# YOUR SUPPLIER OF ADVANCED GEOTECHNICAL TESTING EQUIPMENT

# 2024



23 rue du Port 92000 Nanterre- France
www.floxlab.com

# CONTENTS

## About Floxlab

Floxlab is an engineering company that specializes in crafting a wide array of products, including cutting-edge geotechnical testing equipment, highly precise syringe pumps, and compression frames. Whether our clients require a unique laboratory-scale unit or a comprehensive turnkey system, they can expect to tap into our unmatched wealth of technological expertise and experience, along with unparalleled customer support.

With over 90% of our operations taking place outside of France, Floxlab systems have become the standard in leading laboratories worldwide. We have established a robust presence in key regions, including the United States, Europe, the Middle East, China, and Russia. According to our satisfied customers, we are undeniably the foremost global designer and manufacturer of pumps.

Our devices excel in delivering precision when it comes to pressure, volume, and flow rate, benefiting various sectors such as petroleum research, reactant delivery, supercritical fluids, geoscience, and more.

At Floxlab, our guiding philosophy centers on continuous improvement. We achieve this by consistently monitoring market demands, conducting thorough material research, and carefully gathering and analyzing customer feedback.A

## Floxlab team

Our engineering teams, comprising experts in electrical, manufacturing, mechanical, and software disciplines, form the fundamental foundation of our innovative production process. Floxlab's origins trace back to its roots in engineering, where organization, precision, and reliability have served as the enduring cornerstones of our company, guiding us since our inception and continuing to drive us toward excellence.

Engineers at Floxlab play a pivotal role in shepherding products from the initial concept to the manufacturing stage. Their responsibilities encompass the design of intricate mechanisms, circuitry development, Computer-Aided Design (CAD) modeling, material selection, and comprehensive testing and analysis.

Within Floxlab, our engineers excel at helping both colleagues and clients envision the complete product journey, spanning from fundamental physical concepts to the actual manufacturing process. We offer our clients the opportunity for comprehensive involvement, encompassing product design, simulation, fabrication, testing, and delivery. This approach fosters the development of intricate systems and ensures the effective realization of creative visions.

## Contact us

FLOXLAB
23 rue du Port
92000 Nanterre
France
Phone : + 33 1 81 93 12 85
Fax : + 33 1 41 31 04 76
Email: contact@floxlab.com
Website: www.floxlab.com


## Description

This SC-450 is crafted for the purpose of precisely cutting rock specimens to a specific dimension. The mechanism involves moving the entire specimen toward the cutting blade at a preselected, customizable speed using a hydraulic power feed with variable rates. The tool incorporates several essential components, including a fixture to securely hold the specimen, a system for advancing the specimen, a diamond-impregnated cutting blade, an emergency stop switch for safety, a coolant delivery system and a collection pan to capture debris. The cutting area is enclosed by a metal covering that features a viewing window. This setup allows for the safe and controlled cutting of rock specimens, with the capability to achieve diameters ranging from 20 mm to 170 mm.

## Specifications

| | |
|---|---|
| Standard | ASTM D4543 |
| Specimen diameter | From 20 mm to 170 mm |
| Specimen length | up to 400 mm |
| Saw blade diameter | 450 mm (18 inches) |
| Motor power | 2,200 watts, 3,000 RPM |
| Compatible coolants | water (usually), oil |
| Weight: | 250 Kg |
| Dimensions (WxLxH) | 780x1600x1260 mm |
| Required power supply | 220 VAC specify 50 or 60 Hz |
| Required water supply | 50 psi |

## Benefits

- Can be used for all standard specimen sizes


## Description

The ACM-300 represents a robust drill press, equipped with diamond coring bits, purposefully engineered to accommodate a range of specimen sizes, with a maximum diameter of 150 mm (6 inches) and a maximum length of 300 mm (12 inches). The standard configuration of this machine includes a drill press featuring an automatic constant pressure feed mechanism, a rotary union (swivel), a containment pan with a specimen clamping vise, and a system for supplying coolant. The drill press's automatic feed system is noteworthy, as it offers variable force and maintains a consistent pressure, allowing the coring bit to efficiently penetrate soft rock at high speeds. For the coring operation, users have the option to utilize a water/oil coolant, or alternatively, liquid nitrogen can be employed when dealing with unconsolidated samples.

