FAMILY ONE

Rock Mechanics

A complete range of rock testing instruments — from index testers and acoustic systems to load-frame and pump-actuated triaxial platforms — designed for academic, research and industrial geomechanics laboratories.

ROCK MECHANICS • LABORATORY EQUIPMENT

Specimen Preparation Tools

A complete laboratory workflow — from raw rock to test-ready plug

The Floxlab Specimen Preparation Suite brings together four purpose-built machines that integrate into a single, repeatable laboratory workflow. From coring and cutting to grinding and flatness verification, every step is engineered for precise, ASTM-compliant specimens in rock mechanics research and industry.

THE FOUR-STEP WORKFLOW

1

ACM-300

Coring

Extract cylindrical plugs from rock cores and blocks with diamond coring bits.

2

SC-450

Cutting

Cut specimens to precise length using a Ø 450 mm diamond blade.

3

SG-300

Grinding

Grind end surfaces flat and parallel with a Ø 300 mm diamond cup wheel.

4

SF-300

Flatness

Verify ASTM D4543 compliance with a precision digital dial indicator.

Coring & Cutting

ACM-300 Automatic Coring Machine • SC-450 Automated Cutting Saw

ACM-300 Automatic Coring Machine

Plug extraction from rock cores and blocks

GENERAL VIEW

INTERNAL VIEW — CORING IN OPERATION

The ACM-300 plugs cylindrical specimens from rock cores of various diameters or from blocks of similar size. It works with all types of diamond coring bits and delivers clean, repeatable plugs ready for downstream mechanical testing. Three rotation speeds, adjustable lowering speed and drilling force, internal core-drill irrigation via rotary seal, and horizontal or vertical sample clamping — with an optional recirculating coolant system.

2,520 rpm	Ø 102.6 mm	300 mm	2.2 kW
Max rotation	Max Ø drilling	Max depth	Motor power

SC-450 Automated Specimen Cutting Saw

Precise diamond-blade cutting of rock specimens

GENERAL VIEW

INTERNAL VIEW — DIAMOND BLADE & CARRIAGE

The SC-450 is a robust automated saw for cutting rock specimens with a diamond blade, delivering precise cuts in a self-contained laboratory unit. Designed for natural rock specimens with or without water, it accepts prismatic or cylindrical samples up to Ø 170 × L 400 mm, features a hydraulic carriage with adjustable feed, a closed-loop 40 L cooling system, and an integrated vacuum cleaner for dry cutting.

Ø 450 mm	1,450 rpm	170 × 400 mm	2.2 kW
Max blade	Rotation speed	Max specimen	Motor power

Grinding & Flatness Check

SG-300 Automated Specimen Grinder • SF-300 Specimen Flatness Gage

SG-300 Automated Specimen Grinder

Precise surface grinding of rock specimens

GENERAL VIEW

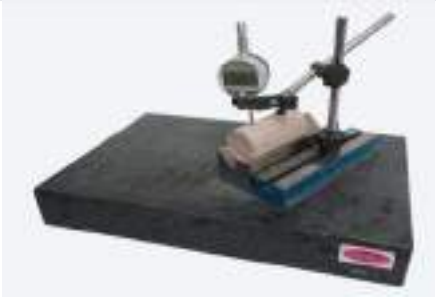
INTERNAL VIEW — GRINDING WHEEL & CLAMPS

The SG-300 is a robust automated grinder for rock specimens using a diamond cup wheel. Surpassing industry standards, it delivers flat, parallel surfaces essential for accurate mechanical testing. Features include a Ø 300 mm diamond wheel at 1,450 rpm, wet or dry grinding with integrated vacuum, a closed-loop 40 L cooling system, and mobility on four lockable wheels.

Ø 300 mm	1,450 rpm	170 × 400 mm	210 kg
Diamond wheel	Rotation speed	Max specimen	Weight

SF-300 Specimen Flatness Gage

ASTM D4543 compliance verification



GENERAL VIEW — GRANITE BASE & DIAL INDICATOR

The SF-300 ensures precise measurement of a specimen's flatness. A specimen is positioned on a Grade-A granite base (class 00), and a vertically mounted digital dial indicator reads out the degree of flatness to laboratory precision — the essential QC step before mechanical testing. Accepts specimens up to 300 mm (12 in) high and weighs only 20 kg on a compact benchtop footprint.

ASTM	±0.0001"	0.01 mm	20 kg
D4543 compliant	Accuracy	Resolution	Benchtop weight

floXlab

AVS-A

Acoustic Velocity System

P & S wave velocity and dynamic elastic constants of rock cores

AVS-A — turnkey bench-top acquisition setup with PC + Applilab

Geotechnical & Rock Mechanics Testing Equipment

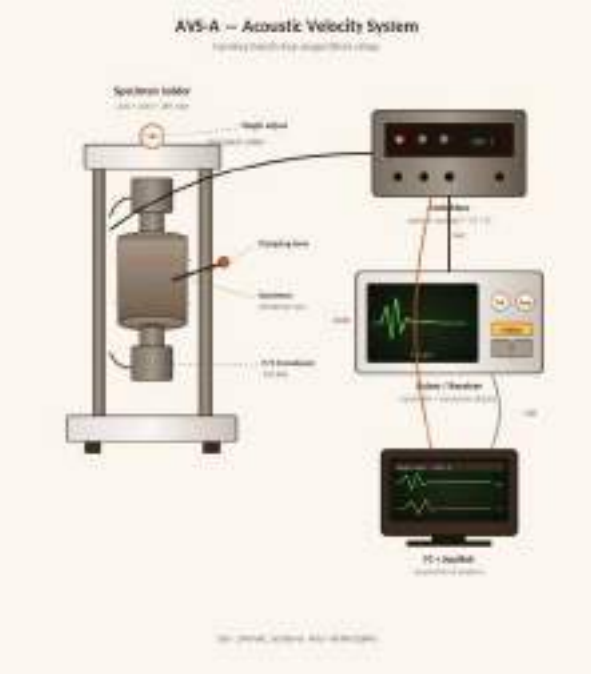
Overview

What the AVS-A does, in brief

- Ultrasonic pulse-transmission through rock cores
- Measures P-wave (Vp) and S-wave (Vs) velocities
- Computes dynamic Young's, shear, bulk moduli & v
- Three modes — compressional P, shear S1 and S2
- 1 MHz transducers — high-resolution time-of-flight
- Fast-loading specimen holder with centring collars
- Turnkey acquisition with PC + Applilab software
- Compliant with ASTM D2845 — IP53 rated

Main Components

Bench-top setup — annotated diagram



Specimen Holder

Fast-loading frame, 200 × 200 × 380 mm

P / S Transducers

1 MHz resonance — P, S1 and S2 modes

Pulser / Receiver

Excitation electronics + waveform display

Switchbox

Routes signals across P / S1 / S2 channels

PC + Applilab Software

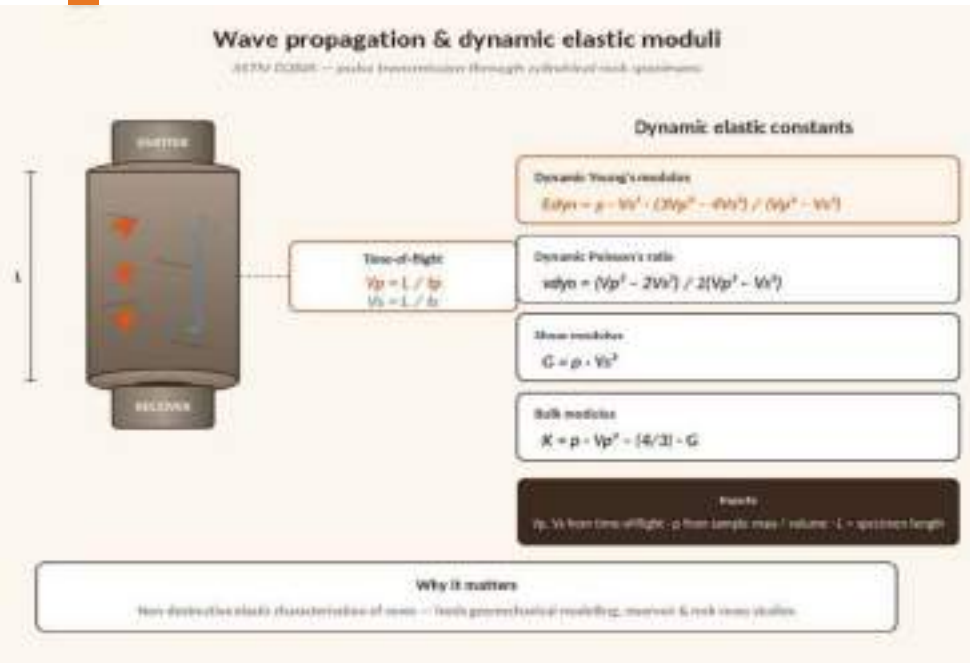
Automated acquisition, analysis & reporting

Centring Collars & Lever

Precise alignment and grip of specimen

Measurement Principle

Pulse transmission — ASTM D2845



How the test works

- Cylindrical core machined and centred in holder
- Acoustic gel applied at both transducer faces
- Pulser excites at 1 MHz, P or S mode
- Receiver captures the transmitted waveform
- Time-of-flight tp and ts read on oscilloscope
- Vp = L/tp, Vs = L/ts → dynamic moduli computed

Technical Specifications

Test method	Acoustic velocity — ASTM D2845	**Output**	Vp, Vs, Edyn, vdyn, G, K
Standards	ASTM D2845	**Specimen holder**	200 × 200 × 380 mm
Test cycle	Pulse transmission — P and S waves	**Pulser/receiver**	340 × 215 × 215 mm
Resonance freq.	1 MHz	**Switchbox**	200 × 200 × 400 mm
Wave modes	Compressional P, shear S1 and S2	**Operating range**	5 – 40 °C, indoor use
Protection	IP53 — coupling gel supplied	**Power supply**	100 – 240 VAC, 50/60 Hz

Applications

Where the AVS-A delivers value

Tunnelling & TBM

Dynamic moduli for geomechanical modelling of reservoirs and underground works

Mining

Rock-mass characterisation for mining geomechanics and slope studies

Civil Engineering

Calibration of seismic data with laboratory velocities on cores

Quarrying & Aggregates

Petrophysical correlations between Vp, Vs and porosity, anisotropy

Geomechanics R&D

Dynamic vs static moduli comparison studies in research laboratories

Field & Lab Use

Non-destructive QC of cores prior to triaxial or compression tests

floXlab

ROCK MECHANICS • ACOUSTIC TESTING

AVS-0

Overburden Acoustic Velocity System

Acoustic velocity measurement under confining pressure — ASTM D2845

AVS-0 — 300 kN compression frame coupled to acoustic triaxial cell

Geotechnical & Rock Mechanics Testing Equipment

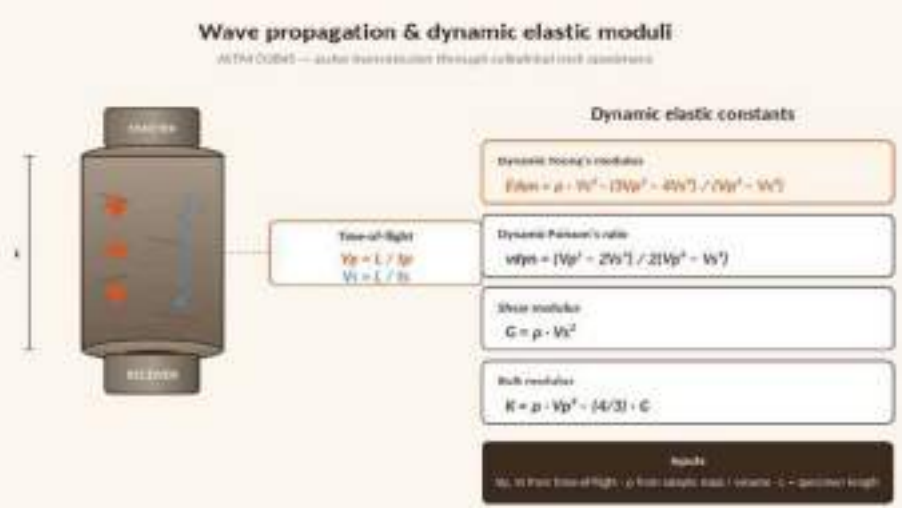
Overview

Acoustic triaxial system for dynamic rock characterisation

- Propagation of P, S1 and S2 acoustic waves through cores
- Confining pressure up to 10,000 psi (70 MPa)
- Automated computation of velocities & dynamic moduli
- High-pressure acoustic cell + 300 kN compression frame
- Fast pulser-receiver — ultrasonic excitation at 1 MHz
- High-speed A/D converter for clean waveform capture
- Computer-controlled with intuitive Floxlab software
- Compliant with ASTM D2845 standard

Measurement Principle

Pulse transmission — ASTM D2845



How the test works

- Cylindrical core machined and centred in HOEK cell
- Acoustic gel applied at both transducer faces
- Pulser excites at 1 MHz, P or S mode
- Receiver captures the transmitted waveform
- Time-of-flight tp and ts measured
- Vp = L/tp, Vs = L/ts → dynamic moduli computed

Why it matters

Non-destructive elastic characterisation of cores under realistic stress — feeds geomechanical modelling, reservoir & rock-mass studies

System Architecture

Four integrated subsystems

1 Compression Frame

Hydraulic frame applies axial load

- Servo-hydraulic actuator 300 kN
- Modes: force, displacement, stress, strain
- Hydraulic pressure up to 20 MPa, 1 L/min
- Ethernet interface to acquisition PC

