



ROCK TESTING

HOSKIN

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Supplying Testing & Monitoring Instruments Since 1946

ABOUT HOSKIN

For over seventy years, Hoskin Scientific has been a supplier of testing and monitoring instrumentation to the Canadian market. With offices in Vancouver, Edmonton, Oakville and Montréal our customers are able to receive local sales and technical support in our three major departments.

Our Environmental Department provides solutions for monitoring and sampling biological and chemical parameters in the environment. Our team of environmental sales representatives and diverse product range guarantee that you will find the right products for your application. Specific areas include: water quality, water quantity, soil moisture, plant science, weather stations, indoor air quality, aquatic sampling, and oceanography.

Our Materials Testing Department offers testing equipment for soil, asphalt, petroleum, concrete and cement. Our qualified sales associates focus on providing a sophisticated range of testing equipment complying with the various test methods, ensuring that accurate and consistent test results are always obtained.

Our Instrumentation Department focuses on a wide range of products including optical camera systems, transducers and transmitters, data acquisitions and loggers, signal conditioners and indicators, automation sensors and measurement systems. We have technical sales associates that are trained in various areas and willing to help you with your instrumentation requirements.

RENTALS

We offer high quality, proven equipment that will provide the user with valuable data as well as numerous ways of retrieving, filtering and viewing that data. We carry a wide range of instrumentation, including: water quality, portable gas monitors, soil sampling instruments and more.

Rental Equipment:

- Single and multi-parameter instruments that can be setup for spot checks or extended deployment/data logging
- Water sampling instruments
- Water velocity and stream profiling instruments
- Soil sampling instruments
- Soil vapour sampling instruments
- Portable gas monitoring instruments

Customer satisfaction is our goal and we make an effort to ensure that all our customers are satisfied with their rental. All rental instruments are cleaned and calibrated before being sent to the user (please note that we also require equipment to be returned clean). If a rental instrument requires recalibration, please return the instrument to us and we will recalibrate at no charge. Any instrument not functioning properly can be exchanged at no cost.

Hoskin Scientific offers technical support over the phone and can also provide hands on demonstrations.

We are constantly expanding and looking for new equipment to add to the rental inventory and welcome all suggestions.

Check our website www.hoskin.ca for current offerings.

Daily, weekly and monthly rental rates available – please call for a quote.

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Rock Schmidt Classification Hammer (ASTM D5873-14, ISRM)



The world's most advanced rebound hammer, with unmatched dispersion characteristics, durability and measuring range has now been fully adapted for rock testing. The following features of the hammer make it ideal for rock testing applications;

- *Impact Angle Independence:* The rebound value is independent of the impact direction.
- *Preset Statistics:* Statistics methods recommended by ISRM and ASTM are implemented into the hammer for automatic calculation of the rebound number. The option is also there to define a user specific statistics method.
- *Young's (E-) Modulus:* ISRM recommends a correlation between elastic modulus and the rebound value based on the formula $E_t = ce^{dr}$ (where R is the rebound value). A correlation in this format may be defined in the software and downloaded onto the Rock Schmidt.

Original Schmidt Rebound Test Hammer (ASTM D58B-14, ISRM)



The benchmark against which all rebound hammers are compared and the basis of every international rebound hammer standard. The Original Schmidt Type N is the most widely used hammer for geomorphical applications. A large number of UCS to rebound value correlations exist based on the tests made with this hammer.

- Geomorphical applications which investigate the bulk hardness properties of a rock outcrop
- Prediction of penetration rates for tunnel boring machines and rotary drum cutters
- Relative dating of landforms such as moraines and rock glaciers

ASTM Rock Cradle



This universal cradle can hold rock core samples with diameters from EX (21.46 mm) to NX (54.74 mm) size and greater. The cradle comprises a vertical hammer guide fitted to a steel plate of minimum mass conforming to ASTM D5873.

Dimensions: 220 mm diameter x 420 mm height
Weight: 27kg

Calibration Anvil



Standards: ASTM C805, ASTM D5873

Made from special alloy steel and supplied complete with a traceable hardness certificate, the anvil is essential for the periodical laboratory verification of the rock classification hammer.

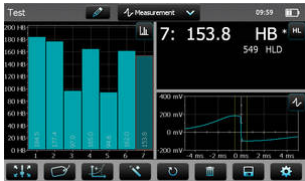
Dimensions: diameter 150 mm x 230 mm
Weight: 16 kg

Equotip 550 All-In-One Hardness Testing Solution



Equotip 550 with impact device D. Impact energy 0.011 Nm. Recommended for testing on very weak rocks, small samples, brittle core samples and also for testing edge effects.

Extensively used for rock hardness and for investigating weathering effects on rocks. The impact energy is approximately 1/200th that of the Type N rebound hammer.



This makes it very suitable for testing on historical sites, very soft types of rock that cannot be tested with a rebound hammer and also on brittle rock cores that would be damaged by a rebound hammer.

The impact device type S features the same impact energy and much more durable ceramic impact body that is more suited to heavy users on harder rock.

Equotip Leeb Impact Devices - D & S

The portable hardness tester Equotip may be combined with many different impact devices and support rings, allowing a wide range of different materials, surfaces and part geometries to be measured. These significantly extend the possibility of applications for the Equotip device. Each of these special impact devices is compatible with basic unit Equotip and is supplied as accessory.



	D	S
Impact Energy	11 Nmm	11 Nmm
Indenter	Tungsten carbide 3 mm	Ceramics 3 mm
Scope	Most commonly used probe. For the majority of applications	For measurements in extreme hardness ranges. Tool steels with a high carbide content.

Pundit PL-200 and Pundit Lab+ Ultrasonic Pulse Velocity



Ultrasonic testing is widely used for rock material characterization. The pulse velocity is directly related to the physical and mechanical properties of the rock. Proceq’s Pundit PL-200 and Pundit Lab+ ultrasonic test instruments allow an accurate measurement of both compression (P-wave) and shear (S-wave) pulse velocity. The procedure is described in both ASTM and ISRM recommendations. Once these have been determined, the elastic constants of the material, (P-wave modulus, the shear modulus, Poisson’s ratio and dynamic modulus of elasticity) can be calculated.