## Specifications

| | |
|---|---|
| Standard | ASTM D4543 |
| Coring bit internal diameter | From 21.5 mm (0.845 inch) to 150 mm (6.0 inches) |
| Maximum coring depth | up to 300 mm (12 inches) |
| Drip pan dimension | L x W x H: 1000 x 380 x 340 mm |
| Compatible coolant | Water, Oil , liquid N2 (option) |
| Drill speed | 550, 1120, 1680 RPM |
| Dimensions | L x W x H: 1400 x 680 x 2140 mm |
| Weight | 100 Kg |
| Water supply | 100 psi |
| Electrical | 220 VAC, 50-60 Hz |

## Benefits

- Can drill specimens with dimeter up to 150-mm
- Easy and fast drilling operation


## Description

This tool is designed to achieve precise and flat end-faces when the geometry of the specimen is of utmost importance. It employs a variable-rate feed mechanism that allows the entire specimen to be processed in a single pass at an adjustable speed, resulting in end-faces that are both parallel and flat, meeting the specifications outlined by ASTM and ISRM. The equipment consists of a specimen clamping device, a hydraulically operated feed mechanism, a diamond grinding cup wheel, a coolant delivery system, and a collection pan for debris. The grinding process is enclosed within a metallic cover that includes a viewing window for observation. Specimens ranging in diameter from 20 mm to 170 mm can be accommodated. This unit is user-friendly and self-contained, surpassing industry standards. Furthermore, the use of a high-quality, genuine diamond-grinding wheel ensures a flawless and smooth finish.

## Specifications

| | |
|---|---|
| Standard | ASTM D4543 |
| Specimen diameter | From 20 mm to 170 mm |
| Specimen length | up to 400 mm |
| Grinding wheel precision | +/- 0.001” (2.5 / 100 mm) |
| Grinding Wheel diameter | 300 mm |
| Motor power | 2,200 watts, 3,000 RPM |
| Compatible coolants | water (usually), oil |
| Weight: | 250 Kg |
| Dimensions (WxLxH) | 780x1600x1260 mm |
| Required power supply | 220 VAC specify 50 or 60 Hz |
| Required water supply | 50 psi |

## Benefits

- ASTM-compliant
- Easy to use


## Description

The specimen flatness gauge ensures precise measurement of a specimen's flatness. A specimen with a maximum height of 300 mm (12 inches) is positioned on a high-quality Grade-A thick granite base, and an electronically adjustable digital dial gauge, mounted vertically, indicates the degree of flatness.

## Specifications

| | |
|---|---|
| Standard | ASTM D4543 |
| Granite base | 200 mm x 300 mm x 50 mm |
| Max specimen height | 300 mm (12 inches) |
| Accuracy | +/- 0.0001 inch |
| Resolution | 0.01 mm (0.0005 inch) |
| Weight | 20 Kg |

## Benefits

- ASTM-compliant
- Can be used for all standard specimen sizes


## Description

The point load tester performs a precise determination of the uncorrected point load strength index, denoted as "Is," which is then converted into a point load index standardized to a diameter (De) of 50 mm. This converted value, known as "Is(50)," serves multiple purposes, including rock strength classification and the estimation of parameters such as uniaxial compressive strength (UCS) and rock anisotropy, represented as Ia(50). The device itself comprises several components, including a hydraulic jack equipped with a pressure gauge, a sturdy two-column crosshead frame, and a protective carrying case. When pressure is applied through the hydraulic pump, it displaces a piston carrying the lower conical platen. The pressure is directly measured using a digital pressure gauge. The upper platen is securely attached to the crosshead, and a fixed graduated scale is in place to measure the diameter of the rock sample accurately. This instrument adheres to the procedures outlined in ASTM D5731, ensuring standardized and reliable testing methodologies. The PLT-100 can be supplied with an optional indirect tension Brazilian fixture (ITB-250) for assessing the tensile strength of the specimen.

## Specifications

| | |
|---|---|
| Standard | ASTM D 5731 |
| Load capacity | 100 kN |
| Maximum sample size | 4 inches (101.6 mm) |
| Pump pressure | 70 Mpa |
| Pressure accuracy | 0.2% FS |
| Weight: | 25 Kg |
| Dimensions | 50 x 30 x 25 cm |

## Benefits

- Simple test
- Direct reading of specimen diameter
- Extreme rigidity
- Inexpensive instrument
- Portable, easy to carry on-site
- Attractive alternative to the UCS test because provides similar data at a lower cost


## Description

The fracture toughness apparatus is purpose-built for determining the fracture toughness of rock using chevron notched core specimens in a three-point bend configuration. This property plays a pivotal role in classifying and characterizing rocks based on their resistance to crack propagation. The apparatus comprises several key components, including a 10-KN load frame, a load cell, a 3-point bend fixture, and specialized fracture toughness software. In the testing process, a rock sample prepared with a chevron or V-shaped notch, oriented perpendicular to the core axis, is positioned on two support rollers. A compressive load is applied to separate the sides of the notch, which leads to transverse splitting of the specimen through crack propagation and coalescence in the unnotched part of the cross-section. Throughout the test, the load is accurately measured using a dedicated load cell, while the displacement of the load point and the crack mouth opening displacement (CMOD) are monitored using two LVDT transducers and a clip-on gage, respectively. These measurements are then utilized to determine the fracture toughness of the rock, including both level I and level II fracture toughness values.