2 Acoustic Triaxial Cell

HOEK-type high-pressure cell

- Steel cylinder, threaded removable end caps
- Two seated acoustic platens (P, S1, S2)
- Confining pressure up to 70 MPa (10,000 psi)
- Heating mantle option up to 120 °C

3 Acoustic Pulser-Receiver

Ultrasonic excitation & conditioning

- High energy & gain for attenuating materials
- Suited to low-frequency geological samples
- Auto P / S1 / S2 wave selection box
- High-speed A/D converter — clean signal capture

4 Data Acquisition System

PC + proprietary Floxlab software

- Fully automated acquisition and control
- Logging & display of P, S1, S2 waveforms
- Compressional & shear velocities computed
- Determination of dynamic elastic constants

Technical Specifications

Axial load	300 kN	**Wave types**	P, S1 and S2
Confining pressure	up to 70 MPa (10,000 psi)	**Temperature**	Ambient (heating to 120 °C, opt.)
Specimen Ø	1.5 in (38.1 mm) — others on request	**Wetted parts**	Stainless steel
Specimen length	Twice the diameter	**Power supply**	110 – 220 VAC, 50/60 Hz
Frequency	1 MHz	**Standard**	ASTM D2845

Unique design — rapid specimen change without draining the confining fluid

floXlab

ROCK MECHANICS • FRACTURE TOUGHNESS TESTING

FTA

Fracture Toughness Apparatus

Chevron-notch three-point bend testing on rock core specimens

FTA — 10 kN servo-controlled press, ISRM Level I & II compliant

Geotechnical & Rock Mechanics Testing Equipment

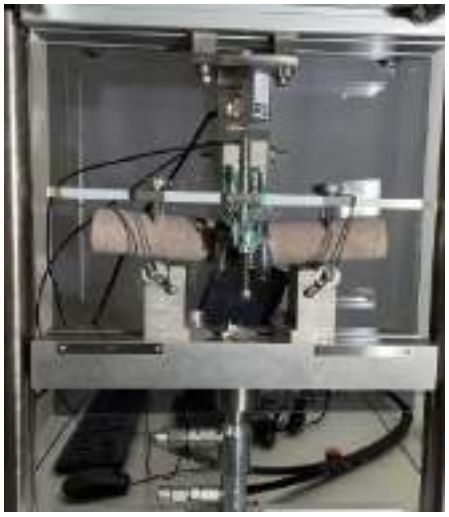
Overview

Purpose-built apparatus for rock fracture toughness measurement

- Determines fracture toughness — resistance to crack propagation
- Chevron-notched core in three-point bend configuration
- ISRM Suggested Method — Level I & Level II evaluation
- 10 kN servo-controlled press with high-precision load cell
- Continuous monitoring of LOAD, LPD and CMOD
- Two LVDT transducers + clip-on gauge synchronized
- Computer-controlled with Floxlab software & reporting
- Specimens of 54.7 mm and 4-inch diameter

Test Principle

Chevron-bend method for stable crack propagation



1 LOAD
Measured by a 10 kN load cell with ± 0.5 % accuracy

2 LPD
Load-point displacement measured by two LVDT transducers

3 CMOD
Crack-mouth opening displacement measured by a clip-on gauge

K_IC values derived from LOAD, LPD and CMOD

Stable crack propagation along the chevron ligament — ISRM Method 1 (Chevron Bend)

System Architecture

Four integrated subsystems

1 10 kN Hydraulic Press

Rigid bench-top press

- Fixed crosshead with two stiff lateral columns
- Hydraulic actuator integrated in lower crosshead
- Rapid piston displacement for positioning
- Precise & controlled loading during testing

2 10 kN Load Cell

High-precision force sensing

- Direct, real-time axial force reading
- Maximum load: 10 kN
- Accuracy: ± 0.5 % of full scale
- Direct interface with data acquisition station

3 3-Point Bend Fixture

ISRM Method 1 (Chevron Bend)

- Holds chevron-notched core in 3PB setup
- Specimens of 54.7 mm and 4-inch diameter
- Two support rollers + one loading roller
- Easy and fast specimen installation

4 Fracture Toughness Software

Floxlab proprietary software

- Predefined templates for fast execution
- Automatic K_IC Level I & Level II computation
- Real-time graphs of LOAD, LPD and CMOD
- Professional test report generation

Technical Specifications

Standard	ISRM Suggested Method	**Vertical clearance**	310 mm
Compression rating	10 kN (1 ton)	**Load cell accuracy**	± 0.5 % full scale
Specimen Ø	54.7 mm and 4 inches	**Load cell sensitivity**	approx. 2 mV/V
Specimen length	16 inches	**Weight**	250 kg
Horizontal clearance	500 mm	**Power supply**	220 VAC, 50 Hz

Step-by-step user-guided workflow — from sample setup to professional K_IC report

floXlab

LP700

Liquid Permeameter

Steady-State Liquid Permeability Measurement on Core Samples

Product Overview

What the LP700 does — and how it's built

The LP700 is a steady-state liquid permeameter for accurate permeability measurement on core plug samples. It combines a high-pressure injection pump, a hydrostatic coreholder, dual differential-pressure transducers and a back-pressure regulator on a compact bench-top frame — all driven from a PC supervision station running the Applilab software.

Key Features

01

Steady-State Method

Direct application of Darcy's law on saturated cores.

02

Constant Flow Injection

Dual-cylinder pump up to 25 cc/min.

03

High-Pressure Capability

Confining, pore & back pressure o 10,000 psi.

04

Dual ΔP Range

Two transducers: ±50 psi & ±500 psi for wide K range.

05

Back Pressure Regulator

Stable outlet pressure for clean measurement.

06

Software Acquisition

Applilab — real-time, automatic, Excel export.

Technical Specifications

Parameter	Value
Measurement type	Liquid steady-state (Darcy)
Confining pressure	0 – 10,000 psi
Pore pressure	0 – 10,000 psi
Back pressure	0 – 10,000 psi
Flow rate	0 – 25 cc/min (HPLC)

Parameter	Value
Pressure transducers	10,000 psi — 0.1% FS
Differential transducers	Validyne ±50 / ±500 psi
Specimen diameter	1" or 1.5"
Specimen length	Twice the diameter
Power supply	110/220 VAC, 50/60 Hz

Principle & Applications

How it works — and where it delivers value

Measurement Principle — Darcy's Law

$$K = (Q \cdot \mu \cdot L) / (\Delta P \cdot A)$$

K – permeability (mD) • Q – flow (cc/min) • μ – viscosity (cP) • L – length (mm) • ΔP – pressure drop (psi) • A – section (cm^2)

1 Saturate
Core fully saturated with the test liquid is unted in the coreholder.

2 Confine
Confining pressure seals the sleeve against the rock specimen.

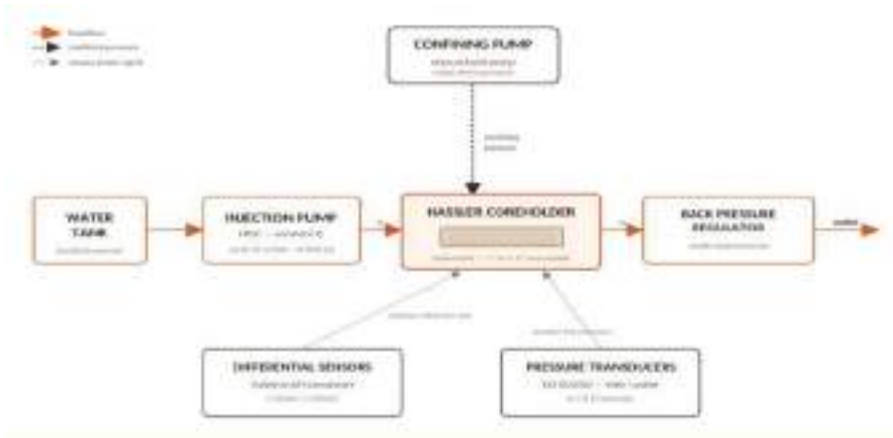
3 Inject
Injection pump delivers fluid at constant low rate Q.

4 Regulate
Back-Pressure Regulator holds the outlet pressure constant.

5 Stabilize
Steady-state regime: ΔP across the core stabilizes.

6 Compute
K is computed directly from Darcy's law.

System Schematic



Applications

Conventional Reservoirs
Routine absolute K on sandstone & carbonate cores.

Enhanced Oil Recovery
Baseline K before/after EOR fluid injection studies.

Carbon Storage (CCS)
K of reservoir & seal layers for CO_2 injection.

Aquifer & Hydrogeology
K of aquifer rocks for groundwater modeling.

Academic Research
Petrophysical characterization of porous media.

Quality Control
Routine QC of preserved or restored cor amples.

floXlab

Original

Cerchar Apparatus

Determination of the Cerchar Abrasivity Index on Rock Samples

Cerchar Original — fully mechanical hard-rock abrasivity tester

Geotechnical & Rock Mechanics Testing Equipment

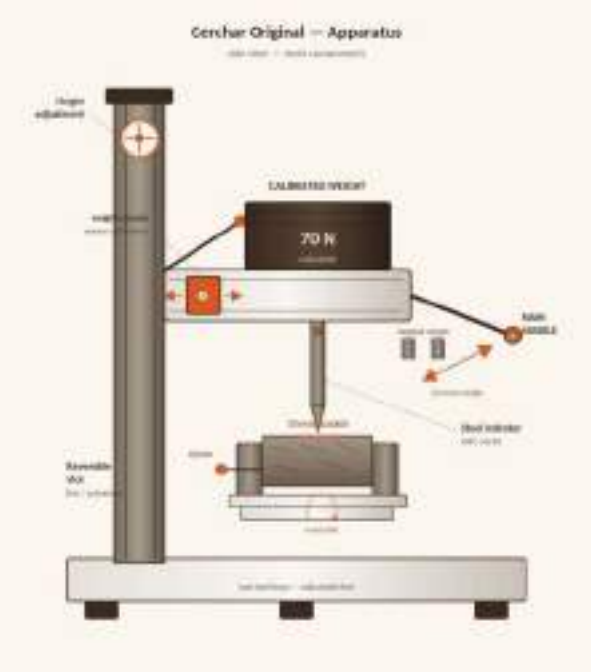
Overview

What the Cerchar Original does, in brief

- Cerchar abrasivity test for hard-rock samples
- Determines the Cerchar Abrasivity Index (CAI)
- 70 N adjustable load — fine-tuned by chariot
- HRC 54/56 indenter hardness — replaceable
- 10 mm scratch length on the rock surface
- Specimens up to Ø 76 mm × H 150 mm
- Fully mechanical — no power, air or hydraulics
- Compliant with ASTM D7625, NF P94-430-1, ISRM

Main Components

Side view — annotated diagram



Steel Indenter

HRC 54/56 hardened pin, replaceable

Calibrated Weight

70 N adjustable — fine-tuned by chariot

Reversible Vice

Flat or cylindrical specimens, up to Ø 76 mm

Main Handle

Drives the indenter through 10 mm stripe

Height Adjustment

Arm height adjustment for specimens

Base Plate

Cast steel frame, levelled with feet

Measurement Principle

Cerchar method — abrasivity by indenter wear

How the test works

- A sharp pin is pressed against fresh rock
- 70 N load applied via dead weight
- Main handle drives a precise 10 mm stripe
- Pin wears in proportion to abrasivity
- Wear flat diameter d measured under microscope
- 5+ stripes averaged to compute CAI

Technical Specifications

Test method	Cerchar abrasivity — indenter wear	**Indenter material**	Steel — Rockwell HRC 54/56
Standards	ASTM D7625-10, NF P94-430-1, ISRM	**Total weight**	25 kg
Indenter load	70 N adjustable (calibrated by chariot)	**Dimensions**	260 × 460 × 375 mm
Scratch length	10 mm	**Operating range**	5 – 40 °C, indoor use
Specimen Ø max	76 mm (3 in)	**Power supply**	None — fully mechanical
Specimen H max	150 mm (6 in)	**Optional accessories**	Sharpening tool, microscope

Applications

Where the Cerchar Original delivers value

Tunnelling & TBM

Cutter wear prediction for tunnel boring machines and underground excavation

Mining

Drill bit and tool wear assessment for hard-rock mining

Civil Engineering

Hard-rock excavation feasibility for underground construction

Quarrying & Aggregates

Tool selection and wear forecast for rock processing

Geomechanics R&D

Rock characterization and abrasivity ranking in research labs

Quality Control

Routine QC of cutting tools and certified rock specimens

floXlab

West

Cerchar Apparatus

Determination of the Cerchar Abrasivity Index on Rock Samples

West Cerchar apparatus — fully mechanical hard-rock abrasivity tester

Geotechnical & Rock Mechanics Testing Equipment

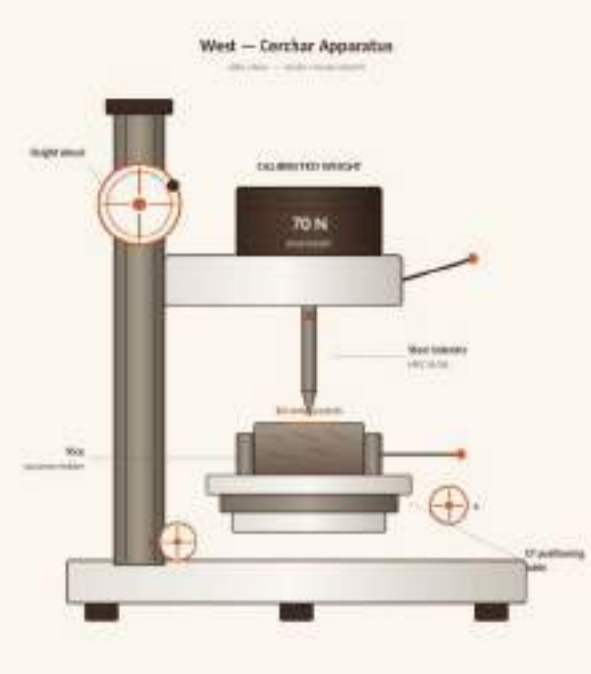
Overview

What the West does, in brief

- Cerchar abrasivity test for hard-rock samples
- Determines the Cerchar Abrasivity Index (CAI)
- 70 N constant load on a steel indenter
- HRC 54/56 indenter hardness — replaceable
- 10 mm scratch length on the rock surface
- Specimens up to Ø 76 mm × H 150 mm
- Fully mechanical — no power, air or hydraulics
- Compliant with ASTM D7625, NF P94-430-1, ISRM

