 positions to simplify the operation.

Separate circuits for every three test specimen positions, adjustable with a precision valve and appropriate pressure gauge for calibration.

Sealing ring to ensure the test positions are airtight.

Dimensions: 1500 x 1600 x 530 mm

Weight: 150 Kg.

Supplied as described, with accessories for cylinder test specimens measuring Ø 150, 100 and 75 mm



H0331 Water penetration testing equipment for six specimens

Equipment with characteristics similar to those of model H0330, but capable of working with 6 test specimens simultaneously.

H0330/1 Compressor

Air compression limit: 10 bar.

Constant pressure: 8 bar.

Power supply: 220 V. / 50 Hz.

Approx. weight: 21 Kg

H0330.7 Rubber seal for cylinder moulds of the permeabilimeter



Concrete contraction test

This test is performed to determine hydraulic axis contraction in concrete test specimens of aggregates measuring up to 30 mm

Standards UNE 83318; ASTM 490; BS 1881

H0345 Mould

For manufacture of test specimens measuring 10 x 10 x 50 cm to determine concrete hydraulic axis contraction.
Made of steel with ground interior surfaces.

Accessory:

H0345/1 Steel points for fitting to the mould (10 units).



H0346 Apparatus for measuring hydraulic contraction in concrete

In specimens measuring 10 x 10 x 50 cm, with a steel base, a comparator measuring 10 x 0.01 mm, and invar bar.

Adherence test – Beam Test

Moulds

H0350 Steel mould, for adherence tests on bars with Ø less than 16 mm. Supplied with base supports and comparators.

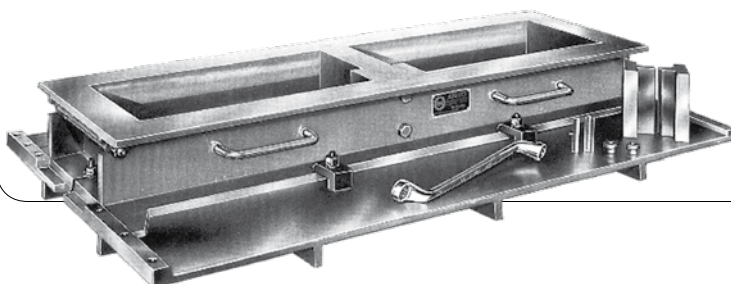
Spare parts:

H0350/1 Locking device for H0350 mould.

H0351 STEEL MOULD, for adherence tests on bars with Ø greater than 16 mm. Supplied with base supports and comparators.

Spare parts:

H0351/1 Locking device for H0351 mould.



Non-destructive tests

Rebound Concrete Test Hammers

Standards UNE EN 12504-2; DIN 1048; ASTM C805; BS 1881; NF P18-417

This method is based on the principle that the rebound of an elastic mass depends on the hardness of the surface that it strikes. There are various models of esclerometer, with different springs for various types of concrete. The test is fast and does not damage the concrete in any way. The method is sometimes used along with ultrasound equipment.

H0360 Test Hammer

To measure the compression strength of normal concrete of various makes and sizes. Supplied with emery stone, case and instruction manual.

Percussion energy: 2.207 Nm.

Measurement range: 5 to 120 N/mm²

Weight: 1.7 Kg

Accessories

H0369 Calibration anvil, to verify the reading of the esclerometers.



H0362 Test Hammer

To test on walls less than 120 mm thick or artificial rocks.

Percussion energy: 0.735 Nm (0.075 Kgm).

Weight: 1.4 Kg

Accessories

H0369 Calibration anvil, to verify esclerometer readings.



H0367 Low percussion energy hardness tester

Designed to perform non/destructive tests on mortar, low strength materials and concrete thicknesses less than 10 centimetres to assess their compression strength.

Impact energy: 0.735 Nm.

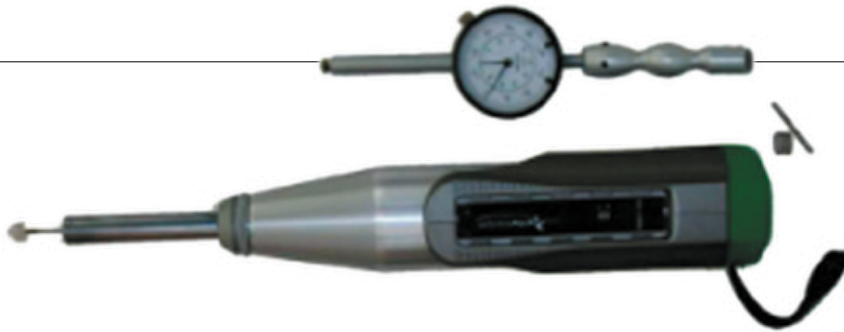
Supplied with carrying strap, emery stone and instruction manual.

Weight: 1.4 Kg



H0368 Wood hardness tester

The only esclerometer on the market that provides reliable onsite evaluation of wood quality.



H0375 Digital Concrete Test Hammer

Designed to perform non-destructive tests on concrete uniformity, and to estimate its compression strength. The esclerometer strikes the concrete with a specific force, the rebound depending on the hardness of the concrete. The rebound "R" is measured by a sensor and displayed and processed on the display unit.

Display unit with non-volatile memory up to 20000 values.

LCD 64 x 124 mm graphic screen with RS 232C output.

Temperature range: -10° to +60°C.

Powered by 5 LR6 1.5 V. batteries with 60 h operation.

Impact energy: 2.207 Nm.

Measurement range: 10 to 120 N/mm² compression strength.

Supplied with: cable, carrying strap, emery stone and instruction manual.