## Specifications

| | |
|---|---|
| Standard | ISRM Suggested method |
| Specimen diameter | 54 mm (2.125 inches) and 4-inches |
| Specimen length | 16 inches |
| Load range | up to 10 kN |
| Wetted parts | Stainless steel |

## Benefits

- Designed for easy and quick installation
- ISRM-compliant device
- Designed for testing a range of specimen diameters

## Description

The SDIM (Slake Durability Index Measurement) instrument is employed to evaluate the ability of a rock sample to withstand abrasion after undergoing weakening and partial disintegration via two standard desiccation and imbibition cycles. During these cycles, samples are alternately rotated in mesh drums partially submerged in water and then subjected to oven drying, typically repeating the process for two or three cycles. The slake durability index is quantified as the percentage of mass loss observed at the conclusion of these cycles.

## Specifications

| | |
|---|---|
| Standard | ASTM D4644, ISRM Suggested Method |
| Rotation speed | 20 rpm |
| Dimensions (W x H x L) | 300 x 500 x 500 mm |
| Weight | 30 kg |
| Power supply | 220 VAC, 50/60 Hz |

## Benefits

- Easy to operate
- ASTM-compliant

## Description

The CAI-70 is a precision instrument designed for the accurate determination of the rock abrasivity index (CAI), which is a crucial parameter used to classify rock materials based on their abrasiveness. The CAI is a dimensionless measurement derived from assessing the wear on a HRC55 Rockwell Hardness steel stylus tip after it has been employed to abrade a specimen with a normal force of 70N.This apparatus comprises several key components, including a stationary stylus, a deadweight (70N) positioned atop the stylus, a sturdy load frame, a robust vice for securely clamping the rock sample, and a cross table with two adjustable axes to align the specimen precisely along both horizontal axes. Additionally, the device features a graduated knob that allows for precise control of the scratch distance with an accuracy of 0.01 mm. Optional accessories include an indenter visualization system, spare indenters, and a sharpening tool. The indenter visualization system consists of a digital camera with support for the indenter and inspection software, which reveals the amount of wear on the stylus and correlates it to the abrasiveness index (CAI). The sharpening tool is used to quickly restore a worn stylus for subsequent scratch tests.

## Specifications

| | |
|---|---|
| Standard | ASTM D7625-10. |
| Load | 70 N |
| Maximum specimen height | 150 mm (6 inches) |
| Maximum specimen diameter | 76 mm (3.0 inches) |
| Scratch distance precision | 0.01 mm |
| Steel Stylus | Rockwell Hardness HRC 54/56 |
| Weight | 25 kg |
| Dimensions (WxLxH) | 330 x 500 x 500 mm |

## Benefits

- ASTM-compliant, West model
- Easy manual handling
- Features precision slide for smooth movement of the rock specimen over the required scratch distance
- Easy adjustment of the daylight for different specimen heights

## Description

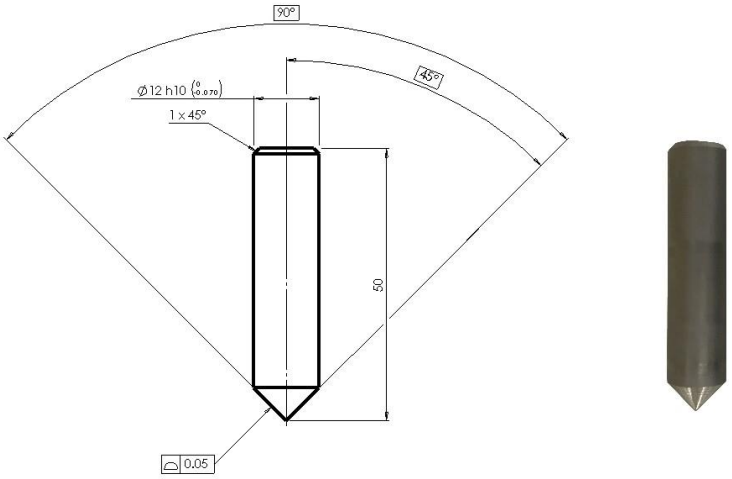
The OCAI-70 is a precise tool used to determine the rock abrasivity index (CAI), which plays a vital role in classifying rock materials based on their abrasiveness. This CAI is a dimensionless measurement derived from assessing the wear on a HRC55 Rockwell Hardness steel stylus tip after it has been used to abrade a specimen subjected to a 70N normal force. The instrument follows the ASTM D7625 method for assessing rock abrasiveness. The apparatus includes a mobile stylus and a deadweight (70N) positioned above the stylus. An articulated axis allows the user to place the stylus on the fixed specimen, and then, by moving the axis, creates a consistent 10mm-long stripe. The operator manually moves the stylus at a speed of 1mm/second during the test. Optional features encompass an indenter visualization system, spare indenters, and a sharpening tool. The indenter visualization system consists of a digital camera with support for the indenter and specialized inspection software. This system reveals the extent of wear on the stylus, which is then correlated to determine the abrasiveness index (CAI). The sharpening tool is utilized to quickly restore a worn stylus for subsequent scratch tests.