Main Components

Side view — annotated diagram



Steel Indenter

HRC 54/56 hardened pin, replaceable

Calibrated Weight

70 N constant dead-weight load

Vice + Specimen

Holds rock up to Ø 76 mm × H 150 mm

XY Positioning Table

Draws the precise 10 mm scratch

Height Wheel

Manual vertical adjustment to specimen

Base Plate

Cast steel frame, levelled with feet

Measurement Principle

Cerchar method — abrasivity by indenter wear

How the test works

- A sharp pin is pressed against fresh rock
- 70 N load applied via dead weight
- XY table draws a 10 mm stripe
- Pin wears in proportion to abrasivity
- Wear flat diameter d measured under microscope
- 5+ stripes averaged to compute CAI

Technical Specifications

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Standards	ASTM D7625-10, NF P94-430-1, ISRM	**Total weight**	25 kg
Indenter load	70 N (calibrated dead weight)	**Dimensions**	260 × 460 × 375 mm
Scratch length	10 mm	**Operating range**	5 – 40 °C, indoor use
Specimen Ø max	76 mm (3 in)	**Power supply**	None — fully mechanical
Specimen H max	150 mm (6 in)	**Optional accessories**	Sharpening tool, microscope

Applications

Where the West delivers value

Tunnelling & TBM

Cutter wear prediction for tunnel boring machines and underground excavation

Mining

Drill bit and tool wear assessment for hard-rock mining

Civil Engineering

Hard-rock excavation feasibility for underground construction

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floXlab

PDP200

Pulse Decay Permeameter

High-Pressure Permeability Measurement for Tight Rocks

PRODUCT BROCHURE

Floxlab • Geotechnical & Rock Mechanics Testing Equipment

Product Overview

What the PDP200 does — and how it's built

The PDP200 is a fully automated pulse decay permeameter for accurate, high-pressure permeability measurement of low-permeability rock cores. It combines a robust high-pressure coreholder, calibrated upstream/downstream gas reservoirs and a thermostatic enclosure in a single platform — all driven from a PC supervision station. Compliant with API RP 40.

Key Features

01

Pulse Decay Method

Transient analysis for ultra-low permeability.

02

High Confining Pressure

Up to 10,000 psi (≈ 70 MPa).

03

Pore Pressure Control

Up to 3,000 psi (≈ 21 MPa) with N_2.

04

Thermostatic Stability

Stable temperature inside enclosure.

05

Automated Sequencing

Software-driven valves & pulses.

06

Remote Supervision

Operate, monitor and acquire fr

Technical Specifications

Parameter	Value
Standards	API RP 40 (Core Analysis)
Permeability range	0.1 µD to 0.1 mD
Max confining pressure	10,000 psi (≈ 70 MPa)
Max pore pressure	3,000 psi (≈ 21 MPa) — N_2
Specimen diameter	1" or 1.5"

Parameter	Value
Specimen length	Twice the diameter
Air supply	100 psi compressed air
Power supply	220 VAC ±10%, 60 Hz, 500 W
Overall dimensions	90 × 150 × 60 cm
Weight	80 kg

Principle, Software & Applications

How it works — and where it delivers value

Pulse Decay Principle

1

Pressurize

Reservoirs and sample equilibrate at pore pressure.

2

Apply Pulse

Small ΔP applied upstream across the sample.

3

Decay

Gas migrates — P1 drops, P2 rises.