A correlation to UCS in either polynomial or exponential format may be defined in the Link software and downloaded onto the Pundit PL-200 or Pundit Lab+.

Application Overview

Recommended Instruments

	Hardness Testing				Equotip 550	Ultrasonic Pulse Velocity
	RockSchmidt		Original Schmidt			Pundit PL-200 / Pundit Lab+
	Type N	Type L	Type N	Type L		
Geomorphological applications which investigate the bulk hardness properties of a rock outcrop	•		•	•		
Prediction of weathering grades	•		•	•		
Relative dating of landforms such as moraines and rock glaciers	•		•	•		
Correlation to Unconfined (or Uniaxial) Compressive Strength (UCS)	•	•			•	•
Correlation to Young's Modulus	•	•				
Prediction of penetration rates for tunnel boring machines and rotary drum cutters	•		•	•		•
Testing on weak rocks, porous rocks and those with thin weathering crusts		•		•	•	
Testing on cores	≥ 84 mm Ø	≥ 54.7 mm Ø		•	•	
Testing on rectangular blocks	> 100 mm thick	•	> 100 mm thick	•	•	
Investigation of hardness near to edges					•	
Determination of the pulse velocities of compression (P) waves and shear (S) waves in rock from which the dynamic elastic constants are calculated						•
Assessing the state of preservation of historical stone buildings						•
Quality classification of building stone						•

Standards and Guidelines

The following standards and guidelines apply to rock testing:

- **ASTM D 5873** – Standard Test Method for Determination of Rock Hardness by Rebound Hammer Method. (Applicable for UCS between 1 MPa and 100 MPa.)
- **ASTM D 2845** – Standard Test Method for Laboratory Determination of Pulse Velocities and Ultrasonic Elastic Constants of Rock.
- **ISRM** (Aydin A. ISRM Suggested method for determination of the Schmidt hammer rebound hardness: Revised version. Int J Rock Mech Mining Sci (2008), doi:10.1016/j.ijrmmms.2008.01.020)
- **ISRM** (Aydin A. Upgraded ISRM Suggested Method for Determining Sound Velocity by Ultrasonic Pulse Transmission Technique: Rock Mech Rock Eng (2014) 47:255-259, DOI 10.1997/s00603-013-0454-z)

Rock Strength Index Apparatus (Point Load Tester) and Accessories

The apparatus consists of a 60 kN load frame capacity with a hydraulic loading ram actuated by a hand pump. The frame is adjustable for testing samples up to 102 mm dia. A ruler assembled on the frame allows for direct measurement of the distance D between the conical platens before and after the test. The compression load is measured by a pressure transducer with an advanced digital display unit assuring the best accuracy and resistance to the failure shocks. The machine, fit with the accessory 45-D0550/D5, can also be used for compression tests on small cores or cylindrical specimens. The apparatus is contained in a easily transportable plastic case.

- Light and portable unit
- Sample size up to 102 mm dia.
- Accepts irregular shaped samples
- High resolution digital display, battery operated
- Resistant to failure shocks
- Serial port for PC connection included
- Compression platens option for compression test on small cores and cylinders

Technical Specifications

- Load range: 0 to 60 kN
- Digital display: 2x16 characters
- Resolution: 32.000 div
- Load pacer included
- Load measured in both kN and MPa
- Serial port for PC connection
- Accuracy: $\pm 1\%$
- Case dimensions: 800x500x280 mm
- Weight approx.: 15 kg

Platens for compression tests

45-D0550/D5

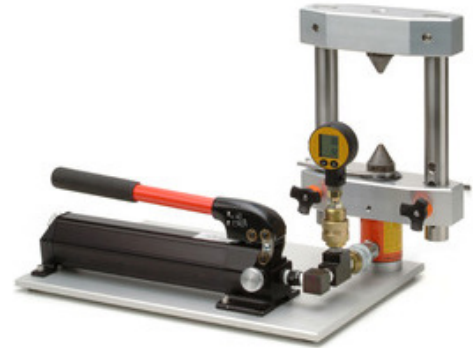
Set of lower and upper platen 52 mm dia. with spherical seat



Portable Point Load Test Apparatus

Light-weight Point-load Tester for specimen from 10 mm up to 120 mm in diameter.

- Easy to handle, functional design
- High stiffness of the light-weight testing frame
- Height adjustable cross-beam for different specimen heights
- Flexible and easy to use
- High accuracy by digital precision pressure gauge Cl. 0.1% with maximum value memory, IP 65, resolution 0.01 kN (LP 4500 only)
- Consists of hand-operated hydraulic pump, pressure cylinder, stainless steel base-plate, digital pressure gauge (proof for fieldwork) or two different analogue gauges for different loads
- Max. Specimen height: 120 mm
- Load range: 100 kN
- Accuracy: 0.1 %
- Resolution: 0.01 kN
- Weight: approx. 17.5 kg



STDZ-2, Point Load Tester

A portable instrument which can be used in both the laboratory or in situ to determine the rock strength index of rock samples or cores.

The values required for the calculation of the rock strength index are failure load and distance between the conical points.

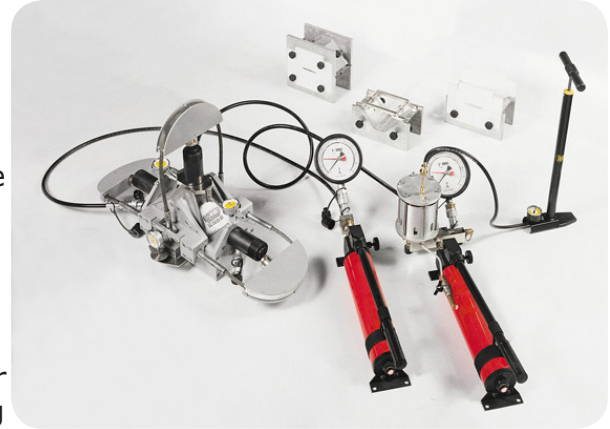


- Max. work pressure: 60MPa
- Piston diameter: diameter 35 mm stroke 160 mm
- Piston area: 9.62cm²
- Capacity 100kN
- Resolution 0.1kN
- Peak value is retained in the memory

Measurement of Shear Strength

ASTM D5607, ISRM Suggested Method

This apparatus was originally developed at Imperial college, London, by Professor E. Hoek. It is a simple and practical method of determining the strength and slope stability of rock, both in the field and in the laboratory. The apparatus consists of a shear box designed to accept samples not larger than 115x125 mm, or alternatively cores up to 102 mm dia. The shear box consists of two halves, the upper being connected to two rams for reversible shearing action and the lower connected to a ram for normal load application. The loads are recorded by Bourdon tube load gauges.