Dimensions: 330 x 80 x 100 mm

Weight: 1.8 Kg



Standards ASTM C803; BS 1881

Windsor probe

This method is used to determine concrete strength via the penetration of a steel probe. The probe is fired into the concrete surface and the depth of penetration is measured. Concrete strength can be estimated "in situ", by calibrating the depth of penetration versus compression strength.



H0380 Windsor probe, supplied with propulsion unit, micrometric measuring unit, conversion table and carrying case. The ballistic loads must be ordered separately.

Dimensions: 500 x 250 x 150 mm

Weight: 14 Kg

H0380/1 Silver probe, for tests on concrete with natural aggregates. Pack of 75.

H0380/2 Silver probe, for tests on concrete with lightweight aggregates. Pack of 75.



Crack measurements

H0400 Crack detection microscope

Designed specifically to measure the width of fissures in concrete structures. A high definition apparatus that uses an adjustable light power supply equipped with high power batteries.

Supplied in a carrying case measuring: 40 x 90 x 150 mm

Magnifying power: 35X.

Measurement range: 4 mm

Divisions: 0.02 mm

Standards ASTM C426, BS 1881

H0400 Linear variation measurement

H0405 Analogue deformometer, for surface measurement of linear variations in concrete structures. The unit consists of a 5×0.001 mm comparator, calibration bar, 50 reference discs, glue, user instructions and a carrying case.

Measurement range: 200 mm

H0406 Analogue deformometer, for surface measurement of linear variations in concrete structures. The unit consists of a 5×0.001 mm comparator, calibration bar, 50 reference discs, glue, user instructions and a carrying case.

Measurement range: 300 mm

H0407 Digital deformometer, for surface measurement of linear variations in concrete structures. The unit consists of a millesimal 5 digit comparator, with display in millimetres and inches, a battery charger, calibration bar, 50 reference discs, glue, user instructions and a carrying case.

Measurement range: 200 mm

H0408 Digital deformometer, for surface measurement of linear variations in concrete structures. The unit consists of a millesimal 5 digit comparator, with display in millimetres and inches, a battery charger, calibration bar, 50 reference discs, glue, user instructions and a carrying case.

Measurement range: 300 mm

Spare parts:

H0405/1 Reference discs, pack of 50.

H0405/2 A tube of special glue.



Measuring deflections and sagging

An apparatus to determine deviation, whether tensile or compressive, in buildings, bridges, roofs of any suspended structure. The reading is taken on a comparator gauge. The equipment consists of a hinged support, comparator gauge, plumb and a roll of non-stretch wire.

Models:

H0410 Case for 1 item, 10 x 0.01 mm comparator

H0411 Case for 1 item, 30 x 0.01 mm comparator

H0412 Case for 3 items, 10 x 0.01 mm comparators

H0413 Case for 3 items, 30 x 0.01 mm comparators

H0414 Case for 3 items, one 30 x 0.01 mm comparator and two 10 x 0.01 mm comparators

Accessory:

H0415 Non-stretch wire roll (length 20 m).



Crack monitors, consisting of two plates partially superimposed one over the other. The top plate is stamped with a grid, while the bottom plate is calibrated in millimetres or fractions, marked by the movement of the grid over the bottom plate, beginning at zero.

H0409 Standard crack monitor made of acrylic resin, used to measure vertical and horizontal movement. Supplied in sets of 5.



H0409/1 TT2 angle crack monitor made of hard PVC, used to measure all types of cracks in angles undergoing two-way movement. Supplied in sets of 5.



H0409/2 TT3 floor crack monitor made of hard PVC, used to measure sinking or settling. Supplied in sets of 5.



H0409/3 TT4 crack monitor made of hard PVC, used to measure loss of flatness affecting any cracked surface. Supplied in sets of 5.



Bolt removal strength test

Standards EN 1542, 12504-3; ASTM C900; BS 1881:207

Bolt removal equipment

H0500 Manual bolt removal equipment

Used to measure concrete strength by applying extraction force on a preinserted bolt inserted in the concrete before setting. Hand operated hydraulic remover for bolts measuring up to 32 mm Ø and 200 kN capacity. The unit includes a hydraulic hollow piston, a calibrated aneroid pressure gauge and hydraulic components (hose, pump, rapid connectors...) without accessories.



H0501 Manual bolt removal equipment

Similar to model H0500, 300 kN capacity.

H0502 Manual bolt removal equipment

Similar to model H0500, 500 kN capacity.

H0505 Electrical-hydraulic bolt removal equipment

Used to measure concrete strength by applying extraction force on a preinserted bolt inserted in the concrete before setting. Electrical-hydraulic remover for bolts measuring up to 32 mm Ø and 200 kN capacity. The unit includes a hydraulic hollow piston, a calibrated aneroid pressure gauge and hydraulic components (hose, motor pump unit, rapid connectors...) without accessories.

H0506 Electrical-hydraulic bolt removal equipment

Similar to model H0505, 300 kN capacity.

H0507 Electrical-hydraulic bolt removal equipment

Similar to model H0505, 500 kN capacity.

H0510 Electrical-hydraulic bolt removal equipment with digital display.

Used to measure concrete strength by applying extraction force on a preinserted bolt inserted in the concrete before setting. Electrical-hydraulic remover for bolts measuring up to 32 mm Ø and 200 kN capacity. The unit includes a hydraulic hollow piston, a digital display, a pressure sensor and hydraulic components (hose, motor pump unit, rapid connectors...) without accessories.

H0511 Electrical-hydraulic bolt removal equipment with digital display.

Similar to model H0510, 300 kN capacity.

H0512 Electrical-hydraulic bolt removal equipment with digital display.

Similar to model H0510, 500 kN capacity.