4

Compute

ΔP decay rate is fitted t ompute permeabili

```
k = f ( ΔP decay rate, sample geometry, fluid properties )
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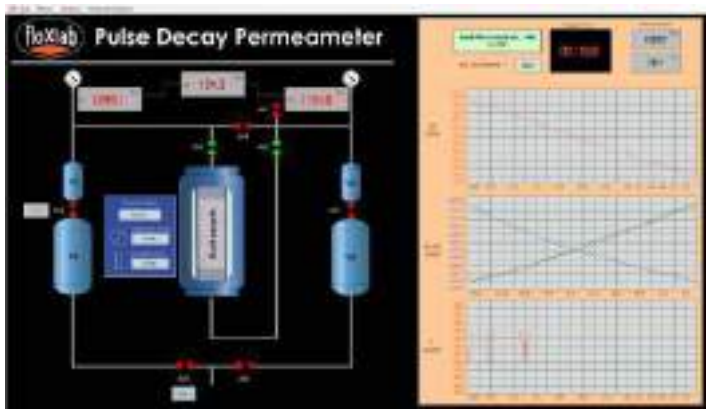
Software & Measurement



Applilab interface

- Real-time P1, P2 and ΔP
- Automated valve sequencing
- Live charts & temperature
- Configurable stop threshold
- Automatic permeability calc.
- Volume calibration routine
- Historical data archive
- Export & reporting

Applications

Oil & Gas Reservoirs

Tight gas, shale gas & unconventional reservoirs.

Carbon Storage (CCS)

Caprock integrity & seal evaluation for .

Geomechanical Studies

Stress–permeability coupling, damage ractures.

Academic Research

Petrophysical characterization in laboratories.

Nuclear Waste Repositories

Host rock & engineered barriers under stress.

Cement & Concrete

Gas permeability of low-porosity materials.

floXlab

PLT100

Point Load Tester

Determination of the Point Load Strength Index Is(50) and UCS estimate

PLT100 — two-column hydraulic press with carrying case

Geotechnical & Rock Mechanics Testing Equipment

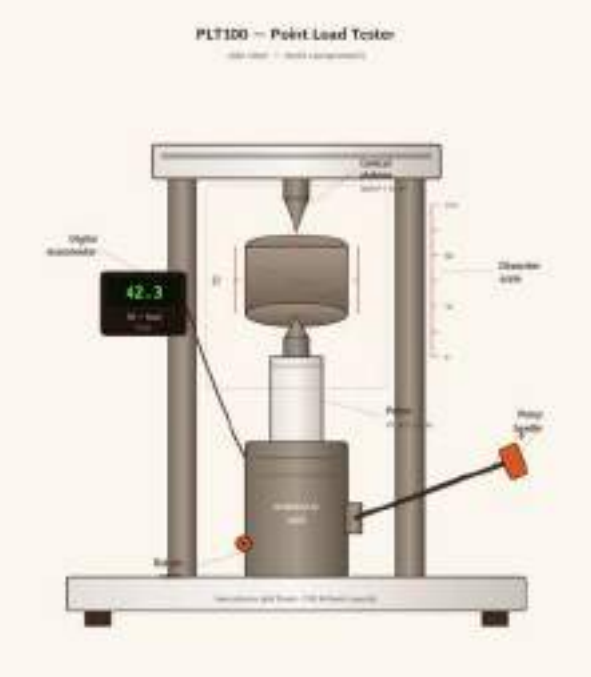
Overview

What the PLT100 does, in brief

- Quick rock strength test on cores or lumps
- Determines Point Load Strength Index Is(50)
- 100 kN load capacity — manual hydraulic press
- Conical platens — stainless steel, replaceable
- Digital manometer with peak-load capture
- Diametral, axial, block & irregular lump tests
- Compact bench-top — 42 kg, with carrying case
- Compliant with ASTM D5731 & 2006/42/EC

Main Components

Side view — annotated diagram



Conical Platens

Upper fixed + lower on piston, stainless steel

Hydraulic Jack

Manual pump — up to 10 kpsi actuator pressure

Piston

90 mm stroke — clearance 185 × 140 mm

Digital Manometer

Live load reading in kN with PEAK capture

Diameter Scale

Graduated ruler — reads specimen diameter D

Return Valve

Releases pressure to lower the piston safely

Measurement Principle

Point Load Test — ASTM D5731

Measure P
peak load
at failure

→

Compute Is
Is = P / De²
uncorrected

→

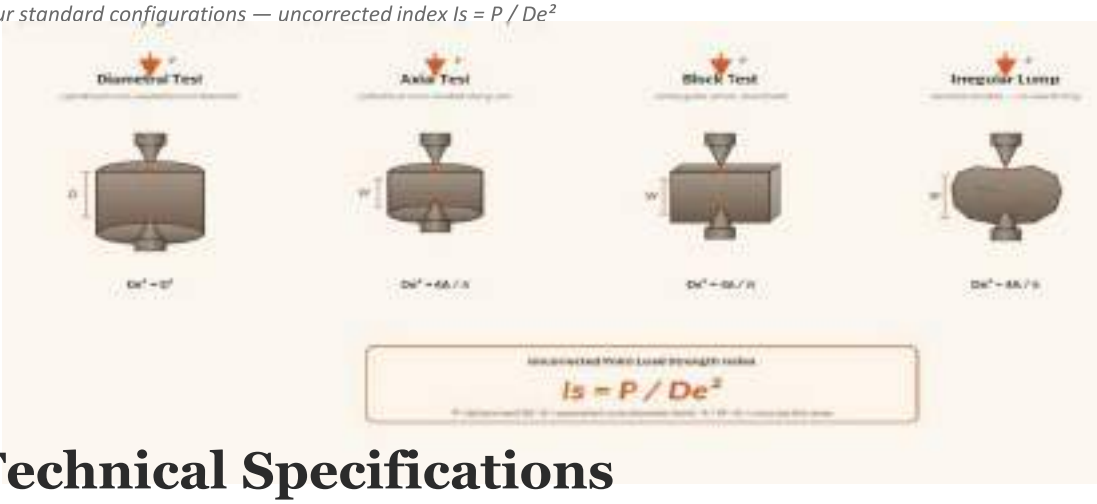
Size correction
Is(50)
to Ø 50 mm

→

UCS estimate
UCS ≈ k · Is(50)
k ≈ 22 – 24

Test Types

Four standard configurations — uncorrected index Is = P / De²



Technical Specifications

Test method	Point Load Test — ASTM D5731	**Platens material**	Stainless steel — conical
Standards	ASTM D5731, 2006/42/EC	**Total weight**	42 kg
Load capacity	100 kN max	**Dimensions**	280 × 300 × 560 mm
Actuator pressure	10 kpsi max	**Operating range**	5 – 40 °C, indoor use
Press clearance	185 × 140 mm	**Power supply**	2 × AA (manometer only)
Piston stroke	90 mm	**Optional fixtures**	Brazilian, block punch index

Applications

Where the PLT100 delivers value

Tunnelling & TBM

Quick UCS estimate for hard-rock excavati easibility studies

Mining

Rock strength screening of cores and lumps from exploration drilling

Civil Engineering

Site investigation, foundation design and ground classification

Quarrying & Aggregates

QC of extracted material and sorting by strength

Geomechanics R&D

Rock strength characterization and anisotropy studies

Field & Lab Use

Compact, portable & battery-powered — ready for the field

floXlab

SDIM

Slake Durability Index Machine

Assessment of rock weathering & abrasion resistance

SDIM — twin-drum bench-top apparatus for slake durability testing

Geotechnical & Rock Mechanics Testing Equipment

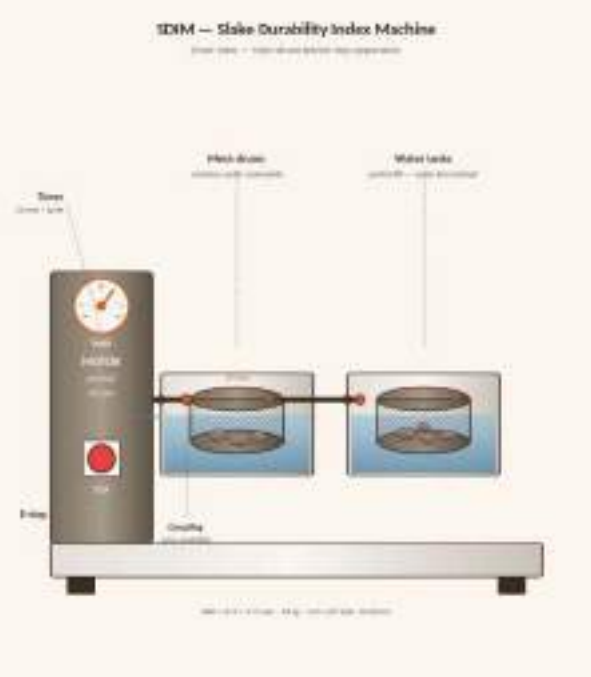
Overview

What the SDIM does, in brief

- Twin-drum slake durability test for weak rocks
- Determines the Slake Durability Index Id2
- Two desiccation–imbibition cycles per ASTM D4644
- Two stainless mesh drums, removable
- 20 rpm rotation with timer-controlled cycle
- Partially submerged drums — water tanks with line
- Compact bench-top — 18 kg, plug & play
- Compliant with ASTM D4644 & ISRM Suggested Method

Main Components

Front view — annotated diagram



Mesh Drums

Two stainless drums — easy removal & cleaning

Water Tanks

Two tanks with marked water line — partial fill

Drive Motor

230 VAC, 20 rpm constant rotation

Timer Knob

10-minute cycle setpoint — auto-stop

Coupling & Locking Pins

Easy assembly between drum and motor

Emergency Stop

Immediate halt of rotation, mushroom button

Measurement Principle

Slake durability test — ASTM D4644

How the test works

- 10 rock fragments weighed dry — m1
- Loaded in mesh drums, partially submerged
- 10 min rotation at 20 rpm (cycle 1)
- Recovered, oven-dried & re-weighed
- Second wetting–rotation–drying cycle
- Id2 = mass retained after 2 cycles, in %

Technical Specifications

Test method	Slake durability — ASTM D4644	**Output**	Index Id2 (% retained)
Standards	ASTM D4644, ISRM Suggested Method	**Total weight**	18 kg
Test cycle	Two desiccation–imbibition cycles	**Dimensions**	680 × 275 × 175 mm
Rotation speed	20 rpm	**Operating range**	5 – 40 °C, indoor use
Cycle duration	10 minutes per cycle	**Power supply**	110 – 230 VAC, 50/60 Hz
Drum capacity	Two stainless mesh drums (removable)	**Safety**	E-stop + locking pins on drums

Applications

Where the SDIM delivers value

Tunnelling & TBM

Weathering forecast for tunnels and underground excavations in shales and mudstones

Mining

Waste-rock characterisation and slope stability for open-pit mining

Civil Engineering

Site investigation in weak sedimentary rocks — embankments, foundations

Quarrying & Aggregates

Aggregate durability check for road, railway and dam construction

Geomechanics R&D

Weathering and disintegration studies of weak rocks in research labs

Field & Lab Use

Routine QC of cuttings and core samples in service laboratories

floXlab

HIGH PRESSURE LABORATORY INSTRUMENTS

Load Frame Rock Compression Test Systems Portfolio

From educational benchtop testers
to research-grade dynamic triaxial systems

GEOLAB

300 kN · 70 Mpa . Ambient T

Educational Rock Compression Tester — entry-level benchtop for universities & training labs.

ROCKTEST

1,000 kN · 70 MPa · 150°C

Industrial workhorse — uniaxial, triaxial, permeability in one frame.

MECATEST 3000

3,000 kN · 70 MPa · 150°C

Premium system for high-strength rock up to Ø 160 ores.

GEOTEST

1,000–2,000 kN · 70/140/210 MPa

Research-grade static + dynamic triaxial with AE a draulic fracturing.

GEOTEST EXPRESS

1,000–2,000 kN · 70/140/210 MPa

Production-oriented box-frame with automated cell ifting for fast throughput.

LOAD FRAME FIXTURES

HOEK · QRC · UTC · Polyaxial

Shared accessories library — interchangeable fixtures cross the entire range.

Versatile · Rigorous · Traceable — from Ø 1" cores to Ø 160 mm plugs, 300 kN to 3,000 kN

POSITIONING

Product Positioning Matrix

Axial load capacity vs. application profile

AXIAL LOAD CAPACITY →

3,000 kN *Industrial*	**MECATEST 3000**	*High-capacity · Ø up to 160 mm*
1-2,000 kN *Research*	**GEOTEST / EXPRESS**	*Dynamic regime · 70/140/210 MPa*
1,000 kN *Industrial*	**ROCKTEST**	*Industrial workhorse*
300 kN *Educational*	**GEOLAB**	*Benchtop · universities*

APPLICATION PROFILE: Education & Training → QA/Industrial → R&D Standard → R&D Advanced + AE/HF → Dynamic Research

Each platform is optimised for a specific application profile — from student training to dynamic geomechanics research. All systems share common fixtures (HOEK, QRC, UTC cells, Brazilian jaws, polyaxial) and run the same Floxlab GEOTEST control software.

CAPABILITIES

Test Capabilities Comparison

What each platform can measure — standard ✓, optional ○, not available —

Test / Capability	GEOLAB	ROCKTEST	MECATEST	GEOTEST	EXPRESS
Uniaxial Compression (UCS)	✓	✓	✓	✓	✓
Triaxial Compression	✓	✓	✓	✓	✓
Indirect Tension (Brazilian)	✓	✓	✓	○	○
Point Load Strength Index	✓	—	—	—	—
Acoustic Velocity (P, S1, S2)	✓	✓	✓	✓	✓
Strain gauges / Deformation sensors	✓	✓	✓	✓	✓
Liquid Permeability	—	✓	✓	✓	✓
Pore Pressure Control	—	✓	✓	✓	✓
High-Temperature (150 °C)	—	✓	✓	✓	✓
Dynamic / Cyclic Loading	—	—	—	✓	✓
Acoustic Emission (AE)	—	—	—	✓	✓
Hydraulic Fracturing	—	—	—	✓	✓
Electrical Resistivity	—	—	—	✓	✓
Polyaxial (σ1≠σ2≠σ3)	—	✓	—	✓	—

✓ Standard ○ Optional module — Not available

EDUCATIONAL

GEOLAB

Servo-controlled 300 kN benchtop rock compression tester — ASTM compliant

KEY SPECIFICATIONS

300 kN
Max Axial Load

70 MPa
Confining Pressure

592 MPa
Stress on 1" sample

Ø 1"/1.5"
Sample Diameter

POSITIONING

Entry-level platform for universities, geotechnical schools and training labs. Compact, servo-controlled, ASTM-certified and fully modular — students perform five different rock tests on a single frame.

FIVE TESTS — ONE FRAME

Triaxial Compression

Failure envelope, cohesion, friction angle — ASTM D7012.

Compatible with HOEK cell

Uniaxial Compression (UCS)

UCS, Young's modulus, Poisson's ratio — ASTM D7012.

Acoustic Velocity

P-wave, S1 & S2 under triaxial conditions — ASTM D2845.

Brazilian Indirect Tension

Tensile strength — ASTM D3967.

Point Load Strength Index

Rapid field-applicable index — ASTM D5731.

Modular Fixtures

Configure progressively as your curriculum grows.

INDUSTRIAL

ROCKTEST

1,000 kN servo-controlled compression frame with automated confining pressure

KEY SPECIFICATIONS

1,000 kN
Axial Load

70 MPa
Confining Pressure

150 °C
Max Temperature

Ø up to 54.7mm
Sample diameter

POSITIONING

Rock compression system for both uniaxial and triaxial testing. Fixed crosshead on four stiff columns delivers extreme rigidity. High-frequency servo-valve provides precise flow regulation. Automated multi-stage triaxial tests eliminate operator variability.

FSIX MEASUREMENT FAMILIES

Triaxial Compression

UCS, triaxial strength, Mohr-Coulomb envelope, E and v.

Compatible with HOEK cell , Quick Release Cell and Universal cell

Uniaxial Compression (UCS)

UCS, Young's modulus, Poisson's ratio — ASTM D7012.

Acoustic velocity

P, S1 & S2 waves, dynamic moduli — 1 MHz, ASTM D2845.

Brazilian Indirect Tension

Tensile strength — ASTM D3967 / ISRM.

Permeability

Liquid permeability 0.01 mD – 1 Darcy, pore pressure control.

Polyaxial (σ1≠σ2≠σ3)

Three independent principal stresses via polyaxial fixture.

PREMIUM

MECATEST 3000

The 3,000 kN reference for high-strength rock and oversized cores

KEY SPECIFICATIONS

3,000 kN
Max Load

70 MPa
Confining Pressure

150 °C
Max Temperature

Ø 54.7 to 160 mm
Max Specimen

POSITIONING

Heavy-duty four-column frame minimises compliance errors — critical for accurate elastic modulus. Compatible with specimens from Ø 54.7 mm up to Ø 160 mm: NX, HQ and oversized industry-standard sizes.

FIVE MEASUREMENT FAMILIES

Triaxial Compression

UCS, triaxial strength, Mohr-Coulomb envelope, E and v.

Compatible with HOEK cell , Quick Release Cell and Universal cell

Uniaxial Compression (UCS)

UCS, Young's modulus, Poisson's ratio — ASTM D7012.

Acoustic velocity

P, S1 & S2 waves, dynamic moduli — 1 MHz, ASTM D2845.

Brazilian Indirect Tension

Tensile strength — ASTM D3967 / ISRM.

Permeability

Liquid permeability 0.01 mD – 1 Darcy, pore pressure control.

High temperature

high-temperature capability with 150 °C heating mantle.

RESEARCH

GEOTEST

Research-grade dynamic triaxial system — static & dynamic regimes

KEY SPECIFICATIONS

1–2,000 kN
Axial Load

70-210 MPa
Confining (max)

Static
+ Dynamic regime

4-column
Open frame

POSITIONING