The normal loading system is complete with an adjustable low friction pressure maintainer to absorb volume changes of the specimen during the shearing action and to ensure a constant vertical stress.

45-D0548 is supplied complete with two 50 kN pumps and manometers, three dial gauges 25 x 0.01 mm, and two mold forms used for the correct alignment of the sample before the test with cementation. It can be completed with accessory 45-D0548/10 to fulfill ASTM D5607 requirements.

45-D0548/D is compliant with ASTM D5607 and separates: 5 potentiometric transducers with 25mm travel (4 vertical and 1 horizontal), 2 hand operated pumps for lateral and vertical load fitted with Bourdon gauges, 2 pressure transducers for the direct acquisition of the load values on the external datalogger model WF6016. The pump for vertical load is fitted with a pressure maintainer to assure uniform load during the test.

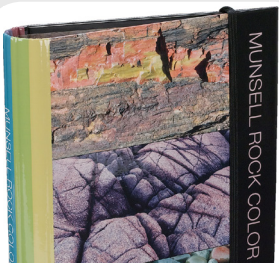
The high alumina cement for the cementation of the sample is not included and must be ordered separately.

Rock Classification Chart

The Munsell Rock Color Chart Provides a Durable, Accurate Method for Classifying and Evaluating Rock Color Samples.

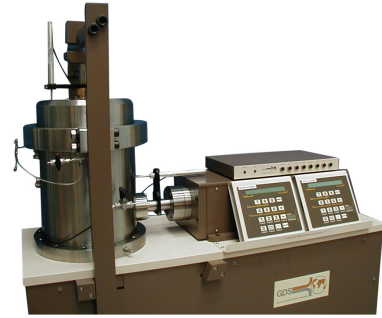
The Munsell Rock Color Chart helps geologists and archeologists communicate with colour more effectively by cross-referencing ISCC-NBS colour names with unique Munsell alpha-numeric colour notations for rock colour samples. The rock color chart is a revision of the previously published Geological Society of America (GSA) Rock Color Chart.

Your Munsell Rock Color chart gives you the convenience of evaluating rock colours of all types where you need it most, in the field. Evaluate rock colour wet or dry; medium, fine or coarse grained rocks too.



Back Pressure Shearbox - High Pressure (HPBPS)

The High Pressure Back Pressure Shearbox (HPBPS) is a high pressure, high load version of our standard back pressure shearbox. It is able to perform direct shear tests with precise back pressure control, for the direct control and measurement of realistic slope failure. The device can load the sample to 100kN axially and in shear whilst also being capable of applying up to 10MPa back pressure.



Realistic slope stability conditions: Conditions can be applied by accurately controlling the normal force, shear force and back pressure.

Highly accurate displacement measurement: For very small yet long term creep movements to be measured.

Direct shear testing: Allow direct shear tests to be performed under closely controlled conditions in terms of axial load and back pressure.

10MPa stainless steel cell: For back pressure control and pore pressure measurement.

Provide accurate results whilst working at high loads: Up to 100kN axial and shear load.

High Pressure Triaxial Cells (CellsHP)



GDS produce cells for 32/100mm samples and from 14-100MPa to satisfy the complex range of tests required by today's modern geotechnical laboratories. Cells are available with or without balanced ram.

Large pressure range: GDS triaxial cells are available from 4-100MPa, allowing the end user to choose the ideal cell for their range of testing needs.

Large variety of sample sizes: GDS range of cells can hold samples up to 100mm at a variety of different pressures.

Third party frames: GDS Triaxial cells can be supplied as part of a complete system or for use in pre-existing 3rd party load frames. Please contact Hoskin Scientific with the make and model of existing frame for fit information.

Temperature control: Versions of some cells are available for testing samples at elevated temperatures up to 1500C.

Virtual Infinite Stiffness Load Frames (GDSVIS)



The GDS Virtual Infinite Stiffness loading system (GDSVIS) is the premier load frame in the GDS range with load capacities of 100kN, 250kN and 400kN.

The GDSVIS allows the axial loading system to operate as though it has infinite stiffness (zero system compliance). This type of frame is exclusive to GDS.

Load-deformation relationship: The GDSVIS is calibrated to provide precise data on the load-deformation relationship of the entire load application and load measuring system, which is then automatically used for self compensation.

Built in feedback: All VIS frames have feedback control and continuous display of axial load and platen displacement to allow simple and confident control of force and displacement.

Automatic correction: VIS provides automatic correction for system compliance, a common cause of error, which can under-estimate results of sample stiffness.

500kN Virtual Infinite Stiffness Load Frames (VIS500)

The 500kN Virtual Infinite Stiffness loading system (GDSVIS) is the premier load frame in the GDS VIS range. VIS stands for virtual infinite stiffness. It allows the axial loading system to operate as though it has infinite stiffness (zero system compliance). This type of frame is exclusive to GDS.

The 500kN version of the VIS has the added advantage that the beam lift can be used to lift the cell top on/off the cell base (extra long columns as an option) as well as hydraulic clamps to hold the beam in place.

Load-deformation relationship: The GDSVIS is calibrated to provide precise data on the load-deformation relationship of the entire load application and load measuring system, which is then automatically used for self compensation.

Built in feedback: All VIS frames have feedback control and continuous display of axial load and platen displacement to allow simple and confident control of force and displacement.

Automatic correction: VIS provides automatic correction for system compliance, a common cause of error, which can under-estimate results of sample stiffness.

Column strength: The 500kN load frame has been built with 4 columns for extra strength and rigidity and can hold a cell size with a 700 mm outer cell diameter.