## Specifications

| | |
|---|---|
| Standard | ASTM D7625-10. |
| Load | 70 N |
| Maximum specimen height | 150 mm (6 inches) |
| Maximum specimen diameter | 76 mm (3.0 inches) |
| Scratch distance precision | 0.01 mm |
| Steel Stylus | Rockwell Hardness HRC 54/56 |
| Weight | 25 kg |
| Dimensions (WxLxH) | 260 x 460 x 375 mm |

## Benefits

- ASTM-compliant, original version
- Easy manual handling
- Features precision slide for smooth movement of the rock specimen over the required scratch distance
- Easy adjustment of the daylight for different specimen heights




## Description

The indenter functions as the stylus pin in both the original and west Cerchar abrasivity index testers. It's designed in accordance with the ASTM D7625 method for assessing rock abrasiveness. The tip of the test pin features a conical angle of 90°, and typically, it lasts for approximately 10 tests per unit.

## Specifications

| | |
|---|---|
| Standard | ASTM D7625-10. |
| Diameter | 12-mm |
| Length | 50-mm |
| Cone | 90° |
| Rockwell Hardness | HRC 54/56 (200 DaN/mm$^2$) |

## Benefits

- ASTM-compliant
- Fast delivery


## Description

The computer-controlled acoustic velocity measurement system facilitates the controlled propagation of both compressional (P) and shear waves (S or S1&S2) through geological rock specimens. Its integrated hardware and software employ state-of-the-art technology, enabling highly accurate determination of compression and shear wave velocities as well as dynamic elastic constants. This comprehensive system is equipped with essential components, including a swift-loading sample holder, a switch box, and a high-speed pulser-receiver that administers excitation to the ultrasonic sensors and visually presents the resultant waveform signals. The rapid-response pulser is employed to initiate excitation of the ultrasonic sensor, while an exceptionally high-speed analog-to-digital converter is utilized for the rapid capture and storage of the ensuing waveform signals. This setup ensures precise data acquisition and analysis for advanced research and geological investigations.

## Specifications

| | |
|---|---|
| Standard | ASTM D 2845 |
| Specimen diameter | Up to 2 inches |
| Specimen length | Up to 6 inches |
| Frequency | 1 MHz |
| Temperature | ambient |
| Waves | P and S1&S2 |

## Benefits

- designed to teach students the principles of acoustic velocity measurement
- short test duration
- Cost effective


## Description

The AVS-0 system allows for the propagation of compressional and shear waves through rock specimens under overburden pressures of up to 10,000 psi and at ambient temperature. It computes the acoustic velocity and ascertains dynamic elastic constants. This computer-controlled setup comprises an acoustic triaxial cell, a compression testing frame, and a fast-acting pulser-receiver responsible for both exciting the ultrasonic sensors and displaying the resulting waveform signals. The rapid-response pulser is utilized to initiate the excitation of the ultrasonic sensor integrated into the platens of the triaxial cell, while an exceptionally high-speed analog-to-digital converter is employed for the swift capture and storage of the ensuing waveform signals.

## Specifications

| | |
|---|---|
| Standard | ASTM D 2845 |
| Axial load | 300 KN |
| Pressure | Up to 10,000 psi |
| Specimen diameter | 1-inch, 1.5 inches (other upon request) |
| Specimen length | Twice the diameter |
| Frequency | 1 MHz |
| Temperature | ambient |
| Waves | P and S1&S2 |
| Wetted parts | Stainless steel |

## Benefits

- Representative overburden pressure conditions
- short test duration
- Cost effective


## Description

The servo-controlled MECATEST represents a conventional rock compression testing system with the capability to conduct both uniaxial and triaxial compression tests on large specimens. These tests enable users to derive valuable information such as strength and elastic properties, shear strength at varying confining pressures, angle of shearing resistance, cohesion, modulus of elasticity, Poisson's ratio, and tensile strength. The system's configuration options include uniaxial compression platens, axial and circumferential deformation sensors, a triaxial cell, acoustic velocity measurements, permeability assessments, polyaxial fixtures, and indirect tension Brazilian fixtures.

## Specifications

| | |
|---|---|
| Standard | ASTM D7012, D7070, D2664, D3967 |
| Compression load capacity | 3,000 kN |
| Maximum confining pressure | 70 MPa |
| Temperature | Ambient |
| Specimen diameter | From 54.7-mm up to 160-mm |
| Specimen length | Twice the diameter |
| Wetted parts | Stainless steel |
| Power supply | 110-220VAC, 50/60Hz |

## Benefits

- Multi-purpose machine capable of a wide range of uniaxial, acoustic and triaxial compression tests
- Automated tests with pre-programed stress and strain path
- Delivers unparalleled accuracy and reliability
- Heavy-duty, stiff, noise-free compression frame


## Description

The servo-controlled ROCKTEST is a streamlined and traditional rock compression testing system designed for conducting both uniaxial and triaxial compression tests on specimens. The tests conducted provide users with the capability to ascertain strength and elastic properties, shear strength under varying confining pressures, the angle of shearing resistance, cohesion, modulus of elasticity, Poisson's ratio, and tensile strength. The system's adaptable configuration options encompass uniaxial compression platens, axial and circumferential deformation sensors, a triaxial cell, acoustic velocity measurement, permeability assessment, polyaxial fixtures, and indirect tension Brazilian fixtures.