High stiffness 4-column load frame (1,000 or 2,000 kN) with balanced triaxial cell. Ultra-high-speed control for dynamic waveforms at cyclic frequencies. Programmable sinusoidal, triangular and rectangular signals for fatigue testing.

ADVANCED MEASUREMENT MODULES

Acoustic Emission (AE)

Real-time microcracking events — damage mapping, failure location.

Hydraulic Fracturing

Breakdown pressure, fracture propagation and closure.

Electrical Resistivity

Tracks saturation and fluid transport during loading.

Liquid Permeability

Steady-state & transient — 0.01 mD to 1 Darcy range.

Acoustic Velocity (P & S)

Vp, Vs1, Vs2 throughout loading — dynamic moduli.

Polyaxial (σ1≠σ2≠σ3)

Three independent principal stresses via polyaxial fixture.

PRODUCTION

GEOTEST EXPRESS

All GEOTEST capabilities in a box-frame design with automated cell lifting

KEY SPECIFICATIONS

1–2,000 kN
Axial Load

70-210 MPa
Confining (max)

Box-Frame
Enclosed design

Auto-Lift
Cell handling

POSITIONING

Box-type rigid frame offers enhanced safety shielding and greater stiffness than open 4-column designs. Automated push-button cell lifting accelerates turn-around and reduces operator fatigue. Optimised for high-volume labs running repetitive characterisation campaigns.

KEY DIFFERENTIATORS

Box-Type Rigid Frame

Enclosed structure with safety shielding and greater stiffness.

Push-Button Cell Lifting

Automated system — faster turn-around, reduced operator fatigue.

Same Test Capabilities

All GEOTEST modules: AE, HF, permeability, acoustic, resistivity.

Production Throughput

Optimised for high-volume core plug characterisation.

Cell Ratings

70 / 140 / 210 MPa · diameters 1"–55 mm or 55–100 mm.

Materials

Stainless steel or Inconel wetted parts.

SHARED LIBRARY

Triaxial Cells & Test Fixtures

Interchangeable across GEOLAB · ROCKTEST · MECATEST · GEOTEST

HOEK Cell

Ø 42 – 54.7 mm (Type 2) · Ø 63.5 – 100 mm (Type 3) · 70 MPa · ambient.
GEOLAB · ROCKTEST · MECATEST

QRC Triaxial Cell

Ø 38.1 – 54.7 mm · 70 MPa · 150 °C · 3× radial LVDTs + 1 axial · quick-release.
ROCKTEST · MECATEST

UTC Universal Cell

Ø 55 – 100 mm full-diameter plugs · 70 MPa · 150 °C · acoustic-velocity compatible.
ROCKTEST · MECATEST

Balanced Triaxial

Ø 1"–55 mm or 55–100 mm · 70 / 140 / 210 MPa · stainless or Inconel · balanced piston.
GEOTEST · GEOTEST EXPRESS

TEST FIXTURES

UCP — Uniaxial Compression

LVDT + circumferential extensometer. 100 mm or 160 mm platens.
UCS, E, ν.

ITB — Brazilian Tension

Diametral jaws with spherical bearing. Ø 54.7 / 63.5 / 76.2 / 85 / 100 / 150 mm.

Polyaxial Fixture

Three independent σ1 ≠ σ2 ≠ σ3 via flat jacks. AE + acoustics + HF option.

Triaxial Cell Trolley

Mobile lifting + ergonomic worktable for mount/dismount. Lockable casters.

CONTROL & SUPERVISION

Floxlab GEOTEST Software

One proprietary software — every system in the portfolio

KEY BENEFITS

- **Learn it once, deploy it everywhere**
- Eliminate operator variability via pre-programmed test sequences
- Repeatable multi-stage triaxial protocols
- Automated professional PDF report per test
- Reduced training burden — single interface for all frames
- Full traceability: raw data + set-points + computed parameters

01

Synoptic Overview

Live system status at a glance — every component color-coded.

02

Measurement Display

Real-time load, stress, strain and velocity readouts.

03

Trend Curves

Live graphical curves — stress-strain, umetric, Mohr envelope.

04

Set-Point Control

Enter or adjust target values live during the test.

05

Macro Commands

Program automated stress & strain paths — multi-stage.

06

Excel Reports

Export professional test reports with one click.

COMPLIANCE & MARKETS

Standards & Target Sectors

Internationally recognised methods · served industries

INTERNATIONAL STANDARDS

ASTM D7012

Compressive strength and elastic moduli of rock

API RP 40

Rock permeabilities

ASTM D2845

Laboratory determination of acoustic wave velocities

ASTM D3967

Splitting tensile strength — Brazilian test

ASTM D5731

Point Load Strength Index of rock

ISRM SM

Full suite of ISRM Suggested Methods

TARGET SECTORS

Oil & Gas

Reservoir geomechanics, wellbore stability, hydraulic fracturing design, core analysis.

Mining

Ore body characterisation, pillar design, slope stability, underground excavation.

Geothermal

Thermo-hydro-mechanical characterisation, EGS reservoir design, caprock integrity.

Civil & Geotech

Tunnel design, dam foundations, slope stability, seismic response of rock masses.

CCS / Carbon

Caprock integrity, injectivity, fracture onset, long-term monitoring via AE.

Academic & Research

Fracture mechanics, fatigue, constitutive models, method development.

GEOTEST *Express*

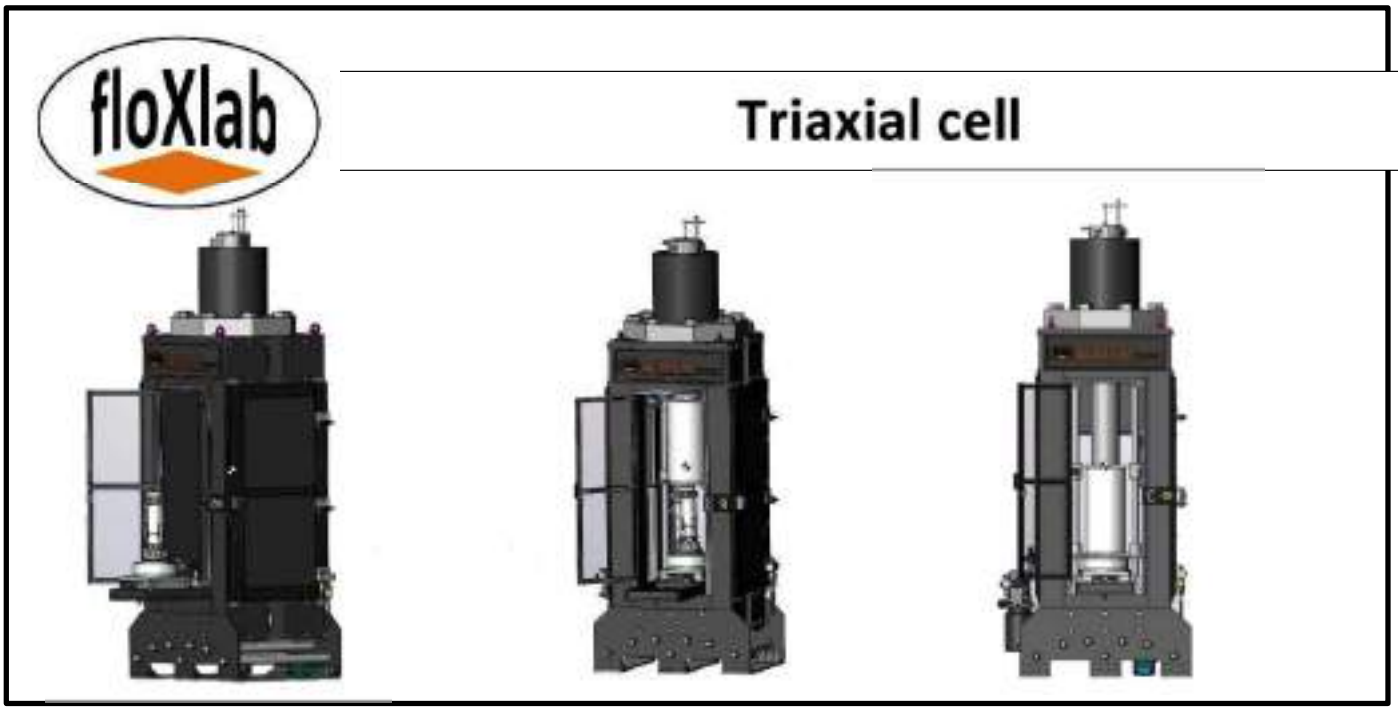
floXlab

- Triaxial testing of rock samples as per ASTM & ISRM specifications
- Capable of performing complete triaxial test cycle – from initialization to completion – including multi-stage testing procedures quickly and effortless
- Doubles the number of tests achievable per day
- Significantly shortens preparation time between the tests
- Axial load up to 2,000 kN
- Up to 210 MPa cell pressure capacity

OVERVIEW

The GEOTEST EXPRESS Rock Triaxial Testing Systems, is engineered to deliver unmatched precision, reliability and efficiency in rock mechanic's research. Built upon decades of technical refinement, the system embodies a highly mature design that has evolved though successive engineering iterations to achieve optimal structural and operational performance. Combined with streamlined manufacturing processes, the GEOTEST EXPRESS stands as a benchmark for engineering excellence, testing efficiency, and cost-effective performance in the field of rock characterization.

The FLOXLAB GEOTEST EXPRESS is a closed-loop, digitally servo-controlled triaxial testing apparatus designed for high-precision execution of triaxial and unconfined compression tests on rock specimens. The system enables accurate control of stress and strain parameters, ensuring repeatable and reliable results under various loading conditions. In addition to conventional triaxial applications, it is engineered to perform permeability evaluation, hydraulic fracturing, acoustic velocity, acoustic emission and electrical resistivity measurements, and other advanced rock mechanics investigations requiring precise load, pressure, and deformation control



An automatic hydraulic lift and sliding base are integrated into the GEOTEST EXPRESS system to provide rapid and effortless specimen setup—far more efficient than traditional triaxial configurations. The triaxial cell can be fully assembled or disassembled at the push of a single button, eliminating the need for bolts or nuts and significantly reducing preparation time, allowing operators to focus on testing rather than setup.

Constructed from high-grade stainless steel, the triaxial cell is designed to accommodate cylindrical specimens up to 55 mm in diameter, with an available upgrade for larger specimens up to 100 mm. The standard unit features a rigid loading piston combined with a low-friction graphite seal, ensuring smooth and stable operation.

The self-contained cell wall design allows the wall to be automatically lowered and securely locked once the specimen is prepared, simplifying handling and improving safety. The configuration includes an internal load cell, embedded instrumentation, and reinforced frame assemblies for enhanced precision in deformation modulus and post-failure behavior measurements.

The standard GEOTEST EXPRESS configuration incorporates a servo-valve-controlled confining pressure intensifier to control confining pressures. The intensifier is housed within a robust metal cabinet equipped with casters, a 20-liter fluid reservoir, ensuring mobility and operational convenience. Pressure gauge provides real-time verification of confining pressures, while quick-connect fittings simplify fluid line connections and reservoir maintenance. The pressure intensifier integrates a pressure transducer and LVDT, enabling servo control based on pressure, fluid volume, or any other user-defined parameter. This setup allows execution of complex testing protocols such as stress/strain path analysis, rock compressibility determination, permeability testing, and hydraulic fracturing

The GEOTEST EXPRESS operates through FLOXLAB's integrated digital signal conditioner and controller, combined with the advanced GEOTEST's software. Triaxial testing is streamlined through direct programmable control of test parameters—stress, strain, and others—automatically adjusted to specimen geometry.

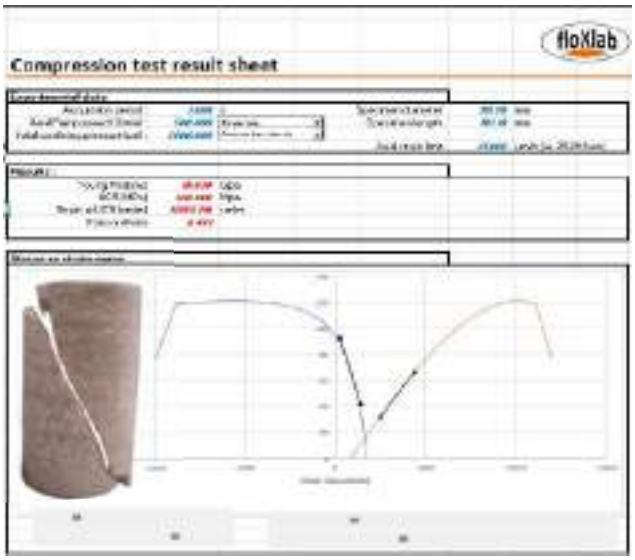
All test parameters are continuously computed and instantly available for display, graphing, or closed-loop control. The software also supports custom user-defined variables and multi-sensor averaging, offering extensive flexibility for advanced experimental configurations and ensuring accurate, consistent test results.

The system design eliminates the need for complex and time-consuming pre-calculations when configuring test programs, allowing operators to focus entirely on the material's mechanical response rather than on hardware setup or signal management.

FLOXLAB's network-ready architecture enables seamless data monitoring, sharing, and control with the flexibility to display or export test parameters in any preferred unit system, even when combining mixed measurement units. At the core of the GEOTEST EXPRESS lies an embedded microprocessor that ensures uninterrupted test execution, maintaining full operational capability even in the event of a host computer failure.

The controller features automatic dynamic control mode switching between connected transducers and computed parameters, enabling smooth, bump-less transitions during testing. It also performs signal conditioning for all connected transducers, applying real-time linearization through high-order polynomial calibration. The digital control loop delivers the responsiveness required for precise load regulation in brittle materials.

Test example



The GEOTEST EXPRESS system enables multi-stage triaxial testing with precision and operational simplicity. The following example illustrates a multistage triaxial test performed to determine the residual strength of a rock specimen under varying confining pressures.

The test was conducted on a single Berea Sandstone sample with a diameter of 50 mm and a height of 100 mm, instrumented with one axial deformation sensor and one diametral sensor to capture detailed strain measurements.

Three confining pressure levels were applied sequentially: 20 MPa, 50 MPa, and 100 MPa. Each stage was automatically terminated by the software once the Poisson's ratio reached a threshold of 0.5, indicating the onset of significant lateral deformation.

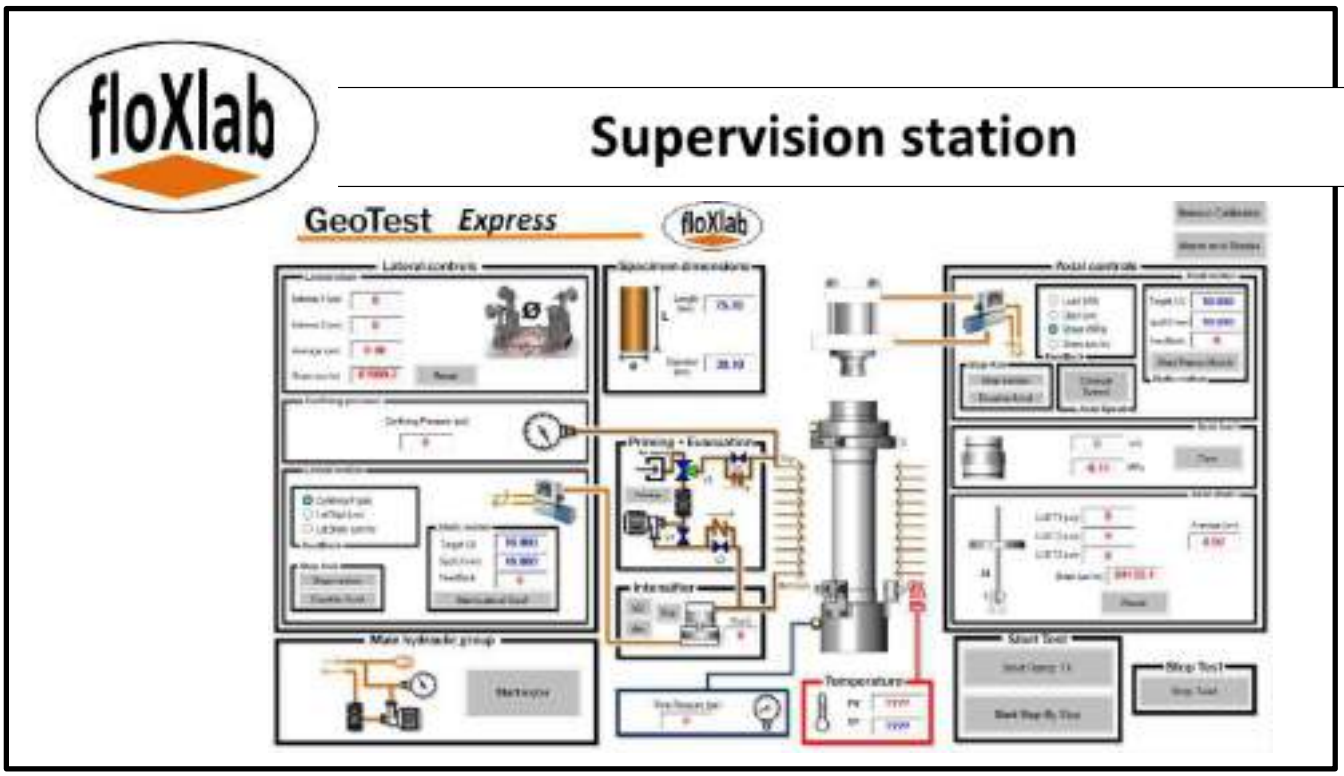
During the final stage, the confining pressure of 100MPa was maintained constant while control was switched to radial strain mode to induce large post-peak deformations while preventing specimen rupture. A high-stiffness loading frame was employed to ensure system stability and accurate post-failure response measurement.

When the deviator stress dropped by more than 25% of the peak value, the system automatically transitioned to frame displacement control, stabilizing the test and maintaining sensor alignment.