1000kN (1MN) / 2000kN (2MN) Static Compression Only Load Frame (1MN or 2MN)

The GDS 1MN Static Load frame is actuated from the base by a Hydraulic actuator at loads up to 2000kN. To increase efficiency and to reduce whole life costs the actuator is powered by a 200cc / 64MPa GDS advanced pressure controller.

This efficiency means that the full load of the frame, 1MN, can be achieved by drawing less than 1000Watts (1 or 2 kW) from mains electricity in place of a hydraulic power pack which can draw up to 30kW.

Control is carried out by a GDS advanced pressure controller and as such is very stable and accurate. No special requirements are needed to host or service a powerpack or to protect system users from noise generated by a powerpack.

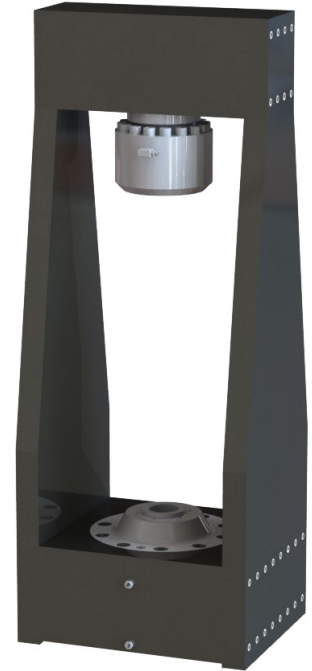
The static frame uses low pressure compressed air on the reverse side of the actuator to raise the actuator post compression. This allows a simple manual regulator to be set with a small pressure in the upper chamber of the actuator. This innovation allows lower stress testing to be carried out more efficiently and more accurately without the cost implications of using a second pressure controller for the upper chamber of the actuator. Once the regulator is set it can then be left unattended for all tests, so long as a supply of clean, dry compressed air is available at a pressure greater than 0.5MPa (5Bar).

Ideal for creep and relaxation testing

Ideal for use where displacements are very small and loads need to be very stable and well controlled.

Infinite Volume Controller option

For tests where continuous displacement is required to amplitudes greater than 5mm.



1000kN Load Frame Including Hydraulic Actuator (HLF1000-H)

The GDS 1000kN load frame is a servo-hydraulic system that has been designed to be a compact and effective addition to a soil and rock testing laboratory.

Two versions of the 1MN load frame are available:

- 4 Column Moveable Head - where different sized test cells are to be used.
- Fixed Heads

The HLF1000-H has closed loop-feedback control of force and position as standard. This allows the frame to be used for many different test types from soil to rock mechanics and other material test applications where precise control of axial force and displacement are required in a very stiff reaction frame (2GN/mm).

Compact design

Reduces the laboratory floor space required, only 2430 mm x 750 mm x 700 mm.

Hydraulic power

Hydraulic power is derived from a separate powerpack that can be sited up to 15 m from the load frame.

ELDCS control system

This load frame is controlled by the ELDCS control system which, has 4 channels of high speed data acquisition built in and is connected to the PC via the USB bus.

Closed loop-feedback control of force and position as standard

The load frames have closed loop-feedback control of force and position as standard. This allows the frame to be used for many different test types from soil to rock mechanics and other material test applications where precise control of axial force and displacement are required in a very stiff reaction frame.

Low friction, bidirectional actuator

Full system load is available in compression and tension.



Acoustic Velocity Transducers

Systems to measure the P- and S- Wave velocities within a sample. AV sensors are generally used where pressures and load exceed those where bender elements can be used. AV sensors are based on the same principle as bender elements but the piezo ceramic elements are not exposed to the environment so they can be used at pressures up to 100MPa and loads up to 2MN. Sensors and sources are mounted in the pedestal and topcap or to the sides of the sample in some cases. Each sensor package contains a Compressional wave (P-Wave) element and two shear wave (S-Wave) elements. The Shear wave elements are set in orthogonal directions to allow two shear waves to be generated with different polarisation. This is important where samples may be cross-anisotropic or even fully anisotropic.



Multiple Wave types as standard: Standard sensor package has: P-Wave, S- Wave Polarity 1 & S-Wave Polarity 2

High speed data acquisition to yield high resolution results: Result accuracy is dependent on the resolution of time in acquired data. Higher speed data acquisition yields higher resolution results.

High Bit count: Yields a more dynamic capture of acquired waveforms with less tuning needed.

Designed to fit most GDS high pressure triaxial and Hoek Cells: Some existing GDS high pressure cells can be adapted to include GDSAV transducer sets.

Vertical and horizontally mounted elements are available in some cells: Allows users to describe fully anisotropic samples by measuring velocities in all directions and polarities.

Software controlled switching: Once the system is set up sensors do not have to be plugged and unplugged to use different wave types.

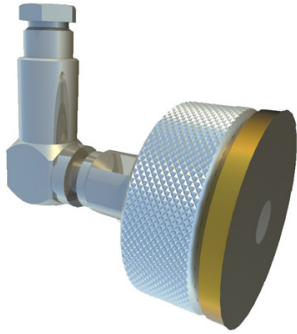
Tests that can be Performed: Standard Package: Compression wave – Vertically travelling, Shear wave – Vertically travelling Polarisation Horizontal direction 1, Shear wave – Vertically travelling Polarisation Horizontal direction 2

Upgrade Options: Horizontally mounted elements can be added to some cells.

Technical Specifications:

Max Logging Speed (Single Channel): When two channels are logged:	1GHz – Single channel mode (8-bit) 125MHz (source and receive at 14-bits), 250MHz (source and receive at 12-bits)
Data Acquisition Number of Bits:	16 (Typically 12/14 at high logging rates)
Sensor Centre frequency (MHz):	1
Timebase accuracy:	±1ppm / year
Gain ranges:	11 (spanning ±10mV to 20V)
Excitation voltage:	Up to 400
Low voltage output:	Source signal acquisition
Axial Load (MN):	Up to 2 on request
Pressure Range (MPa):	Up to 100
Specimen Diameters (mm):	38, 50 options available upon request
	Sample set 3.3 kg, Pedestal 0.95 kg & Top Cap 1.4 kg

Acoustic Emissions Transducers



The Acoustic Emissions transducers enable micro-fractures occurring within a rock specimen during testing to be recorded. The submersible transducers may monitor fractures continuously, or only when triggered.