Accessories and spare parts:

H0515 Cone-shaped clamp Ø 12 mm

H0515/1 Cone-shaped clamp Ø 16 mm

H0515/2 Cone-shaped clamp Ø 20 mm

H0515/3 Cone-shaped clamp Ø 25 mm

H0515/4 Cone-shaped clamp Ø 30 mm

H0515/5 Cone-shaped clamp Ø 32 mm

H0516 Cone-shaped clamp holder for clamps up to Ø 25 mm

H0516/1 Cone-shaped clamp holder for clamps up to Ø 32 mm



Pull-off test

Standards UNE EN 12618-2; EN 1542; UNE EN 12504-3

This test method uses a dynamometer to provide information about adhesive force and tensile strength for several layers of material: limes, plaster coating, mortar, cement and concrete. The test consists of making a round cut with a small drill measuring $\varnothing$ 50 mm and then glueing a test disc over the cut with rapid glue. The disc is removed with the "Pull-Off" test apparatus that indicates its strength directly in N/mm^2 or in kN. All models are supplied with a carrying case, a test disc and a draw pin.

Models with pressure gauge

H0435 Pull-off, capacity: 5 kN (recommended for cements and plasters).

H0436 Pull-off, capacity: 16 kN.

H0437 Pull-off, capacity: 25 kN.

Models with an electronic unit

H0440 Pull-off, digital, capacity: 5 kN.

H0441 Pull-off, digital, capacity: 16 kN.

H0442 Pull-off, digital, capacity: 25 kN.

Accessories

H0445 Test discs $\varnothing$ 50 mm (10 units).

H0445/1 Test discs $\varnothing$ 20 mm (10 units).

H0446 Tungsten carbide drill $\varnothing$ 50 mm

H0446/1 Tungsten carbide drill $\varnothing$ 20 mm

H0453 Metolux glue, 1 Kg



Concrete ultrasonic monitoring

Standards EN 12504-3

The velocity of propagation of a material depends on its density and elasticity. These, in turn, are linked to the quality and strength of the material. As a result, information regarding material component properties can be obtained by ultrasound:

Concrete uniformity.

Holes, cracks, defects caused by fire or ice.

Elastic modulus.

Concrete strength test.

H0394 Ultrasonic Tester

Portable ultrasonic equipment with the following characteristics:

Measuring range: 0-9999.9 μ s.

Resolution: 0.1 μ s

Accuracy: + 0.1 μ s

Display of distance between probes.

Propagation speed measurement: m/s.

Storage in memory up to 50 readings.

Data output RS232C (Windows hyperterminal)

TRG and OUT outputs to view on an oscilloscope.

Battery life: 12 hours with 2300 mAh batteries

Screen: Feedback LCD with two lines (for operation in low light conditions).



The apparatus is supplied in a case for transport, including a carrying case, two 150 kHz probes, two 150 cm connection cables, a standard block, coupling paste, rechargeable batteries, battery charger, RS232C cable.

H0395 Ultrasonic Tester

Portable ultrasonic equipment with the following characteristics:

Measuring range: 0-1999.9 microseconds.

Operating temperature: -5 + 40°C.

Empty battery indication: flashing digits.

Maximum charging time: 8 hours.

Weight: 4 Kg

Dimensions: 310 x 290 x 110 mm

Cable length: 3.5 m.

Probe: piezoelectric crystal 55 kHz.

The apparatus is supplied in a carrying case along with two piezoelectric probes, a standard cylinder to check instrument settings, coupling paste and oscilloscope connection cables



H0396 NDE360 UPV Ultrasonic Equipment

Ultrasonic equipment to measure the velocity of propagation of ultrasound pulses in concrete, wood, masonry or rocks. The equipment consists of two piezoelectric transducers, a transmitter and receiver that generate and receive compression waves (P) and optionally shear waves (S). In compliance with ASTM C597.

Used in: Structural elements with two accessible sides, such as walls, screens, columns, etc.

To determine: Cracks, cavities, holes, lean concrete, etc.

Available models:

UPV-1 Includes two submersible 54 kHz transducers.

UPV-1S UPV option with shear waves.

Characteristics and advantages

4-channel multiplexer

Portable and tough

Colour touchscreen

Back light

6-8 hours of operation (battery)

2 GB Flash memory

Fast keys for Test, Accept and Reject

Windows-software WINTFS for analysis

The equipment not only records arrival times or velocities of propagation, it also records the entire signal so that it can be studied or processed by software subsequently. Supplied with two water-resistant probes. As an option shear wave-sensitive probes can be supplied.



Rebar locator and corrosion monitors

In the construction industry, locating metal rebars and pipes in concrete structures is essential for the maintenance process. Damage caused by drilling through pipes can be substantial. When a drill strikes a metal rebar or joint, the drill bit is normally damaged or broken and the structure in the concrete can suffer serious damage.

Before performing maintenance, it is vital that the location and orientation of metal rebars and the thickness of the concrete layer are established. It is also useful to find out the current condition of the metal structures and identify cases of corrosion. This will be helpful during the progress of the maintenance tasks.

H0385 BH rebar locator

This instrument is easy to use and very accurate. It is used to locate and find the orientation of rebars and to measure the thickness of the overlying layer of concrete. The detector boasts a water-resistant (IP65), sturdy design, for use in the most demanding situations.

Fast and accurate: It quickly locates and determines the orientation of metal rebars in concrete.

Corrosion verification: The same instrument can be used to check probabilities of corrosion in rebars within the concrete structure.

Large easy-to-read illuminated screen: Easy to read data even where there is little or no light.

Interchangeable detection heads and half cell kits: Standard selection of detection heads with narrow corners, very thick, depth probe, copper half cell kit and silver half cell kit.