The specimen was then strained at 1 mm/min for 0.25 minutes, and the corresponding deviator stress was recorded as the residual strength for that confining pressure. The confining pressure was subsequently reduced to 50 MPa, and the same procedure was repeated, followed by testing at 20 MPa.

This example demonstrates the robust control precision and automation capabilities of the GEOTEST EXPRESS, allowing complex multistage triaxial tests to be executed efficiently with consistent, repeatable, and high-resolution data acquisition across all loading conditions.

Supervision station



The GEOTEST EXPRESS represents an optimal solution for triaxial testing in both research and commercial rock mechanics laboratories, combining precision, safety, and efficiency in a single integrated platform. Its automated locking triaxial cell, along with automatic cell filling and drainage, minimizes test preparation time while ensuring a secure and streamlined setup process.
Designed for flexibility, the FLOXLAB GEOTEST EXPRESS can accommodate specimens up to 100 mm (4 inches) in diameter, making it suitable for a broad range of geological materials and testing conditions.

Key features include:

- Direct measurement of axial and lateral strain directly on the specimen for high-accuracy deformation data
- LVDT-based instrumentation for reliable, user-friendly operation
- Simplified test preparation and execution, allowing effortless setup and consistent performance stress.

GEOTEST *Express*

floXlab

A - Axial Load:

1,000 kN
2,000 kN
Other upon request

B – Frame Stiffness:

1,000kN: 3 GN/mm
2,000kN: 4.5 GN/mm

C – Confining pressure:

70 MPa
140 MPa
210 MPa

D – Specimen size:

Up to: 55 mm
Up to: 100 mm

E – Pore pressure:

70 MPa
140 MPa
210 MPa

F – Regime:

Static
Dynamic

GEOTEST *Express - components*

TRIAXIAL CELL

The triaxial cell is a high-pressure vessel designed for precise confinement and axial loading under static and dynamic testing conditions. It features an automated locking system with an integrated hydraulic lift, enabling fast, bolt-free specimen installation and ensuring accurate, repeatable test setup.

Key features include:

- Pressure ratings of 70, 140 or 210 MPa
- Two cell sizes for specimens up to 55mm or 100mm
- Wetted parts in stainless steel or Inconel

CONFINING PRESSURE INTENSIFIER

The confining pressure intensifier is a high-precision, servo-controlled pressure system designed to apply and maintain stable confining pressure during triaxial testing.

It provides rapid pressure ramping, accurate closed-loop control, and excellent pressure stability for both static and dynamic test conditions.

Key features:

- Servo-valve-controlled operation in pressure or displacement mode
- Confining pressure ratings of 70, 140, 210MPa.
- Wetted parts in stainless steel

GEOTEST *Express - components*

PORE PRESSURE PUMP

The GEOTEST EXPRESS pore pressure pump is a high-precision, electro-mechanical unit designed to apply and regulate pore pressure with high accuracy during triaxial testing. It enables stable pressure control, rapid response, and precise measurement for reliable drained and undrained test conditions.

Available configurations:

- Operate in pressure or flow-rate control mode
- Working pressure up to 70 MPa,140 MPa, 210 MPa
- Flow rate up to 60 cc/min
- Wetted parts stainless steel, Hastelloy

ACOUSTIC VELOCITY FIXTURE

The ultrasonic velocity system is an integrated measurement module designed to determine P- and S-wave velocities in rock specimens during triaxial testing.

It provides high-resolution, synchronized ultrasonic acquisition under load and pressure, enabling continuous monitoring of dynamic elasticity parameters.

Key features

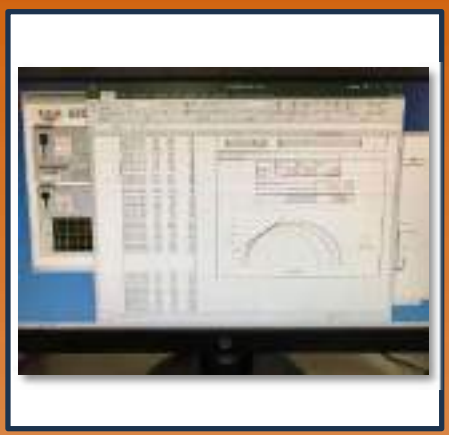
- In-vessel-P- and S1-S2-wave ultrasonic measurement at 1MHz
- Operates up to 120°C under triaxial stress conditions

GEOTEST *Express - components*

HEATING JACKET

The heating jacket is a precision-controlled thermal system designed to uniformly heat rock specimens during triaxial testing.
It ensures stable and homogeneous temperature distribution under pressure, enabling accurate simulation of in-situ thermal conditions.
Key feature includes:

- Operating range up to 150 °C (standard) or 200°C (high-temperature option)



GEOTEST SOFTWARE

The GEOTEST software is an advanced analysis platform designed for automated processing and interpretation of triaxial test data.

It provides precise calculation of mechanical parameters, real-time visualization, and standardized reporting to ensure accurate and repeatable test interpretation.

Key features include:

- Automated analysis of stress-strain, strength, creep and petrophysical properties
- Integrated interpretations of acoustic velocity, acoustic emission and damage evolution

GEOTEST *Express - components*

ACOUSTIC EMISSION

The acoustic emission system is a high-sensitivity monitoring module designed to detect and locate microcracking and fracture events during triaxial testing. It provides real-time, high-frequency data acquisition and advanced signal processing for accurate damage evolution and failure analysis.

Key features include:

- Six lateral AE sensors – full radial coverage
- Signal amplification – 40 dB, 32–1000 kHz filters
- High-resolution acquisition – 16-bit, 10 MHz, 8 channels
- Precise event location – ~2 mm accuracy
- Real-time fracture reconstruction – live morphology mapping

HYDRAULIC FRACTURING

The hydraulic fracturing system is a precision-controlled module designed to initiate and propagate fractures under controlled pressure conditions within rock specimens.

It enables accurate regulation of injection pressure and flow, with synchronized data acquisition for detailed fracture initiation and propagation analysis.

Key features include:

- For specimens 50-100mm in diameter
- Borehole diameter: 6.35-mm
- Wetted parts in stainless steel or Inconel

GEOTEST *Express - components*

ROCK PERMEABILITY

The permeability system is a high-precision module designed to measure fluid flow through rock specimens under controlled stress and pressure conditions.

It provides accurate permeability determination using the Darcy's law method, fully synchronized with triaxial loading and pore pressure control.

Key features:

- Permeability range: 0.01 mD to 10 Darcy
- Pressure: up to 70 MPa

ELECTRICAL RESISTIVITY

The electrical resistivity system is an integrated measurement module designed to evaluate the electrical properties of rock specimens under triaxial stress conditions. It supports both two-point and four-point measurement configurations, providing precise, synchronized resistivity data correlated with mechanical loading and microstructural evolution.

HYDRAULIC POWER UNIT

The hydraulic power unit is a high-efficiency system providing stable, low-noise hydraulic flow for precision servo-controlled testing. Two versions are available: one optimized for static testing and a second designed to support both static and dynamic loading modes with enhanced flow and response capacity.

- Static version:
  Constant pressure, constant flow pump
  Flow: up to 5 lpm
  Reservoir fluid: 20 Liters
- Static & Dynamic version:
  Constant pressure, variable flow pump
  Flow: up to 20 lpm
  Reservoir fluid: 100 Liters
  Frequency up to 10 Hz

floXlab

BUREAU VERITAS

GEOTEST - ROCK TRIAXIAL COMPRESSION TEST SYSTEM

SCAN ME

ASTM

D7012
D7070
D5084

LOAD CAPACITY

1,000 KN
2,000 KN
Other upon request

CELL PRESSURE

70 MPa
140 MPa
210 MPa

CELL DIAMETER

D1: Up to 55mm
D2: Up to 100mm

ROCK MECHANICS TESTERS

LOAD-FRAME TRIAXIAL SYSTEMS

GEOTEST - components

LOAD FRAME

The hydraulic compression frame, built with four high-stiffness columns, ensures maximum rigidity and alignment accuracy while applying precise axial loads to specimens mounted in a triaxial cell. A servo-controlled hydraulic actuator, integrated in the upper crosshead provides great loading capacity. The frame can be operated under both static and dynamic testing conditions.

KEY FEATURES

- Servo-valve-controlled axial actuator which operates in force, stress, displacement and strain control)
- Four high-stiffness column frame with 1,000 or 2,000kN capacity

TRIAXIAL CELL

The triaxial cell is a high-pressure vessel designed to provide precise confinement and axial loading for triaxial and unconfined compression tests.

The cell body is lowered and locked into position by turning a nut on the cell base until it is completely screwed, and the complete assembly is then aligned under the loading piston.

KEY FEATURES

- Pressure ratings of 70, 140 or 210 MPa
- Two cell sizes for specimens up to 55mm or 100mm
- Wetted parts in stainless steel or Inconel

CONFINING PRESSURE INTENSIFIER

The confining pressure intensifier is a high-precision, servo-controlled pressure system designed to apply and maintain stable confining pressure during triaxial testing.

It provides rapid pressure ramping, accurate closed-loop control, and excellent pressure stability for both static and dynamic test conditions

KEY FEATURES

- Servo-valve-controlled operation in pressure or displacement mode
- Confining pressure ratings of 70, 140, 210MPa.
- Wetted parts in stainless steel

PORE PRESSURE PUMP

The pore pressure pump is a high-precision, servo-controlled unit designed to apply and regulate pore pressure with high accuracy during triaxial testing.

It enables stable pressure control, rapid response, and precise measurement for reliable drained and undrained test conditions.

KEY FEATURES

- Operate in pressure or flow-rate control mode
- Working pressure up to 70 MPa,140 MPa, 210 MPa
- Flow rate up to 60 cc/min
- Wetted parts stainless steel, Hastelloy

GEOTEST - components

ACOUSTIC VELOCITY FIXTURE

The ultrasonic velocity system is an integrated measurement module designed to determine P- and S-wave velocities in rock specimens during triaxial testing.

It provides high-resolution, synchronized ultrasonic acquisition under load and pressure, enabling continuous monitoring of dynamic elasticity

KEY FEATURES

- In-vessel-P- and S1-S2-wave ultrasonic measurement at 1MHz
- Operates up to 120°C under triaxial stress conditions

HEATING JACKET

The heating jacket is a precision-controlled thermal system designed to uniformly heat rock specimens during triaxial testing.

It ensures stable and homogeneous temperature distribution under pressure, enabling accurate simulation of in-situ thermal conditions.

KEY FEATURES

- Operating range up to 150 °C (standard) or 200°C (high-temperature option)

GEOTEST SOFTWARE

The GEOTEST software is an advanced analysis platform designed for automated processing and interpretation of triaxial test data.
It provides precise calculation of mechanical parameters, real-time visualization, and standardized reporting to ensure accurate and repeatable test interpretation.

KEY FEATURES

- Automated analysis of stress-strain, strength, creep and petrophysical properties
- Integrated interpretations of acoustic velocity, acoustic emission and damage evolution

ACOUSTIC EMISSION

The acoustic emission system is a high-sensitivity monitoring module designed to detect and locate microcracking and fracture events during triaxial testing.

It provides real-time, high-frequency data acquisition and advanced signal processing for accurate damage evolution and failure analysis.

KEY FEATURES

- Six lateral AE sensors – full radial coverage