High speed data acquisition systems: 10MHz – 50MHz with bit counts or 12-16 Bits allow for high resolution measurement.

Varied systems range: Systems range from simple counter systems through to complete systems that can locate the origin of the event within the sample.

CO2 Gas Adsorption Cell

The GDS Adsorption cell is a Twin Cell based system used for the Adsorption of a Gas onto a chosen sample. One chamber will have a gas with a known volume and pressure. The second chamber will hold a sample with known volume under a vacuum. The gas is then introduced to the sample chamber and the process of adsorption begins.



The system is used to find the adsorption rates and volumes of a chosen gas onto the surface of a particular solid. The use of two cells allows easy calculations of volume and pressure with each cell having its own transducer. The introduction of the gas into the sample chamber is done via a needle valve situated between the two cells. The cell was specifically designed to conduct supercritical CO₂ adsorption onto coal but can also be used for many other adsorption tests. Slight modifications can be made to the cell to fit your specific test requirements upon request.

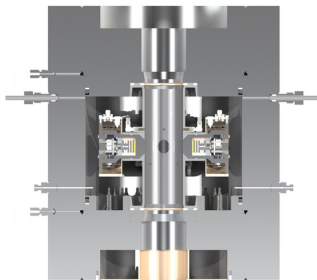
Types of Tests it can perform

- Gas Adsorption onto a sample
- Supercritical CO₂ adsorption onto coal

Technical Specification

- Dimensions: H: 126.5mm W: 195mm, D: 100mm
- Pressure range: 20MPa
- Weight: Approximately 15kg
- Standard sample sizes 38mm, 50mm
- Compatible with CO₂, helium, nitrogen, methane

Instrumented Hoek Cells



A highly sophisticated version of the traditional Hoek cell that can be fully instrumented. Can be used in various applications.

- Embankments & Dams Testing
- Mining
- Oil exploration
- Creep testing
- Optional temperature control Tunnelling Testing

Automatic Uniaxial & Triaxial Test System

Controls Rock Mechanics automatic test systems are designed to test various materials, from soft sandstone to high strength basaltic samples.

The complete test system includes:

ADVANTEST Rock Servo-hydraulic control console for load application conforming to the relevant Standards. The ADVANTEST ROCK, model 45-C9842/RCK, includes a dedicated software module for rock testing under triaxial conditions to determine the failure path. The ADVANTEST 9 Rock, automatically performs loading-unloading ramps under strain control and also applies confining pressure at selectable values. Any time the specimen approaches the failure stage the system automatically and instantaneously increases the confining pressure and move the specimen bearing capacity further, building the failure path. Therefore from a single specimen it is possible to plot the complete failure path.

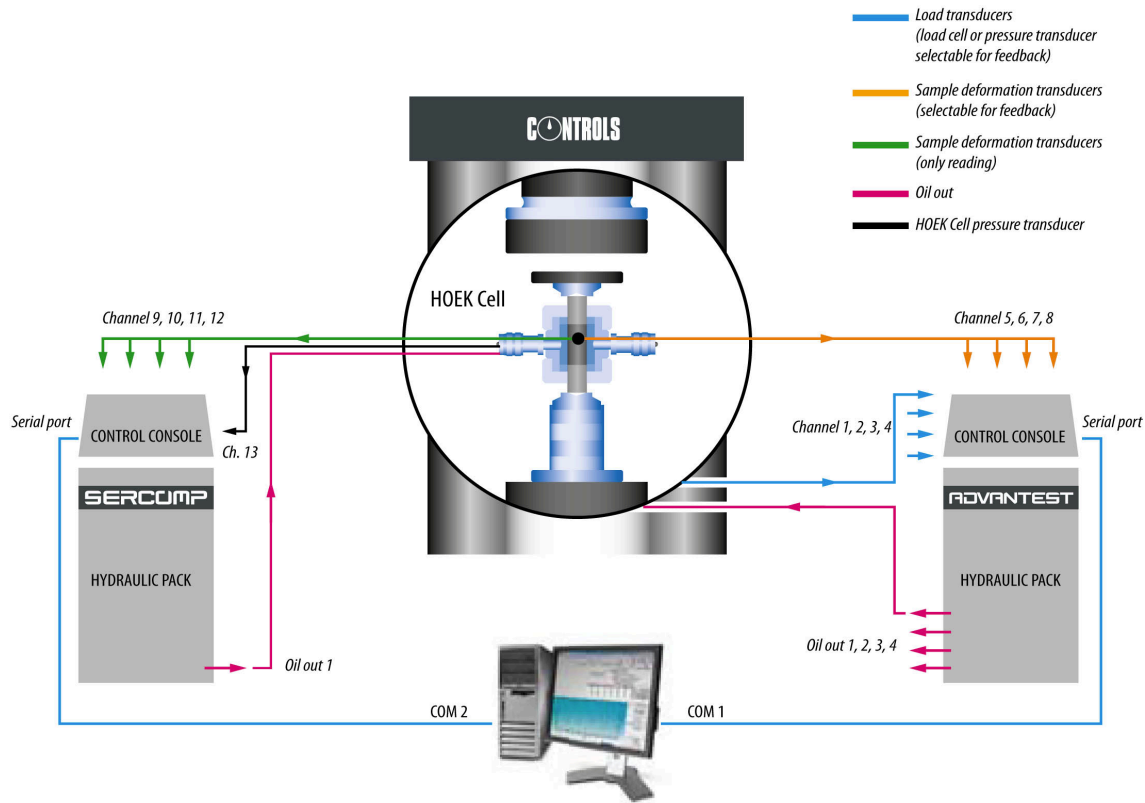
The ADVANTEST ROCK can also be used for load/stress/displacement/strain controlled testing of concrete, fiber reinforced concrete, shotcrete, etc.

Sercomp 7 Rock Servo-hydraulic control console for confining pressure control. The Sercomp unit model 45-C7022/RCK has been specifically designed for triaxial rock testing and works as a remotely controlled pressure unit, managed by the ADVANTEST Rock.