## Specifications

| | |
|---|---|
| Standard | ASTM D7012, D7070, D2664, D3967 |
| Compression load capacity | 1,000 kN |
| Maximum confining pressure | 70 MPa |
| Specimen diameter | Up to 54.7-mm |
| Specimen length | Twice the diameter |
| Power supply | 110-220VAC, 50/60Hz |

## Benefits

- Versatile design
- Cost-effective Rock compression tester
- Designed for instructional purposes
- Perfectly suited for educational and research establishments
- Rapid specimen loading operations
- Automated tests with pre-programed stress and strain path
- Delivers unparalleled accuracy and reliability


## Description

The GEOLAB is a compact compression testing apparatus with the capability to conduct both uniaxial and triaxial compression experiments on specimens. These experiments facilitate the determination of critical parameters such as material strength, elastic properties, shear strength under varying confining pressures, angle of shearing resistance, cohesion, modulus of elasticity, Poisson's ratio, point load, and splitting tensile strengths. Moreover, an acoustic velocity attachment can be integrated into the system for the purpose of propagating compressional (P) and shear waves (S1/S2) through rock specimens. Its principal purpose is to function as an educational instrument, designed to elucidate the fundamental tenets of rock mechanics to students in a lucid and expedient manner. An additional pedagogical advantage lies in the abbreviated duration of the experiments facilitated by this apparatus, underscoring its efficacy and appropriateness for instructional applications.

## Specifications

| | |
|---|---|
| Standard | D2664 & D7012 D3967 D5731 |
| Axial load | 300 KN |
| Pressure | Up to 70 Mpa |
| Specimen diameter | 1-inch or 1.5-inches |
| Specimen length | Twice the diameter |
| Power supply | 110-220VAC, 50/60Hz |

## Benefits

- Designed for instructional purposes
- Perfectly suited for educational and research establishments
- Versatile machine capable of a wide range of tests.
- Rapid specimen loading operations


## Description

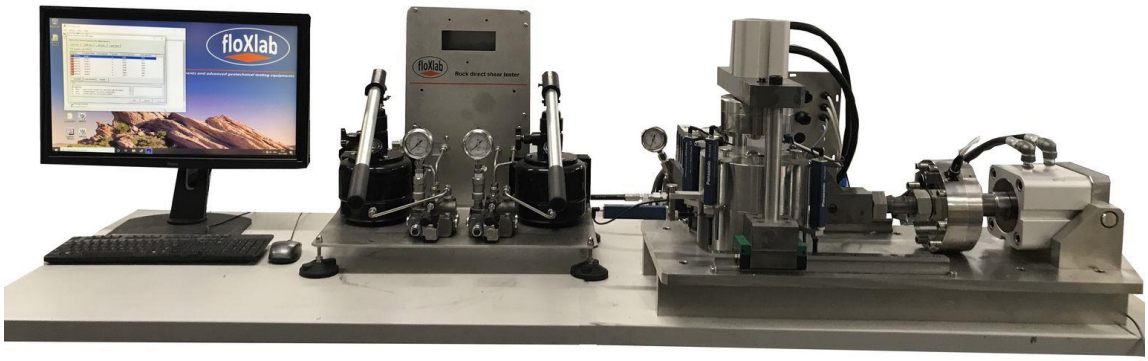
The GEOTEST is a highly advanced rock triaxial testing apparatus that excels in conducting triaxial tests, creep tests, and post-failure behavior evaluations. This versatile system can determine a wide range of geomechanical properties under triaxial compression conditions, including rock deformation properties, rock compressive strength, and static elastic constants. Additionally, it offers optional fixtures to expand its capabilities, enabling the performance of unconfined compressive strength tests, indirect tensile strength tests, acoustic velocity measurements, dynamic elastic constants assessments, rock permeability evaluations, rock compressibility assessments, polyaxial compression tests, hydraulic fracturing experiments, and acoustic emission tests. The hydraulic compression frame applies axial loads to a sample securely mounted in a balanced triaxial cell. This system accommodates both static and cyclic tests. Its stress-testing capabilities are virtually limitless within the device's physical constraints, and experiments can be conducted under stress feedback, strain control, or manual operation. To enhance specimen loading speed and overall system efficiency, it incorporates an integrated hydraulic cell setup mechanism. This mechanism involves mounting and instrumenting the sample on the cell pedestal, lowering the cell body, securely locking it against the pedestal, and then positioning it under the piston loading area.