One handed operation: 4 key access and control of most functions.

Multilanguage menus: Choose your own operating language.

International rebar sizes: User choice of rebar sizes in metric, USA, ASTM/Canadian and Japanese systems.

Rechargeable battery: The batteries can be charged while inside the instrument or externally.

Ergonomic design: Designed for user comfort, the device can rest against the hip while taking measurements.



Rebar locators

H0386 SH rebar locator

This instrument is easy to use and very accurate. It is used to locate and find the orientation of rebars and to measure the thickness of the overlying layer of concrete. Auto-size mode to detect rebar diameters. Recording of up to 10,000 readings. The detector boasts a sturdy water-resistant (IP65) design for use in the most demanding situations.

Fast and accurate: It quickly locates and determines the orientation of metal rebars in concrete.

Corrosion verification: The same instrument can be used to check probabilities of corrosion in rebars within the concrete structure.

Large memory capacity: Recording of up to 10 linear batches of 1,000 readings each.

Large easy-to-read illuminated screen: Displays graphs, statistics, batches and numeric data and readings.

Interchangeable detection heads and half cell kits: Standard selection of detection heads with narrow corners, very thick, depth probe, copper half cell kit and silver half cell kit.

Covermaster® software: State-of-the-art data management to save readings of concrete layers and half cells, as well as fast and easy professional report generation.

Multilanguage menus: Choose your own operating language.

International rebar sizes: User choice of rebar sizes in metric, USA, ASTM/Canadian and Japanese systems.

Rechargeable battery: The batteries can be charged while inside the instrument or externally.

H0387 TH rebar locator

This instrument is easy to use and very accurate. It is used to locate and find the orientation of rebars and to measure the thickness of the overlying layer of concrete. Auto-size mode to detect rebar diameters. Recording of up to 240,000 readings. The detector boasts a sturdy water-resistant (IP65) design for use in the most demanding situations.

Fast and accurate: It quickly locates and determines the orientation of metal rebars in concrete.

Corrosion verification: The same instrument can be used to check probabilities of corrosion in rebars within the concrete structure.

Large memory capacity: Recording of up to 10 linear batches of 1,000 readings each.

Large easy-to-read illuminated screen: Displays graphs, statistics, batches and numeric data and readings.

Interchangeable detection heads and half cell kits: Standard selection of detection heads with narrow corners, very thick, depth probe, copper half cell kit and silver half cell kit.

Covermaster® software: State-of-the-art data management to save readings of concrete layers and half cells, as well as fast and easy professional report generation.

Multilanguage menus: Choose your own operating language.

International rebar sizes: User choice of rebar sizes in metric, USA, ASTM/Canadian and Japanese systems.

Rechargeable battery: The batteries can be charged while inside the instrument or externally.

Accessories

H0388/1 Standard detection head. Designed to cover all your measuring needs.

H0388/2 Narrow angle detection head. Accurate measurement of the overlying concrete layer when the space between each rebar is very narrow

H0388/3 Deep detection head. The ideal detection head to accurately measure rebars located at the bottom of the structure.

H0388/4 Depth probe. The ideal solution for locating joining pipes and multiple levels of metal rebars within a concrete structure.

H0388/5 Extension kit. This kit is used to check or scan bridge roofs and floors from a standing position. It can be connected to the standard detection head or a narrow angle detection head.

H0388/6 Half-Cell Probe Kit. The half-cell probe kit comes with a copper electrode bathed in copper sulphate (Cu/CuSO₄) or a silver electrode bathed in a silver chloride solution (Ag/AgCl). Each cell is airtight and does not need to be mixed with any other chemical component when applied. Supplied with a 25 m (80 ft) cable and a 5 year warranty for each kit.



Non-destructive tests on concrete

Standards ASTM C215, C666; BS 1881:209; NF P18-414

H0483 Resonant frequency meter

This equipment consists of 3 very simple components, the measuring unit, hammer and accelerometer. This RT-1 digital unit is fast, simple, easy to operate and more economic than old analogue vibrator units. It complies with the ASTM C215 concrete resonant frequency test to determine dynamic properties and durability versus freeze-thaw cycles (ASTM C666). Young's dynamic modulus (E), shear modulus (G) and Poisson's ratio (ν) for concrete, rock, masonry, coal and any other cylindrical material, beams or specimens can be obtained in seconds. Standard equipment includes a worksheet to calculate all the moduli, length, bending and torsion.

Characteristics

- Accurate results in seconds.
- High resolution colour screen
- Can be learned in under 10 minutes
- Damping Calculation.
- Data download & analysis in a PC via RS232C.
- AC (100-240 VAC) or rechargeable batteries
- Can be used for testing small specimens.
- Easy, quick to use. Uses plastic materials in compliance with ASTM C215.

Equipment & Software:

- Portable equipment
- Accelerometer.
- BNC Microdot cable.
- Round head hammer.
- Test specimen holder.
- Accelerometer holder kits.
- Small specimen impactor.
- Adhesive/Spatula.
- Carrying case.
- Calculation worksheet.
- Software for downloading, processing and analysis.



H0484 NDE 360 Equipment

Low cost system with 8 available tests for pavement, structure tests, foundations and seismic geophysical profiles:

NDE 360 SE
NDE 360 IR
NDE 360 SEIR
NDE 360 SIR
NDE 360 SASW-S
NDE 360 SASW-G
NDE 360 UPV
NDE 360 PS
NDE 360 IE

Characteristics and advantages

4-channel multiplexer
Portable and tough
Colour touchscreen
Backlight
6-8 hours of operation (battery)
2 GB Flash memory
Rapid keys for Test, Accept and Reject
Windows-software WINTFS for analysis

Specifications

Converter: A-D 16 bits.