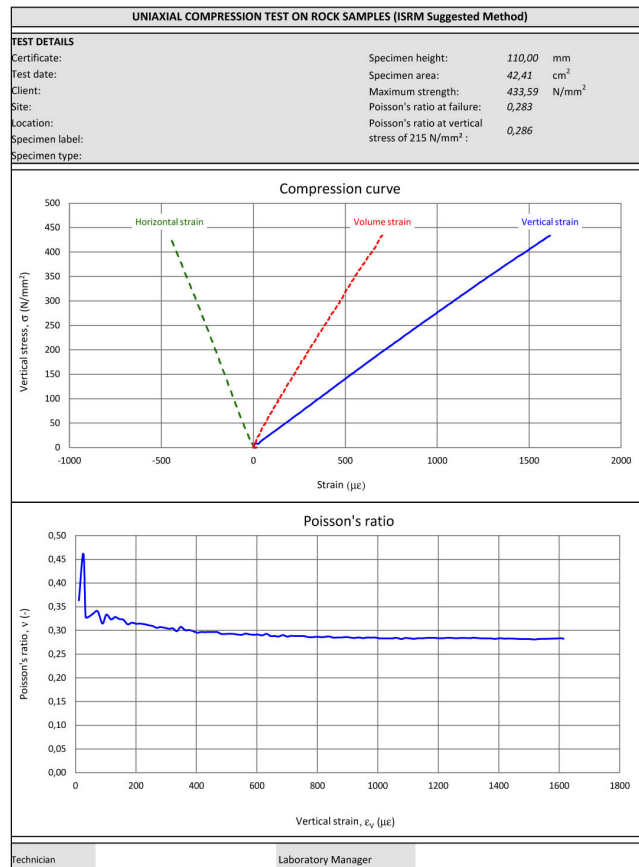
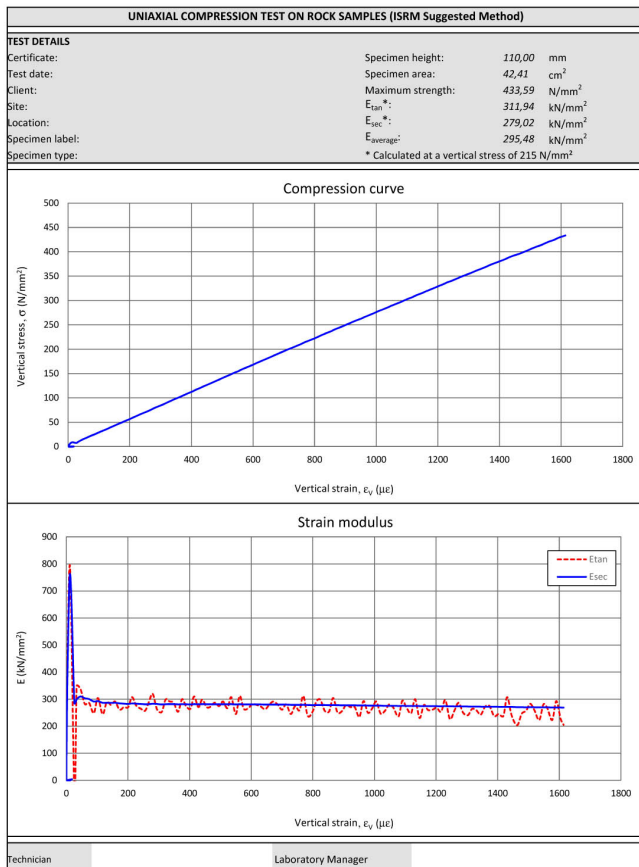
High stiffness compression testing frame. To be selected conforming to the size of the sample and the expected strength. Due to the typical high strength and fragility of rocks we recommend high capacity test frame (4000kN or 5000kN capacity).



ADVANTEST Rock Triaxial tests. Layout of the system



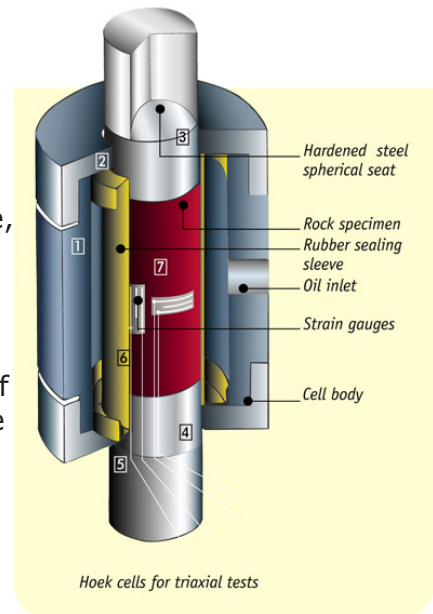
Examples of Excel® data sheets for uniaxial tests



Hoek Cells

The Hoek triaxial cells are offered in four models of different size; each one consists of the following: (please refer to the drawing)

A cell body (1), complete with two quick release self sealing couplings, for the introduction of the hydraulic oil and cell pressure, and for air outlet and saturation of the chamber respectively. Two end caps (2), screwed into the cylindrical cell body. Upper (3) and lower loading caps (4) with spherical coupling. Two female spherical seating (5) connected to the loading caps (3) and (4) for the correct transmission of the axial load from the loading frame of the compression machine to the specimen. A rubber sealing sleeve (6) to separate the specimen from the cell fluid.



Although each sleeve can be used for several tests, an order of five spare sleeves is recommended.

Measurements of axial and radial strain are carried out with the use of electric strain gauges (7), both in vertical and horizontal direction, directly glued on the lateral surface of the specimen. The wiring connections are passed within the rubber sleeve through the cell body and loading cap. Each strain gauge must be connected to a proper device (see 82-P0398) to complete and balance the Wheatstone bridge. The strain gauge measurements can be performed by automatic testing systems (see Automatic Uniaxial and Triaxial test system), or by a suitable datalog (see Datalog, multipurpose data logger). The cell pressure and saturation pressure for permeability tests are carried out by the use of appropriate equipment. See Rock permeability equipment.