- Signal amplification – 40 dB, 32–1000 kHz filters
- High-resolution acquisition – 16-bit, 10 MHz, 8 channels
- Precise event location – ~2 mm accuracy
- Real-time fracture reconstruction – live morphology mapping

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GEOTEST - components

HYDRAULIC FRACTURING

The hydraulic fracturing system is a precision-controlled module designed to initiate and propagate fractures under controlled pressure conditions within rock specimens.
It enables accurate regulation of injection pressure and flow, with synchronized data acquisition for detailed fracture initiation and propagation analysis.

KEY FEATURES

- For specimens 50-100mm in diameter
- Borehole diameter: 6.35-mm
- Wetted parts in stainless steel or Inconel

PERMEABILITY

The permeability system is a high-precision module designed to measure fluid flow through rock specimens under controlled stress and pressure conditions.

It provides accurate permeability determination using the Darcy law method, fully synchronized with triaxial loading and pore pressure control.

KEY FEATURES

- Permeability range: 0.01 mD to 10 Darcy
- Pressure: up to 70 MPa

ELECTRICAL RESISTIVITY

The electrical resistivity system is an integrated measurement module designed to evaluate the electrical properties of rock specimens under triaxial stress conditions.
It supports both two-point and four-point measurement configurations, providing precise, synchronized resistivity data correlated with mechanical loading and microstructural evolution.

KEY FEATURES

- 2-point resistivity with two axial electrodes
- Upgradeable to 4-point with two lateral and two axial electrodes
- LCR meter (12Hz -10kHz)

HYDRAULIC POWER UNIT

The hydraulic power unit is a high-efficiency system providing stable, low-noise hydraulic flow for precision servo-controlled testing.

Two versions are available: one optimized for static testing and a second designed to support both static and dynamic loading modes with enhanced flow and response capacity.

KEY FEATURES

- Static version:
  Constant pressure, constant flow pump
  Flow: up to 5 lpm
  Reservoir fluid: 20 Liters
- Statiic & Dynamic version:
  Constant pressure, variable flow pump
  Flow: up to 20 lpm
  Reservoir fluid: 100 Liters
  Frequency up to 10 Hz

ROCK MECHANICS · GEOMECHANICS

MECATEST

3,000 kN Rock Uniaxial & Triaxial Compression Testing System

Servo-controlled compression testing with uniaxial, triaxial, acoustic velocity and permeability capabilities — engineered for demanding geomechanics laboratories.

3,000 kN	70 MPa	0.01 – 1 darcy	1 MHz
MAX LOAD CAPACITY	CONFINING PRESSURE	PERMEABILITY	ACOUSTIC FREQUENCY

MADE IN FRANCE · ORIGIN: FRANCE

Floxlab.com

SYSTEM OVERVIEW

The mechanical core 02

Comprehensive rock testing — from unconfined compression to acoustic velocity — delivered in a single integrated servo-hydraulic platform with proprietary Floxlab control software.

Load Frame

Servo-hydraulic compression frame rated at 3,000 kN. Four-column design for extreme rigidity, front-door protection and fast-displacement actuator.

Test Capabilities

Uniaxial & triaxial compression, indirect tension (Brazilian), acoustic velocity (P/S waves), strain measurements and liquid permeability.

Digital Control

Proprietary Floxlab software. Pre-programmed stress/strain paths, real-time display, automated test execution and professional PDF reports.

Compression Frame & Hydraulic Power Pack

Servo-Controlled Compression Frame

Load capacity	**3,000 kN**
Piston stroke	**50 mm**
Loading speed	**0.0005 – 10 mm/min**
Dimensions	**1.8 × 1.8 × 1.0 m**
Frame weight	**1,500 kg**
Control modes	**Load / Displacement**
Servo valve	**High-frequency precision**
Height adjust	**6-shim platen set**

Hydraulic Power Pack

Pump flow	**0.65 LPM HP / 7 LPM LP**
Max pressure	**35 MPa (350 bar)**
Pump type	**Radial piston**
Oil tank	**10 liters**
Motor power	**2 HP (1.5 kW)**
Hydraulic hoses	**10 meters**
Pressure filter	**3 microns**
Power supply	**230 VAC, 1-Ph, 50/60 Hz**

Included: 25 L hydraulic oil & spare filter · Ethernet interface to data acquisition computer

Confining Pressure Intensifier

Working pressure	**70 MPa**
Pressure accuracy	**0.25% FS**
Actuator volume	**250 cc**
Volume accuracy	**0.25% FS**
Wetted parts	**Stainless steel**
Control modes	**Pressure / Displacement**
Fluid reservoir	**20 L · fill & drain**

Fills the triaxial cell with confining fluid automatically and pressurizes it with high precision. A linear transducer monitors confining oil volume in real time.

One frame, every test

03

All the measurements a modern geomechanics laboratory needs — uniaxial, triaxial, Brazilian, acoustic and permeability — in a single integrated servo-controlled system.

1 Uniaxial Compressive Strength
UCS, Young's modulus E, Poisson's ratio v, stress–strain curve

2 Triaxial Compression
Shear strength, cohesion, friction angle, failure envelope

3 Indirect Tensile (Brazilian)
Brazilian tensile strength per ASTM D3967

4 Acoustic Velocity (P & S)
Vp, Vs1, Vs2 and dynamic elastic moduli

5 Liquid Permeability
0.01 md – 1 Darcy via Darcy's Law

6 Pore Volume Compressibility
Drained conditions with pore pressure control

7 Strain Gauge Measurements
Axial & radial strain, Poisson's ratio in-situ

8 Thermo-mechanical Testing
Up to 150 °C with UTC cell & heating mantle

Triaxial & Acoustic Cells

HOEK Cells — Type 2 & 3

Type 2: Ø 54.7 mm (NX) & 63.5 mm (HQ)
Type 3: Ø 76.2 / 85 / 100 mm
Length 2× Ø · hydraulic confining · integrated strain gauges · spherical hardened platens.

UTC Universal Triaxial Cells — Type 2 & 3

70 MPa (10,000 psi) · up to 150 °C ·
Type 2: Ø 54.7 – 63.5 mm
Type 3: Ø 76.2 – 100 mm ·
stainless wetted parts · 1/8" connections.
Accessories: diametral extensometer, axial LVDT, calibrator, trolley.

Acoustic Velocity Fixture (AVF)

ASTM D2845 · 1 MHz · P, S1 & S2 waves.
Yields Vp, Vs, dynamic E, v and bulk/shear moduli.
Platens: 54.7 / 63.5 / 76.2 / 85 / 100 mm.

Integration: The AVF fits seamlessly with both HOEK cells and the UTC Universal Triaxial Cells — enabling combined mechanical and acoustic characterization on the same specimen under confining pressure.

Complete Measurement Suite

Dedicated fixtures and modules for full mechanical and hydraulic characterization — all driven by the integrated Floxlab software.

UCP — Uniaxial

UCS, E, v determination. Axial LVDT + circumferential extensometer. Direct servo control. Platens 100 mm & 160 mm.

ITB — Brazilian

Indirect tensile strength via diametral compression. Precision jaws with spherical bearing. Jaw sizes 54.7 – 150 mm.

Strain Gauges (XY)

100 XY gauges (350 Ω) per pack. Axial + radial per ASTM D7012. 4-channel control box. Complete prep kit included.

Pore Pressure Pump

70 MPa · 2 × 15 cc dual cylinder · 0.0001 – 30 cc/min. Constant pressure / flow / volume modes. Drained triaxial ready.

LP-700 Permeameter

0.01 md – 1 Darcy · water or oil · 70 MPa. Upstream/downstream + differential sensors. Independent back-pressure regulation.

Software & Reporting

Floxlab proprietary software. Automated UCS, E, v, shear envelope. Professional PDF reports for every test.

Why Choose MECATEST

Versatile Platform

A single frame runs uniaxial, triaxial, Brazilian and acoustic tests — no retooling required.

Automated Paths

Pre-programmed stress and strain paths for reproducible, operator-independent results.

Unmatched Rigidity

Four-column stiff frame minimizes compliance errors — critical for accurate property determination.

Full Digital Control

High-frequency servo-valve with load and displacement modes for precise regulation at any rate.

Wide Specimen Range

From 54.7 mm to 160 mm diameter — NX, HQ and larger industry-standard sizes.

Integrated Reporting

UCS, E, v, shear envelope automatically calculated — professional PDF reports in one click.

STANDARDS

ASTM D7012 | ASTM D3148 | ASTM D2664 | ASTM D2845 | ASTM D3967 | ISRM

Floxlab
NANTERRE, FRANCE

ROCK MECHANICS TESTING SYSTEM

ROCKTEST

1,000 kN Uniaxial & Triaxial Compression Testing System
for comprehensive geomechanical characterization of reservoir rocks

1,000 kN	70 MPa	200°C	54.7 mm
AXIAL LOAD	CONFINING PRESSURE	MAX TEMPERATURE	MAX SPECIMEN Ø

Servo-controlled · Fully automated · Multi-stage capable
Suitable for all rock types — from soft sandstone to hard crystalline formations

SYSTEM DESCRIPTION

PRECISION ROCK COMPRESSION TESTING

The ROCKTEST is a servo-controlled compression system engineered for both uniaxial and triaxial rock testing. It simultaneously controls axial load, confining pressure, and deformation via pre-programmed stress and strain paths — eliminating operator variability and enabling fully repeatable multi-stage protocols.

1,000	70	200
kN AXIAL LOAD	MPa CONFINING	°C MAX TEMP

COMPRESSION FRAME

Servo-Controlled Load Frame

- Fixed crosshead on four stiff columns — extreme rigidity
- Integrated servo-controlled actuator
- Load control or displacement control mode
- High-frequency servo-valve for precise flow regulation
- Front door safety shield against specimen ejection
- 6-shim set for adjustable lower platen height

Load Capacity	**500 kN or 1,000 kN**
Piston Stroke	**100 mm**
Loading Speed	**0.0005 – 10 mm/min**
Dimensions	**1.5 × 1.5 × 1 m**
Weight	**1,000 kg**
Control Modes	**Load / Displacement**

CONFINING SYSTEM

Automated Confining Pressure Intensifier

- Automatically fills triaxial cell with confining fluid
- Pressurizes & controls confining fluid precisely
- Linear transducer monitors confining oil volume
- Pressure mode or constant displacement mode
- 20-liter fluid reservoir for fill / drain operations
- Metal cabinet on casters — mobile & compact

Working Pressure	**70 MPa**
Pressure Accuracy	**0.25% FS**
Actuator Volume	**250 cc**
Volume Accuracy	**0.25% FS**
Wetted Parts	**Stainless Steel**
Dry Air Required	**100 psi**

LOAD FRAME SELECTION GUIDE

Achievable stress (MPa) per load level and specimen diameter — select the appropriate frame capacity for your target stress regime.

Load ↓ / Dia →	19 mm	25.4 mm	38.1 mm	50.8 mm	54.7 mm	75 mm	101.6 mm
100 kN	353	197	88	49	42	23	12
200 kN	705	395	175	99	85	45	25
500 kN	1,763	987	439	247	212	113	62
1,000 kN	3,527	1,974	877	493	425	226	123

UNIAXIAL TESTS

- Unconfined Compressive Strength (UCS)
- Axial & radial strain
- Modulus of elasticity (Young's modulus)
- Poisson's ratio

TRIAXIAL TESTS

- Triaxial compression strength
- Stress-strain curves under confinement
- Shear strength envelope (Mohr-Coulomb)
- Cohesion & angle of internal friction

SPECIALIZED TESTS

- Brazilian indirect tensile strength
- Acoustic P & S wave velocity
- Steady-state liquid permeability
- High-temperature testing up to 200°C

INTEGRATED SOFTWARE & AUTOMATION

Real-time display — synoptic view of all measurements · component status monitoring · live trend charts

Automated control — macro-driven tests with pre-programmed stress & strain paths · set-point entry

Multi-stage protocols — complex stress paths with full repeatability · eliminates operator variability

Report generation — automated test reports generated at end of each test

TRIAXIAL CELL OPTIONS

1 HOEK Cell

Standard triaxial cell for NX core testing. Determines shear strength parameters and elastic properties from soft sandstone to hard crystalline formations.

Specimen Dia.	**42 – 54.7 mm**
Confining Pressure	**70 MPa**
Strain measurement	**Axial & radial gauges**