2 Microseconds, 500 kHz sampling speed on two channels

Nyquist maximum frequency: 250 kHz

Gain values can be selected per channel separately: x1, x10, x100 x1000.



The NDE 360 is a sturdy, rugged apparatus powered by 8 batteries for END tests. To complete the NDE 360 system, choose one of the following options:

Pavements, Structural Tests and Tunnels

Echo Impact

Surface wave tests

Speeds in pre-manufactured panels (defects)

Ultrasound pulse speed

Data collection for computerised tomographic speed imaging

Equipment for monitoring foundation integrity and depth

Time and/or frequency domain monitoring systems (ASTM D5882)

Parallel seismic analysis

Ultraseismic analysis

Surface seismic wave systems (Geophysics)

Surface wave test

New tests can be added to the equipment from the initial configuration.



H0484/5 NDE 360 SASW-S

Equipment used to determine rigidity, speed and thicknesses in layered systems (normally not exceeding 3 metres) without making holes (specimens) and with one accessible side. The SASW method is a powerful tool used to identify changes in the properties of materials at a variety of depths in a layered system.

Used in:

Pavement, concrete blocks, tunnels, structural concrete. Study of fire damage, freezing. Depth of damaged concrete. Estimation: strength of concrete, masonry and rocks with non-destructive correlation. Study of concrete depth (gunite thickness) and competence along the length of a tunnel.

Available models:

SASW-S Supplied as shown with two accelerometers and an SASW bar.

SASW-S+G Similar to the above with a triaxial geophone



H0484/6 NDE 360 SASW-G

Equipment used to prepare speed profiles and measure thicknesses of soil layer systems located over rock.

Used in:

Study of subsurface rock and soil up to a depth of 33 metres. Determination of speed profiles and thickness of soil layer systems located over rock.

Available models:

SASW-G2 2 data channels with 4 geophones: (2) 1 Hz and (2) 4.5Hz

SASW-G4 4 data channels with 8 geophones: (2) 1 Hz and (2) 4.5Hz

SASW-G8 8 data channels with 8 geophones: (4) 1 Hz and (4) 4.5Hz



H0484/8 NDE 360 IE

Equipment used to study concrete, mortar and masonry integrity. This equipment also measures the thickness of these elements

Used in:

Floors, beams, highways, tunnels, dams, columns, walls, screens, etc.


Detection of:

Thickness, cracks, cavities, delamination, beehives.

Available models:

IE-1 Includes hand equipment with solenoid impactor and displacement transducer (measures thicknesses from 6 cm to 40 cm)

IE-W Similar to the above but submersible

IE-2 Combines the IE-1 with an instrumented hammer and an accelerometer, thicknesses from 6 cm to 100 cm concrete

IE-T IE-1 equipment with a second transducer for thickness measurements, in compliance with ASTM

H0484/4 NDE 360 SIR

Equipment used to study structural supports, internal delamination, fractures, cavities and structural integrity.

Slab impulse response

For use in concrete slabs, concrete pavement, tunnels, premanufactured elements and structural concrete elements in general.

The Slab Impulse Response (SIR) consists of striking the structure with an instrumented hammer and recording the structural vibration with a geophone. Highly flexible, mobile responses indicate deficient supports and structural damage.

Available models:

SIR-1 Includes instrumented hammer (1.4Kg), 4.5 Hz geophone and transducer multi-axis.



H0484/1 NDE 360 SE-1, H0484/2 NDE 360 IR-1, H0484/3 NDE 360 SE/IR

Equipment used to study pile integrity in time and frequency domains. Used in: Driven piles and piles manufactured onsite

Detection of: Cracks, cavities, soil intrusion, washed concrete, uncured concrete, section variations, etc.

Monitoring pile integrity and depth

Available models:

NDE 360 SE-1 shows echoes in time domain

2. NDE 360 IR-1 shows echoes in frequency domain

3. NDE 360 SE/IR: Combines the SE-1 and the IR-1, simultaneously showing the curves in the time and frequency domains. Supplied with instrumented hammer and accelerometer.

4. NDE 360 SE/IR/PS-1 Echo/Impulse/Parallel seismic. Combines the SE-1 and the IR-1 with hydrophones.

5. NDE 360 SE/IR/PS-1G: Echo/Impulse/Parallel seismic. Combines the SE-1 and the IR-1 with hydrophones + Geophone system consisting of a hydrophone and triaxial geophone + IX software


H0484/7 NDE 360 PS

Equipment used in parallel seismic tests. Used to determine pile or foundation depths, even when the head is not accessible.

Measurement of depth, foundation type to determine unknown foundation depths even when the tops (heads) are not accessible.

Available models:

1. NDE 360 PS-1 Includes 1-Hydrophone and IX PS software

2. NDE 360 PS-1G Includes 1-Hydrophone, a triaxial geophone and IX PS software



Non-destructive tests on concrete. Pile integrity

H0484/9 NDE 360 US

Equipment used to measure pile depth (length). Used to determine pile and/or foundation depths when the head is accessible.

Used in:

Piles, bridge and harbour pillars.
Measurement of unknown depth of foundations and piles. It requires that the head or top part be partially exposed.

Available model:

US-1 Includes a triaxial receiver, instrumented hammer and IX US software.



H0460 IT-System Equipment

Supplied with Windows software, RS-232 connection cable, transducer, power plug-adaptor, hammer, printer cable, modem cable and carrying case.