It is also recommended the use of a Specimen extruder, to extrude the rock sample from its jacket thus avoiding to empty the confining fluid. See accessories.

Hoek Cell Specifications

Code	D.C.D.M.A reference	Specimen size (dia. x h) (mm)
45-D0553	AX	30.10 x 60
45-D0554	1.5 in.	38.10 x 75
45-D0555	BX	42.04 x 85
45-D0556	NX	54.74 x 108
45-D0557	HQ	63.5 x 130

Total height (mm)	Total height ⁽¹⁾ (mm)	Weight (kg)
193	240	2.5
247	302	4.0
246	301	6.5
271	326	13.0
300	355	15.0



(1) Including also 45-D0556/A and 45-D0556/B

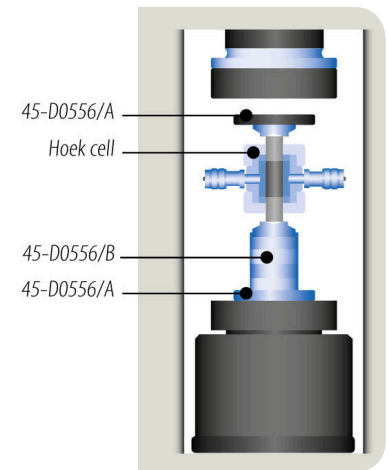
Note: other Hoek cell dimensions, example H type, dia. 63.5 mm, available on request

Hoek Cell Accessories

- 45-D0566/A - Pair of load spreaders for uniform load distribution. Thickness 15 mm (each).
- 45-D0556/B - Distance pad to reduce the vertical clearance of the compression machine. Thickness 25 mm.
- 45-D0556/H - Hoek cell holder

Spare Rubber Sleeves

- 45-D0553/1 - AX, for specimens 30.10 mm dia. x 60 mm h.
- 45-D0554/1 - 1.5 in., for specimens 38.10 mm dia. x 75 mm h.
- 45-D0555/1 - BX, for specimens 42.04 mm dia. x 85 mm h.
- 45-D0556/1 - NX, for specimens 54.74 mm dia. x 100 mm h.
- 45-D0557/1 - HQ, for specimens 63.5 mm dia. x 130 mm h.



Schematic view of the Hoek cell with load spreaders and distance pads within the testing chamber of the compression frame.



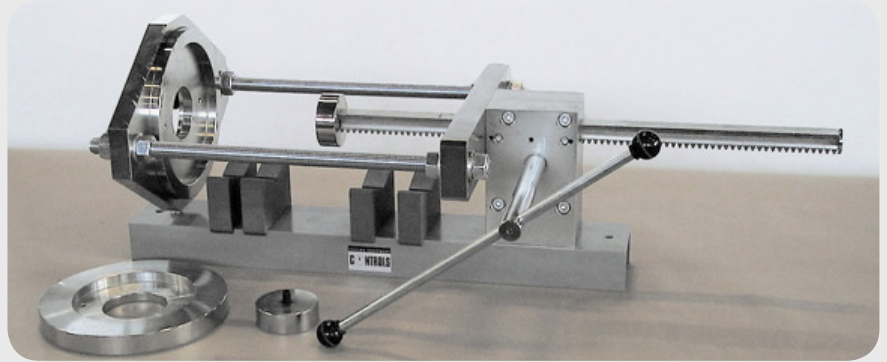
45-D0556/A, 45-D0566/B



Hoek cell 45-D0556 supported by cell holder model 45-D0556/H

Rock Specimen Extruder

Used to extrude the rock sample from its jacket thus avoiding to empty the confining fluid. It consists of a steel frame with a rack and pinion mechanism. Supplied without adapters. Extruder adapters set, comprising two support cell body and shaft head.



Rock Permeability Equipment

This apparatus, originally designed for soil mechanics test applications, can also be used to provide an infinitely variable constant pressure and is used in conjunction with the Hoek cell (see Hoek cells and sample extruder) fit with the permeability end caps, for the investigation of the permeability of rock at high confining pressure, in the laboratory. The apparatus comprises: motorized hydraulic pump; honed piston/spring assembly; precision test gauge 0-3500 kPa range; cylindrical oil/water interchange vessel; valves; 2 kg of high viscosity oil.



The lateral pressure can be applied with the 45-D0588 Low friction pressure maintained (see Semi-automatic Uniaxial and Triaxial test system. Basic test apparatus) or, as an alternative, with the 45-C7022/RCK Sercomp Rock, servo-hydraulic control console which is part of the Automatic Uniaxial and Triaxial test system.

- Pressure range: 0 to 3500 kPa
- Overall dimensions: 310 x 300 x 390 mm
- Weight approx.: 16 kg



Rock/Concrete Specimen End Grinder

This is the ultimate example of the specimen end grinding machine. This machine grinds three specimen end surfaces at one time automatically. It is a successful and reliable machine to reduce manpower, work time, and space to 1/3.

Save time - Test specimens typically require less than 60 seconds to finish. Continuous operator supervision is not required.

Save materials - No capping material is required to finish the specimen end. Grinding disks typically finish 3,000 - 5,000 pieces before a replacement is necessary.

Portability and size - Because of its small footprint, space is kept to a minimum. The end grinder is conveniently mounted on lockable castors providing easy mobility.

Laboratory Coring Machine and Bits

This machine is specifically used in the laboratory for cutting core samples from hard materials such as rock and concrete. A clamp is provided to firmly secure the material during the cutting cycle. The coring area is protected by a transparent cylinder. A special clamping device to prepare rock samples from core pieces is also available. Drill bits not included.



- Power unit: 1800 W
- Coring speed: 1485/2720 r.p.m.
- Coring range: from 8 to 60 mm dia.
- Dimensions of the base tray assembly: 600 x 500 x 200mm
- Weight approx.: 80 kg

Drill bits with spigot adaptors

Model	Description	Specimen dia. mm	Specimen dia. inches	D.C.D.M.A. reference
45-C0342	diamond core bit	21.46	0.85	EX
45-C0343	diamond core bit	30.10	1.185	AX
45-C0344	diamond core bit	38.10	1.500	1.5 in.
45-C0345	diamond core bit	42.04	1.655	BX
45-C0346	diamond core bit	54.74	2.155	NX



Clamping device - 45-C0331

Clamping device for cores max. dia. 100 mm, complete with transparent protection.