Acoustic velocity	**P & S waves**
Seal kits included	**5 kits**

2 QRC High-Temp Triaxial Cell

Quick-release cell reproducing reservoir conditions up to 70 MPa and 150°C with 3 pressure-compensated LVDTs for direct radial strain measurement.

Specimen Dia.	**38.1 – 54.7 mm**
Confining Pressure	**70 MPa**
Temperature	**Ambient – 200°C**
Radial strain	**3× pressure-comp. LVDTs**
Axial strain	**1× vertical LVDT**

3 UTC Universal Triaxial Cell

Designed for full-diameter plugs up to 100 mm. Delivers strength, elastic moduli, velocities and thermal effects in a single test run.

Specimen Dia.	**55 – 100 mm**
Confining Pressure	**70 MPa**
Temperature	**Ambient – 200°C**
Diametral sensor	**DE-55, 0.5% FS**
Axial sensor	**ASL-55, 0.25% FS**

FIXTURE OPTIONS

1 Uniaxial Compression Platen

For unconfined compression tests per ASTM D7012. Includes circumferential extensometer (55 mm) and LVDT for axial deformation.

Specimen dia.	**Up to 55 mm**
Radial deformation	**Circumferential Ext.**
Axial deformation	**LVDT**
Standard	**ASTM D7012**

2 Strain Gauges Package

XY biaxial gauges bonded directly on specimen — eliminates machine compliance errors. Monitors microcrack onset through strain curve non-linearity.

Gauge type	**XY biaxial**
Resistance	**350 Ohm**
Quantity	**100 gauges**
Bridge circuit	**Wheatstone**

3 Acoustic Velocity Platens

Compatible with HOEK cell. Measures P, S1 & S2 wave velocities at multiple stress levels — computes dynamic elastic moduli and detects microcrack initiation.

Waves measured	**P, S1, S2**
Center frequency	**1 MHz**
Feedthroughs	**6 coaxial**
Operating temp.	**Room – 120°C**

5 Brazilian Indirect Tensile Test

Diametrical loading between curved jaws — no special sample preparation. Critical for borehole stability and fracturing design.

Available dia.	**42 – 76.2 mm**
Standards	**ASTM D3967 / ISRM**
Integration	**ROCKTEST load frame**

6 Pore Pressure Syringe Pump

Regulates pore pressure precisely. Essential for computing effective stress, Biot's coefficient and pore compressibility.

Working pressure	**70 MPa**
Pump volume	**2 × 15 cc**
Flow range	**0.0001 – 30 cc/min**
Control modes	**Const. P / Q / V**

7 LP-700 Liquid Permeameter

Steady-state Darcy flow permeability from 0.01 mD to 1 Darcy with dual DP transducers. Quantifies stress-dependent permeability.

Permeability range	**0.01 mD – 1 Darcy**
Fluid	**Water or oil**
Max pressure	**70 MPa**
Pressure accuracy	**0.2% FS**

COMPLETE GEOMECHANICAL SOLUTION

The ROCKTEST integrates seamlessly with FLOXLAB' full portfolio — Acoustic Velocity System, True Triaxial System,... — providing an end-to-end solution for reservoir characterization. All instruments share common software philosophy: real-time monitoring, pre-programmed test paths, and automated reporting.

STANDARDS ASTM D7012 · ASTM D3967 · ISRM · ISO

floXlab · Nanterre, France

GEOLAB

Educational Rock Compression Tester

300 kN	592 MPa	70 MPa	5 Tests
Max Axial Load	Axial Stress (1")	Confining Pressure	In One System

TEST CAPABILITIES

- **Uniaxial & Triaxial Compression**
  ASTM D2664 · D7012
- **Acoustic Velocity (P, S1, S2)**
  ASTM D2845
- **Brazilian Indirect Tension**
  ASTM D3967
- **Point Load Strength Index**
  ASTM D5731
- **Servo-controlled · 2 modes**
  Load / Displacement

KEY SPECIFICATIONS

Axial Load	300 kN
Axial Stress	592 MPa (1")
Confining P.	70 MPa
Piston Stroke	50 mm
Hydraulic P.	20 MPa
Motor Power	1.5 kW
Frame Weight	60 kg

floXlab SAS · 23, rue du Port – Parc de l'Île, 92000 Nanterre, France · contact@floxlab.com · +33 (0)1 81 93 12 85

ABOUT THE GEOLAB

One compact system. Five essential tests.

The GEOLAB is a servo-controlled compression testing apparatus designed for universities, research centres and technical institutes. It performs uniaxial and triaxial experiments on rock specimens, determining critical geomechanical parameters rapidly and reliably.

Triaxial Compression
ASTM D2664 · D7012

Uniaxial Compression
ASTM D7012

Acoustic Velocity
ASTM D2845

Brazilian Tension
ASTM D3967

Point Load Strength
ASTM D5731

Technical Specifications

Max Axial Load	300 kN	Hydraulic Max Pressure	20 MPa
Axial Stress (1" sample)	592 MPa	Pump Flow	0.1 - 1 LPM
Axial Stress (1.5" sample)	263 MPa	Motor Power	1.5 kW (230 VAC)
Confining Pressure	70 MPa	Frame Dimensions	1.0 × 1.5 × 0.3 m
Sample Diameter	Up to 1.5"	Frame Weight	60 kg
Piston Stroke	50 mm		
Control Modes	Load / Displacement		

MODULAR SYSTEM

Expand your lab's capabilities at any time

Each fixture integrates seamlessly with the GEOLAB compression frame and GEOTEST supervision software.

OPTION 1 — Triaxial HOEK Cell

ASTM D2664 · D7012

Axial load at confining pressure. Axial & radial strains via gauges. 1" & 1.5" Ø specimens.

OPTION 2 — Acoustic Velocity Platens

ASTM D2845

P-wave, S1 & S2 wave propagation under triaxial conditions. Dynamic elastic constants.

OPTION 3 — Uniaxial Compression Platens

ASTM D7012

UCS, Young's modulus & Poisson's ratio. Strain gauge compatible. Multiple diameters.

OPTION 4 — Brazilian Tension Fixture

ASTM D3967

Indirect tensile strength via diametrical compression. Precision jaws. Ø 54.7 mm.

OPTION 5 — Point Load Fixture

ASTM D5731

Point Load Strength Index (Is). Two conical platens for cores, blocks or fragments.

HYDRAULICS — Hydraulic Power Pack

Integrated unit

Gear pump, 10 L reservoir, 20 MPa max, 10-micron filter. 1.5 kW — 230 VAC.

GEOTEST 1000 SOFTWARE

Supervision, Control & Reporting

The proprietary floXlab GEOLAB software provides an icon-driven interface guiding users through every test stage. Connected via Ethernet, it delivers real-time data acquisition, graphical display, automated test sequences and professional report generation.

Live Synoptic
Full system status overview

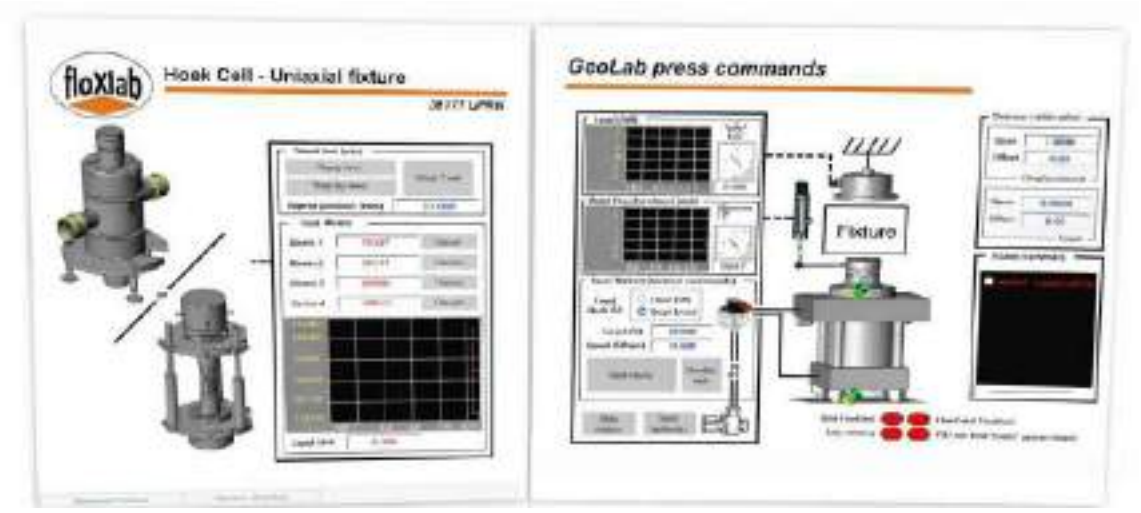
Trend Curves
Live graphical plots throughout test

Macro Commands
Program automated test sequences

Real-time Data
Load, stress, strain & displacement

Set Point Control
Enter and adjust parameters live

Report Generation
Export professional test reports



floXlab

Your supplier of high-pressure laboratory instruments

and advanced geotechnical testing equipment

SHEARTEST

Automated Rock Direct Shear Testing System

ASTM D 5607

ISRM

ROCK MECHANICS TESTERS • DIRECT SHEAR SYSTEMS

OVERVIEW

SHEARTEST SERIES

Direct Shear Apparatus

KEY CAPABILITIES

- Versatile direct-shear system for rock specimens
- Conventional, incremental and residual shear tests
- Closed-loop, servo-controlled hydraulic system
- Simultaneous application of normal and shear forces
- Real-time force and displacement data acquisition
- Determines cohesion (c) and friction angle (Ø)
- Customizable load capacity and specimen size
- Complies with ASTM D 5607 and ISRM standards

SHEARTEST 300
Direct Shear Apparatus

PURPOSE & OPERATING MODES

/ 03

PURPOSE

Determines the shear strength parameters of rock specimens:

Cohesion (c)	**Friction angle (Ø)**	**Peak shear strength**	**Residual shear strength**

STANDARDS

ASTM D 5607

Standard Test Method for Performing Laboratory Direct Shear Strength Tests of Rock Specimens Under Constant Normal Force

ISRM

International Society for Rock Mechanics — Suggested Methods for determining the shear strength of rock joints

OPERATING MODES

CNL

Constant Normal Load

Applies a constant normal stress while shearing progresses.

CNS

Constant Normal Stiffness

Normal stress varies proportionally with normal displacement.

CND

Constant Normal Displacement

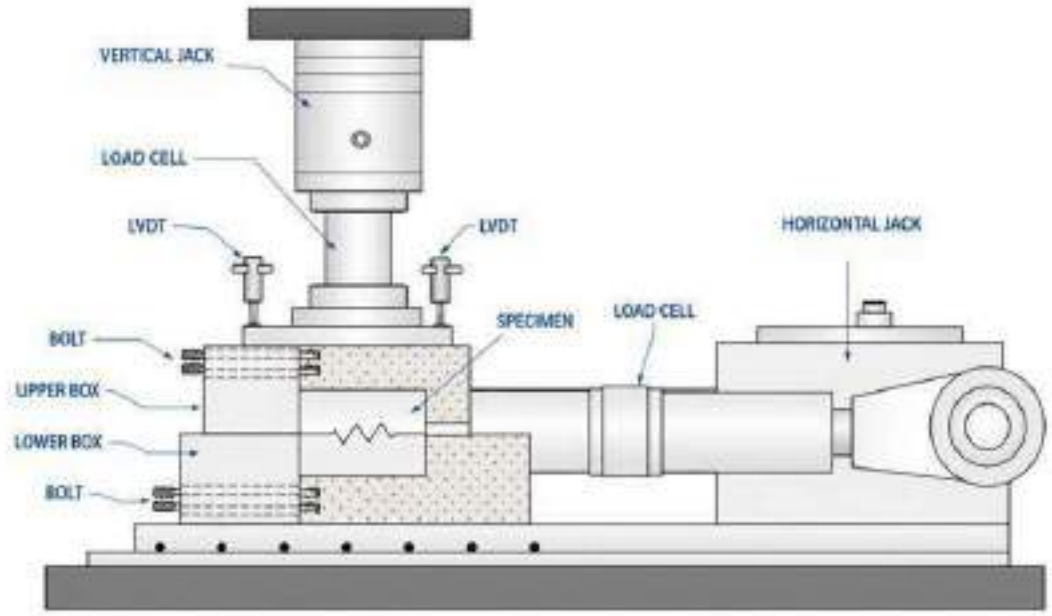
Maintains a fixed normal displacement during shear.

+ constant, incremental or ramped shear loads / displacements

KEY FEATURES

/ 04

Cross-section view of the SHEARTEST direct shear apparatus



TECHNICAL FEATURES

- Servo-controlled hydraulic jacks (normal & shear)
- Normal and shear load cells — 0.05% full-scale precision
- Normal and shear LVDT transducers — 0.5 µm resolution
- Specimen shear upper and lower box
- Normal load reaction frame — high rigidity
- Hydraulic power unit — 21 MPa max pressure
- Specimen extruder
- Computer control & data acquisition station

TYPICAL TEST PROCEDURES

/ 05

01 CONVENTIONAL SHEAR TEST

Applies a constant normal load while the specimen is sheared at a controlled displacement rate. The resulting shear stress–displacement curve reveals the material's peak shear strength, from which cohesion (c) and friction angle (Ø) are derived.

Application: *Essential for designing slopes, foundations and retaining structures.*

02 INCREMENTAL SHEAR TEST

Applies shear load in controlled increments (e.g. 20 kPa per step), maintaining each level for a defined duration to observe creep, relaxation and stiffness evolution. Precise step management and long-term monitoring.

Application: *Ideal for studying progressive failure and time-dependent behavior — natural slopes, underground excavations.*

03 RESIDUAL SHEAR TEST

After reaching peak strength, shearing continues over large displacements, allowing asperities and interlocks to wear away. Accurately measures the point where shear stress stabilizes — the residual shear strength.

Application: *Crucial for evaluating post-failure or long-term stability in reactivated landslides and sheared rock joints.*

SHEAR STRENGTH DETERMINATION

/ 06

The SHEARTEST measures shear stress under different normal stresses to derive the rock's fundamental shear strength parameters.

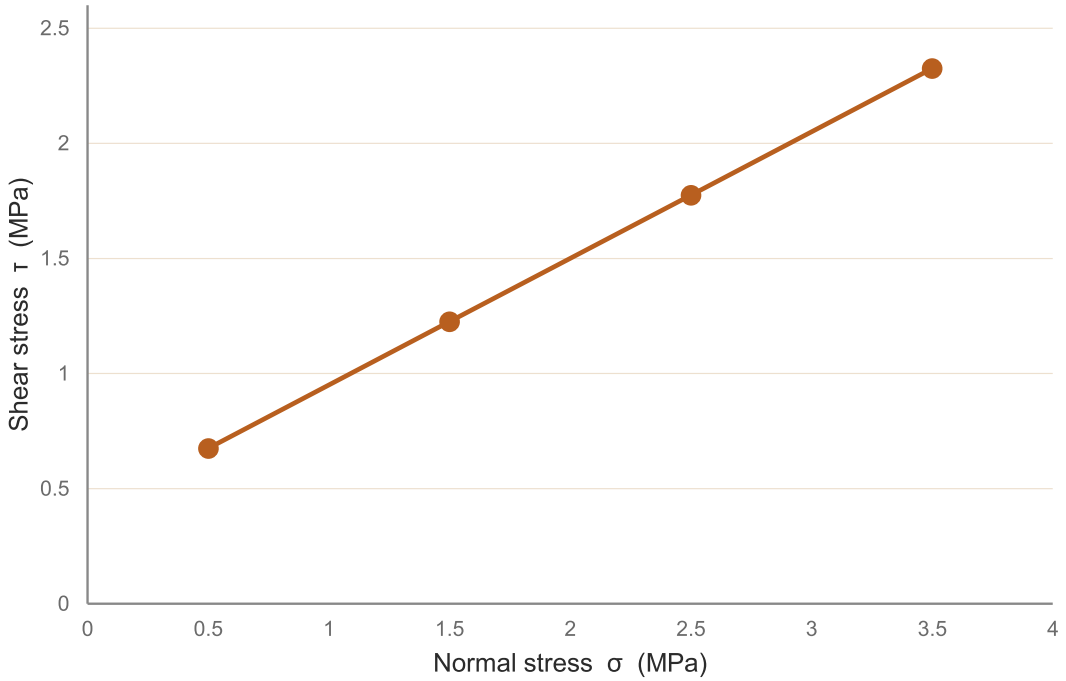
STEP 1 — Peak Shear Stress

Apply constant normal stresses **(N_1, N_2, N_3)** on identical specimens and shear them at a controlled rate.
→ Record the shear stress vs. shear displacement curves and extract the peak shear stress for each test.

STEP 2 — Cohesion & Friction Angle

Plot peak shear stresses against the corresponding normal stresses.
→ **c** (cohesion) = y-intercept **Ø** (friction angle) = slope of the line

Mohr–Coulomb failure criterion: $\tau = c + \sigma \cdot \tan(\varnothing)$



SHEARTEST MODELS

/ 07

Four standard models available, each customizable to specific project needs.

MODEL	SHEAR LOAD (kN)	NORMAL LOAD (kN)	SPECIMEN DIAM / SIDES (mm)	SPECIMEN HEIGHT (mm)	WEIGHT (kg)
SHEARTEST 200-10	200	10	150	150	400
SHEARTEST 100-50	100	50	150	150	500
SHEARTEST 500-300	500	300	150	150	1,250
SHEARTEST 1000-500-L	1,000	500	300 × 300	100	2,000

COMMON SPECIFICATIONS — ALL MODELS

Standard	**ASTM D 5607, ISRM**	Max. shear displacement	**± 50 mm**
Max. normal displacement	**50 – 100 mm**	Power supply	**230 VAC, 1-Ph, 50/60 Hz**
Required air pressure	**100 psi**	Precision (load cells)	**0.05% of full scale**
LVDT resolution	**0.5 µm**	Hydraulic max. pressure	**21 MPa**

SUPERVISION, CONTROL & REPORTING

/ 08

SOFTWARE CAPABILITIES

Synoptic view	Live visualization of the complete test system
Component status	Real-time monitoring of actuators and sensors
Measurements display	Continuous reading of forces and displacements
Trends display	Real-time curves during the test
Set-point entry	Direct control of target values
Automated macros	Pre-programmed test sequences
Professional reports	Automatic generation of test reports

INTELLIGENT DATA ANALYSIS

Automatic calculation of shear strength parameters:

$Ø_a$	$Ø^b$	$Ø_r$	c_a	c
apparent friction angle	basic friction angle	residual friction angle	apparent cohesion	cohesion

Graphs of peak and residual strength vs. normal stress are plotted from combined results across all specimens.