The Integrity Test (IT-System) is used to determine irregularities and/or failures in concrete piles, locating the exact place of the failure. The IT-System can be run by a single operator and test more than 60 piles in one hour. The test is performed by resting a transducer or geophone on the head of the pile and striking the head with the hammer supplied for that purpose. The IT system records the hammer impact followed by the response from the pile and shows both results. If the operator wants to, he can store the signal in the unit memory, including all the information regarding the pile identification number, day, time, place, magnifying factor, filter length, etc. The operator can print the results or connect the equipment to any computer with Windows to transfer or analyse the results or send them to a printer or plotter.



Non-destructive tests. Vibration measurement

The VIBRA system automatically measures vibrations continuously in three perpendicular directions. The system records maximum vibration and frequency values. It operates on standard batteries (for 1 month) and automatically sounds an alarm when a vibration level is surpassed.

The VIBRA system is easily installed by connecting the sensor to the object to be tested and pressing a key. The display shows the day and time and the vibration recorded at that moment. The keypad can be used to review the memory and the maximum level of recorded vibration.

This equipment is during pile driving, pile installation / removal, construction and demolition work, studies on the effects of heavy traffic, speed bands, movement of machinery

Characteristics:

- Sturdy build
- Compact, lightweight
- Reflection and scratch-resistant screen
- Alkaline D batteries
- USB port
- Lightweight geophone with levelling ball
- Wide speed range (0-100 mm/s)
- Vibration frequency recording: 0.8 - 100 Hz
- Totally standards compliant
- Digital geophone detection (digital ID)
- Digital input of vibration codes
- Optional: data, status and alarm via email GPRS/internet
- Complies with Standards (DIN45669, DIN4150, SBR) 'Vibrations in buildings'

H0465 VIBRA equipment, supplied with the following components:

3D transducer with cable and waterproof field case.

RS-232 connection cable.

Windows software.

H0466 VIBRA + equipment, supplied with the following components:

3D transducer with cable and waterproof field case.

RS-232 connection cable.

Windows software.

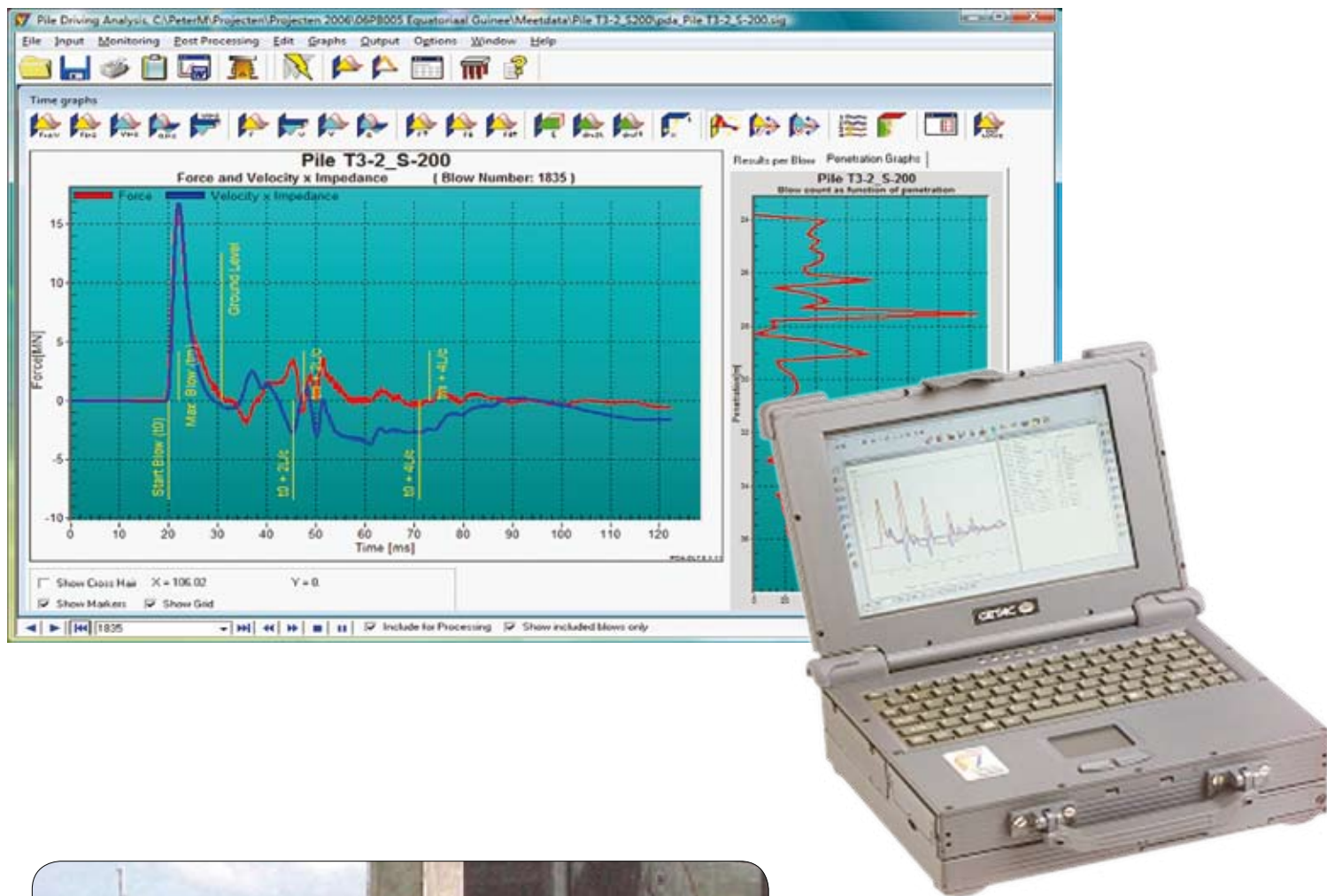


Non-destructive tests. Pile driving (PDA-System)

The PDA-System is used to measure the force and acceleration of each impact during the pile driving process. This measurement system is used mainly to check pile strength. The idea is to offer operators immediate, detailed information regarding soil resistance. The main purpose is to avoid unnecessary driving in order not to disturb the surroundings. The equipment has an accelerometer equipped with specially developed electronics that firmly adheres to the pile. Data are collected by a computer with a WINDOWS system and special software that calculates displacement speed, dynamic strength, etc., in real time. The accelerometer must be secured to one of the faces of the pile (near the head), with a cable connecting the accelerometer to the PC, where the data are processed and displayed on the screen.