Guardmatic MS 510

- Dual capacitor increases power efficiency and reduces run amperage
- 3 hp, 5 hp, or 7-1/2 hp electric motor options.
- Capable of cutting 8" x 8" x 16" block.
- Only two pivot points for reduced saw maintenance and longer diamond blade life.
- Cutting head pivots on bearings which are sealed and lubricated for life. No greasing required.
- A patented cutting head allows for easy removal and transportation on electric models.
- Height can be controlled with a convenient crank control on foot pedal.
- The Sta-level® blade guard keeps the blade guard parallel to the cutting table for accurate cuts.



Portasaw MS 355

- Large Conveyor Cart
- Optional foot pedal kit allows the operator to use their foot to lower the blade into the material.
- High torque continuous duty Baldor electric motors.
- Only two pivot points for reduced saw maintenance and longer diamond blade life.
- Cutting head pivots on bearings which are sealed and lubricated for life.
- Hold the handle and lower the blade into the material to plunge cut.
- Patented Sta-level® blade guard keeps the blade guard parallel to the cutting table for accurate cuts.

Masonry/Refractory Blades

- **SILENT RUNNER®** - A diamond blade for medium to large jobs and maximum production at a low cost per cut. It features a laminated core for maximum noise reduction. Segment height is .390".
- **MI SERIES** - A diamond blade for fast cutting of brick and block. It is available for general and abrasive materials. Segment height is .430".
- **BANNER LINE®** - A diamond blade designed for medium to large jobs and features maximum production at low cost per cut. Segment height is .335".
- **BHT TURBO** - A diamond blade for fast cutting of medium to hard brick and hard concrete paving blocks and stone. It is not recommended for block. Segment height is .495".
- **DM DRI DISC®** - A diamond blade designed for medium jobs and featuring low cost per cut. Segment height is .275".
- **SUPER PREMIER®** - A diamond blade designed for large jobs and features maximum production refractory cutting at the lowest possible cost. Segment height is .335".
- **SUPERLOK® GM** - A blade for fast, chip-free cutting of granite and marble. It is also for general purpose cutting of quarry tile. Segment height is .170".



Slab Slaws - TR18", TR24" and TR36"

Each saw is individually constructed with critical attention given all operating systems and details. Design is based upon the time tested features of famous Highland Park, Becon Star and Frantom saws, many of which are still in operation after 30-40 years. Contempo combined the best of these saws with modern improvements, especially in the operating systems, making the TR-18 and TR-24 saws the best available for heavy duty industrial use, or for the rockhound and lapidary wanting to cut large pieces of material.

- Powerglide Hydraulic Feed System pushes rock to blade for steady cutting.
- V-Guide Rail System with heavy cast aluminum vise features quick release pin and positive screw tightening.
- Multi-Stage Filter and Recirculation System.
- Arbor Shaft is 1 inch diameter in a one piece cast aluminum arbor housing with sealed ball bearings.
- Heavy Duty Tank of 3/16" Steel Plate
- Heavy steel legs on casters allow moving of the saw



For all it's size, the Model TR-36 saw is easy to operate and provides professional cutters of gem material, glass and core samples with reliable performance cut after cut. The true workhorse and "secret" of many successful cuts is the Power Glide Hydraulic feed system. The basic design and simplicity of function insures fast, clean cutting of materials. You are able to set pressure and feed at a constant positive pressure. The Power Glide even has a "power return" feature which returns the carriage after a slice has been cut.

Arbor shaft is 1 inch. Blade is constantly cooled and cleaned by the recirculating system. Coolant is directed to both sides of the blade throughout the cutting operation. Recirculation tank holds 30 gallons.

Vise is operated by a 1 inch Acme thread screw. It has a 25" opening with a 14" depth of cut. 11 1/2" cross feed for a maximum of 14"H x 25"D x approx. 35"W rock size. Jaw face is 15" wide. V-Guide rails have 4" U Channel supports.

The tank is made of 3/16" steel plate and measures 96" long x 40" wide by 27" deep. The hood has four heavy duty, gas assist springs for lifting. Safety shut off switch stops saw when the hood is raised.

Comes with 3 HP continuous duty motor. Specify 220V 60Hz or 240V 50Hz. (5 HP 3 phase motors also available in either frequency).

Core Trimmer and Cut Off Machine

Used to obtain rock samples perfectly machined (cube, prisms, etc) from irregular rock or core pieces. It is supplied complete with a proper vice to hold irregular pieces firmly in place up to 70 x 140 mm approximately and "V" device for cores up to 75mm dia. Longer cores can be machined by turning the sample upside down in the device. The machine also include cooling water inlet and transparent cover, conforming to CE requirements, with a switch that stops the machine automatically when the cover is opened.



The machine can be fit with either a cutting blade or a double-faced cup wheel for surfacing cylindrical specimens ends.

Blade, cup wheel and water pump are not included and have to be ordered separately.

- Specifically designed for rock testing laboratories
- To obtain samples from irregular rock or core pieces
- Double function of trimmer and cut-off apparatus
- Complete with safety device conforming to CE requirements

Technical Specifications

- Power: 1100 W
- Blade speed: 3000 r.p.m.
- Dimensions: 730 x 1050 x 590mm approx.
- Weight approx.: 100 kg

Cooling recirculating pump

45-D0536/1Y - Cooling recirculating pump complete with reservoir. 220 V, 60 Hz, 1 ph

45-D0536/1Z - Cooling recirculating pump complete with reservoir. 110 V, 60 Hz, 1 ph

Cutting blade and cup wheel

45-D0536/2 - Diamond cutting blade, 230mm dia. x 2.8 thick. Maximum cutting area 110 x 70mm

45-D0536/A3 - Double faced diamond cup wheel, 200 mm dia. x 16 mm thickness. Used for finishing/grinding sample ends parallel and at right angles to the axis.

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Environmental Monitoring
Test & Measurement Instrumentation

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