## Specifications

| | |
|---|---|
| Standard | ASTM D7012, D7070, D5084, D3967 |
| Compression load capacity | 1,000 / 2,000 / 4,500 kN |
| Maximum confining pressure | 70 / 140 / 210 MPa |
| Maximum pore pressure | 70 / 140 / 210 MPa |
| Temperature | Ambient and high temperature (option) |
| Specimen diameter | Up to 100-mm |
| Specimen length | Twice the diameter |
| Wetted parts | Stainless steel |
| Power supply | 230-400 VAC, 3-Phases, 50/60Hz |

## Benefits

- Uses a balanced triaxial cell equipped with in-vessel radial and axial strain sensors
- Static and cyclic compression tests
- Automated tests with pre-programed stress and strain path
- Delivers unparalleled accuracy and reliability
- Heavy-duty, stiff, noise-free compression frame
- Rapid specimen loading facilities




## Description

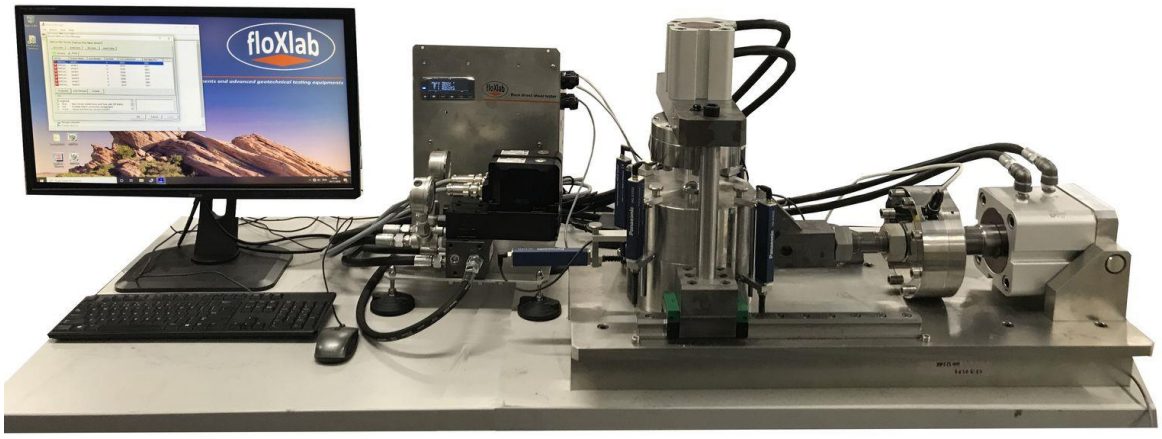
The SHEARTEST-100M is a flexible and durable direct-shear system that is operated manually. This apparatus utilizes hydraulic actuators to apply both normal and shear forces simultaneously to a rock sample situated within a specimen shear box. The system records shear and normal displacements and forces through a dedicated computing station. These collected data are subsequently employed to calculate the shear strength properties of the rock, including the cohesion (c) and the friction angle (Ø).

## Specifications

| | |
|---|---|
| Standard | ASTM D 5607, ISRM |
| Normal load capacity | 50 kN |
| Shear load capacity | 100 kN |
| Max. normal displacement | 25 mm |
| Max. shear displacement | 25 mm |
| Sample ring diameter | 150 mm |
| Sample height | 150 mm |
| Weight | 250 Kg |
| Power | 110-220 VAC, 50/60 Hz |

## Benefits

- ASTM-compliant
- Automated tests
- Stiff load reaction frame




## Description

The SHEARTEST-100A is a versatile and robust, direct-shear system. The closed-loop, servo-controlled device hydraulically applies simultaneous normal and shear forces on a rock sample located in a specimen shear box. Shear and normal displacements and forces are recorded by a dedicated computing station. These data are then used to derive the rock's shear strength parameters, including the cohesion (c) and the friction angle (Ø).

## Specifications

| | |
|---|---|
| Standard | ASTM D 5607, ISRM |
| Normal load capacity | 50 kN |
| Shear load capacity | 100 kN |
| Max. normal displacement | 25 mm |
| Max. shear displacement | 25 mm |
| Sample ring diameter | 150 mm |
| Sample Height | 150 mm |
| Weight | 500 Kg |
| Power | 230 VAC, 3ph, 50 or 60 Hz |

## Benefits

- ASTM-compliant
- Automated tests
- Stiff load reaction frame

## Description

The SHEARTEST-300 is a versatile and sturdy direct-shear system. This advanced, closed-loop, servo-controlled device utilizes hydraulic actuator to simultaneously apply normal and shear forces to a rock sample within a specimen shear box. A dedicated computing station records shear and normal displacements as well as forces. Subsequently, these recorded data are employed to determine the shear strength characteristics of the rock, which include cohesion (c) and friction angle (Ø).