H0470 PDA-System Equipment

The equipment includes PDA software, two voltage indicators, two accelerometers, a connection box, cable and cable holder (50 m) and instruction manual.



Cross-hole equipment



The Cross-hole test system, or CSL, is used to test a wide range of foundation structures, from piles manufactured “in situ” to walls. A structure can only be tested if it can be accessed by pipes and probes, in such way that the probes can be introduced through the pipes. When used as a system for checking structure quality, it becomes a powerful instrument for the detection and evaluation of all kinds of defects that affect concrete integrity.

The Cross-hole testing system (CSL) – The CSL testing system consists of propagating ultrasound waves through two or more access pipes. These pipes are previously filled with water to measure the speed and energy of the propagated waves. The test can be carried out for any kind of foundation or concrete structure that has two or more access pipes (or probes) that can hold water. The CSL can also be applied to submerged piles and structures that do not have internal pipes but can be fitted with external pipes. The computer tomographic imaging tests are carried out when the defects detected are critical and require an in-depth study.

The Crosshole sound profile system consists of 4 basic components. These four components are: a portable Freedom Data PC

with a high speed data collection card, the CSL software for data collection and analysis, the CSL modules of the impulse generator and the amplifier; a lowering / lifting unit with depth meter; and two transducers. These components are inter-connected by cables to form a complete system.

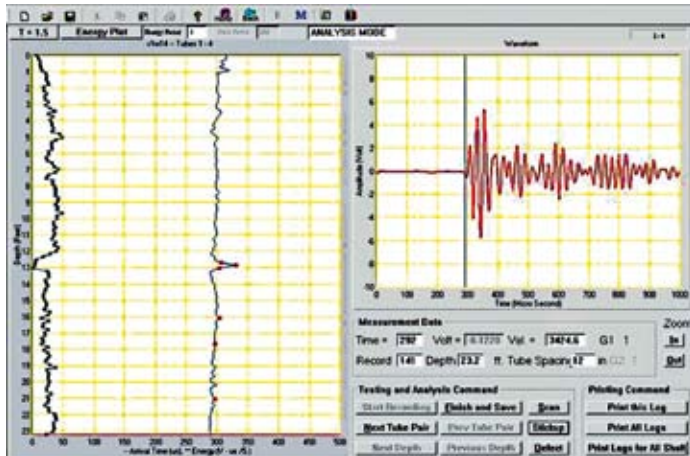
Easy collection and analysis of digital data with the battery-powered laptop.

Computer imaging (2D and 3D) of the pile and defects by software (speed).

All the data and tests are stored in the hard disc.

Output for printer and optional portable field printer.

Real time display of test results with clear presentation of the time signal, speed and/or energy, as well as classic bands and computer imaging.



Software

The software enables completely automatic operation, both for adjustment of equipment and the detection and delimitation of defects. Colour frames are used for clear identification of sound concrete as opposed to damaged concrete. The CSL software is a program that measures the first signal arrival in real time. It can collect data simultaneously through one (CSL-1) or two channels (CSL-2). The software can also be used with computer imaging programs and use computer imaging data to obtain 2D and / or 3D images of the defects (TOMO-1 software, optional). This software can be run manually or automatically by the user. The basic equipment provides testing distances of up to 6 metres of concrete.

Internally powered by 12 VDC batteries, external 12 VDC (car charger) or directly plugged into the mains.

CSL-1 for a single time recording or CSL-2 for two recordings at the same time.

Crosshole test

Monitoring of concrete works by ultrasound is not new in the field of non-destructive testing. The test consists of generating an ultrasound signal and receiving it at a known distance. The width of the signal from the time of transmission to the time of reception provides the elastic characteristics of the material to be tested. Two or more metal pipes are anchored to a reinforcement inside the work piles, and fastened so that they are diametrically opposite each other.

For each pair of pipes, the measurement is performed by two probes placed at the same depth; one of them generates the sound signal and the other one receives it. The measurements are made by having the probes removed from the length of both pipes at the same time. The acoustic coupling between the two probes and the concrete pile is essential. This coupling is performed by filling the measurement pipes with water.

The diagrams obtained by using this method are very uniform and show the depth and possible defects of the pile with great accuracy. The technique adopted for signal display allows for rapid interpretation of concrete characteristics and pile execution.

H0480 Crosshole testing equipment (CSL- 1)

With the following components:

Freedom data PC, a weatherproof industrial laptop computer with Windows XP / Windows Vista, TFT high contrast colour screen, large capacity hard disc, Pentium mobile or equivalent, network card, USB ports, external connections for VGA, COM1, LPT1, etc.

CSL1 software for data recording and processing and automatic generation of reports in Office.

Ultrasound wave transmitter and receiver measuring Ø 1.5" or special probes with much smaller diameters.

The probes are entirely interchangeable and can be used as transmitters or receivers.

An ultrasound pulse generator to excite the transmitter, with synchronised activation systems to initiate the recording system.