## Specifications

| | |
|---|---|
| Standard | ASTM D 5607, ISRM |
| Normal load capacity | 500 kN |
| Shear load capacity | 300 kN |
| Max. normal displacement | 100 mm |
| Max. shear displacement | +/-50 mm |
| Sample ring diameter | 150 mm |
| Sample height | 150 mm |
| Weight | 1250 Kg |
| Power | 380 VAC, 1ph, 50 or 60 Hz |

## Benefits

- ASTM-compliant
- Automated tests
- Stiff load reaction frame


## Description

The servo-controlled HYDRATEST system is designed for conducting triaxial tests on sediment samples containing methane hydrates under extreme conditions of low temperature (below freezing) and high pressure. Its primary purpose is to investigate the mechanical properties of methane hydrate-bearing sediments (MHBS) at various levels of methane hydrate saturation. These mechanical properties of MHBS are influenced by factors such as temperature, pore pressure, confining pressure, and hydrate saturation. Through triaxial tests, the system determines essential properties like Young's modulus, cohesion, and internal friction angle of laboratory-synthesized hydrate-bearing sediments. The system employs a hydraulic compression frame capable of applying axial loads of up to 100 kN on the specimen. It is servo-controlled, utilizing in-vessel load cells and strain sensors to precisely control the applied load on the sample. Triaxial stresses are imposed by applying circumferential confining pressure concurrently with the axial load. To facilitate the experiments, two dedicated syringe pumps independently inject methane and water into the specimen at controlled pressures. Additionally, a temperature control jacket connected to an external bath is utilized to regulate and maintain a consistent, isothermal temperature profile within the specimen, allowing for controlled cooling, heating, and temperature maintenance throughout the testing process.

## Specifications

| | |
|---|---|
| Compression load capacity | 100 kN |
| Temperature | -10 to +60°C |
| Confining pressure | up 70 MPa |
| Gas pressure | up 70 MPa |
| Water pressure | up 70 MPa |
| Specimen diameter | 50 mm (other upon request) |
| Specimen length | Twice the diameter |
| Wetted parts | Stainless steel |
| Power supply | 110-220VAC, 50/60Hz |

## Benefits

- Designed for mimic hydrate behaviour in sediments under temperature and triaxial test conditions
- Automated tests with pre-programed stress and strain path
- Delivers unparalleled accuracy and reliability


## Description

The AVS 700 system is designed to conduct measurements of compressional and shear wave velocities in rock specimens while replicating in situ conditions, including overburden pressure, pore pressure, and temperature. The system consists of a pressure vessel that encases the rock sample, flanked by two compression platens housing piezo-electric crystals for both compression and shear wave measurements, a fluid vessel containing pore fluid for injection into the specimen, an air-operated pump responsible for controlling both confining and pore pressure, a fast-acting pulser-receiver and a data acquisition computer station. The pulser-receiver is responsible for exciting the ultrasonic sensors and displaying the resulting waveform signals. The rapid-response pulser is employed to initiate the excitation of the ultrasonic sensor, while an exceptionally high-speed analog-to-digital converter is utilized for the rapid capture and storage of the ensuing waveform signals.

## Specifications

| | |
|---|---|
| Standard | ASTM D 2845 |
| Specimen diameter | 1 inch, 30mm and 1.5 inches |
| Specimen length | up to 4 inches |
| Temperature range | ambient to 120°C |
| Maximum confining pressure | 70 MPa |
| Maximum pore pressure | 70 MPa |
| Wetted parts | Stainless steel or Hastelloy |
| Power supply | 110-220VAC, 50/60Hz |

## Benefits

- Easy specimen loading operations
- Cost-effective instrument
- Delivers unparalleled accuracy and reliability


## Description

The fully automated ROCLAB system performs at in-situ temperatures, pore and bulk volume compressibility measurements of rock specimens under either hydrostatic stress, triaxial stress or uniaxial strain control. The apparatus consists of a controlled temperature pressure vessel which accommodates various loading platens with different diameters and three servo-controlled syringe pumps to respectively control the pore, radial and axial pressures. A diametral extensometer is utilized for radial strain measurement during compressibility tests while radial deformations are obtained with three LVDT sensors. An in-vessel strain-gaged load cell provides a direct reading of the axial force applied to the specimen.

## Specifications

| | |
|---|---|
| Standard | ISRM recommendations |
| Specimen diameter | 1 inch, 30 mm and 1.5 inches |
| Specimen length | up to 4 inches |
| Temperature | Ambient to up 150°C (300 F) |
| Maximum confining pressure | 100 Mpa |
| Maximum axial stress | 100 Mpa |
| Maximum pore pressure | 100 Mpa |
| Wetted parts | Stainless steel or Hastelloy |
| Power supply | 110-220 VAC – 50/60 Hz |

## Benefits

- Include in-vessel strain sensors for uniaxial-strain compressibility tests
- Simulates actual reservoir production stress path
- Accounts for inelastic behavior of reservoir rock
- Measures compaction directly from axial strain
- Obtains compressibility as a function of pore pressure
- Multifunctional system


## Description

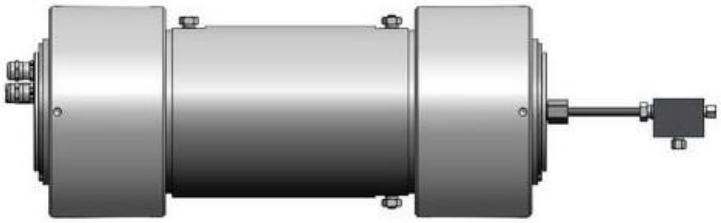
The TRILAB apparatus is designed for the study of stress-strain behavior and the compressibilities of bulk and pore volumes under in-situ stress and temperature conditions. Governed by a computerized control interface, the system features a balanced deviatoric triaxial cell, which is instrumented with integrated in-vessel strain gauges, a thermal regulation system, an internal load cell, and a lifting device. To induce and regulate axial, pore, and confining pressures, the system is equipped with three high-pressure syringe pumps. The apparatus is modularly designed to accommodate a range of maximum cell pressures and test specimen geometries.