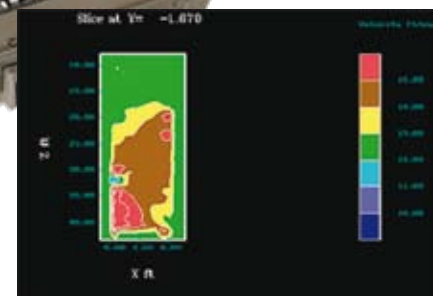
Equipment to determine recording depths.

Encoder / pulley to lift the probes.

Tripod.

Two cable coils for 80 metres of usable cable.

Amplifying systems and cabling for the CSL test.



H0481 Crosshole testing equipment (CSL-2)

Similar to the CSL-1 model but equipped with 3 probes for 2 simultaneous recordings.

Crosshole test Down-Hole;Up-Hole in soils and rocks

Standards ASTM D4428-D4428M-00
Crosshole seismic test

CS (Crosshole Seismic) tests are performed to provide information on the dynamic properties of soil, rock, design and analysis of structures to combat earthquakes, studies of liquefaction potential, settling failure and foundation designs subject to dynamic loads. Tests and research provide compression wave and shear wave speed profiles versus depth.

Other parameters such as quotients and Poisson modulus can be easily determined from the measurements of compression and shear wave speeds. In addition, material damping can be determined by CS tests. Apart from CS tests, Downhole Seismic (DS) requiring a single probe can be performed.

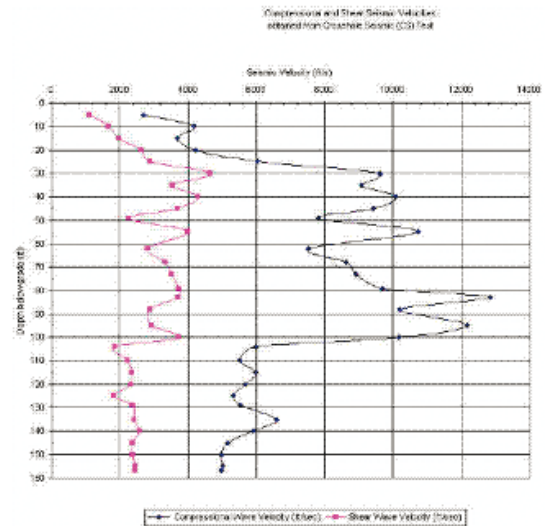
The Crosshole Seismic method is a test method that is used to determine soil and rock properties. A power supply capable of generating compression and shear waves is lowered through one of the drill holes. Also lowered are a pair of geophone receptors with 3 equal components (triaxial geophones), to the same depth through 2 additional drill holes made with equal spacing increments (normally 3 and 7 metres from the source perforation) in line, as shown in the picture. The receivers are attached to the sides of the drill hole walls, from where they detect the passage of the compression and shear waves.



Access and Requirements

CS tests require two or more (normally three) drillings / holes. These drill holes generally have a diameter of 3-4 inches and are coated with PVC and grouted to ensure good wave energy transmission. The tests are simplified by using an inclinometer with a box instead of PVC pipe. The typical distance between two adjacent perforations is 3 metres, although this distance is greatly influenced by the type of material.

Drillings / holes for the receiver are made to the total depth to be studied. For tests that use a separating spoon (ex., for specimen collection) as a transmitter, the drillhole advances as the required measurement intervals are defined (equal intervals of 60-150 centimetres) and tested. If a power supply with a hammer attached to the drill hole wall is used, the transmitter hole can be drilled to the total depth to be studied, before the test.



Data collection

For a CS test, the transmitter is lowered to the measurement depth in the hole, this must progress at the same pace as the drill hole. For later tests, one or two receivers (triaxial receivers) are lowered simultaneously to the same depth through the other drill holes. Orientation bars are fastened to the transmitter and receiver, unless sleeved inclinometers are used. The power supply is turned on at the surface to generate the compression and shear waves. In some cases, when a specimen collector is used as the power source, the upper part of the transmitter bars are struck by an instrumented hammer (or the transmitter inside the drill hole is triggered) to generate compression and/or shear waves with enough energy. The vertical component of the receiver is used to capture the shear waves that are vertically polarised (SV). The polarised energy is generated in both directions, which duplicates the data and allows effective measurement of shear wave arrival. The radial component detects the propagation of compression waves (P) and the tangential component detects the shear waves propagated horizontally (SH). The input value of the hammer and/or PS-V source and receiver output are recorded in the Freedom NDT. The drilling continues to the next measurement depth and the transmitter is placed (or lowered to the next measurement depth) and the process continues until all the required measurements have been taken.

In a DS study, the normal source is a hammer that strikes a board on the surface and requires a single drilling. The triaxial geophones, spaced at approximately three metres, are lowered together with the probe (downhole). The source (hammer) generates compression and shear waves that are recorded by the geophone/s. The vertical receiver component is used to capture the compression waves that are propagated vertically (P) and the radial component captures the shear waves polarised horizontally (SH).

Compared with surface methods, the CS test is the most accurate method to determine soil and rock properties. This method can detect thin low speed strata located between high speed strata, which is not possible with surface methods such as Spectral Analysis of Surface Waves (SASW) or Diffraction Study Tests. In addition, the precision and resolution of the CS method are constant at any test depth, while in surface methods these two characteristics diminish at greater depths.

In cases where carrying out 2 or 3 drillings is expensive or not practical, Downhole tests can be performed. If the tests are carried out on rocks, it is not necessary to place the probes in pipes.

H0482/D Downhole test equipment

H0482/U Uphole test equipment

H0482/C Cross-hole test equipment