## Specifications

| | |
|---|---|
| Standard | ASTM D7012 |
| Specimen diameter | Model 1: up to 54.7 mm<br>Model 2: 54.7 to 100 mm |
| Specimen length | twice the diameter |
| Temperature range | ambient to 150°C (300F) |
| Maximum axial load | Model 1: 1,000 kN<br>Model 2: 2,500 kN |
| Maximum confining pressure | 70 / 140 MPa |
| Maximum pore pressure | 70 / 140 MPa |
| Wetted parts | Stainless steel |
| Power supply | 110-220VAC, 50/60Hz |

## Benefits

- Easy specimen loading operations
- Versatile machine capable of a wide range of petrophyscial and mechanical tests.
- Automated tests
- Delivers unparalleled accuracy and reliability
- Achieve any desired stress path



## Description

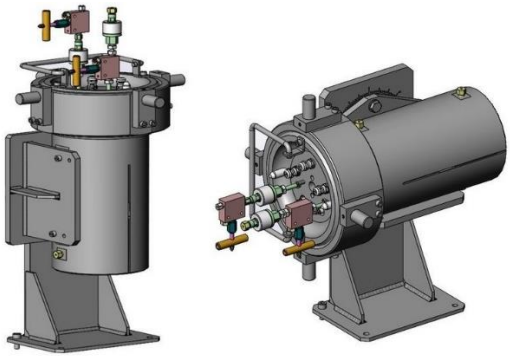
The HUC Series consists of hydrostatic core holders integrated with acoustic sensors, making them ideal for ultrasonic studies involving fluid displacement in porous media. A key feature of these core holders is their ability to apply equal radial and axial confining pressures. The cell assembly includes specialized acoustic platens designed to facilitate the transmission of compressional (P) and shear (S1/S2) waves through rock specimens under controlled overburden pressure and temperature conditions. Measurements performed on rock samples at varying confining pressures allow for the determination of compressional and orthogonal shear wave velocities, dynamic elastic constants, and simultaneous assessment of rock permeability. A cylindrical core sample is placed inside a Viton sleeve and positioned between a fixed acoustic platen at one end and a floating acoustic platen at the other. Confining pressure is applied using an external pump to ensure firm contact between the core sample and the acoustic platens, accommodating a variety of core lengths. Coaxial feedthroughs facilitate the monitoring of acoustic signals from the acoustic floating platen. Pore fluids enter through the fixed acoustic platen, flow across the core sample, and exit via a ¼" diameter tubing connected to the floating acoustic platen. To replace the core sample, the confining fluid must first be drained, and the end plugs unscrewed by rotating it counter clockwise. This action removes the entire assembly—fixed acoustic platen, sleeve, core, and floating acoustic platen—allowing the core to be extracted from the sleeve. A new core can then be loaded by reversing the process.

## Specifications

| | |
|---|---|
| Standard | ASTM D2845 |
| Max confining pressure | 10,000 psi |
| Max temperature | 120°C |
| Acoustic waves | P, S1 & S2 |
| Frequency | 1 MHz |
| Sample diameter | 1 and 1.5 inches |
| Sample length | Twice the diameter |
| Wetted part material | Stainless steel / Hastelloy |
| Pore inlet | 1 |
| Pore outlet | 1 |
| Port fittings | 1/8-inch |

## Benefits

- Tests performed on a series of rock specimens under different pressures and temperatures
- Compression and two orthogonal shear wave velocities
- Dynamic elastic constants
- Rock permeabilities



Vertical position Horizontal position

## Description

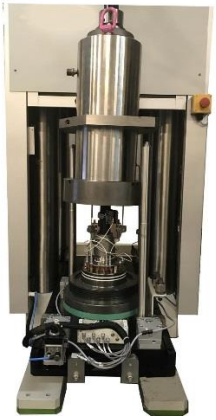
The UEC Series consists of hydrostatic core holders integrated with acoustic sensors and electrodes, making them ideal for ultrasonic and resistivity studies involving fluid displacement in porous media. A key feature of these core holders is their ability to apply equal radial and axial confining pressures. The cell can be optionally equipped with a built-in hydraulic deviator chamber to apply an axial load on the specimen, enabling the application of distinct radial and axial confining pressures to generate deviatoric stress on the sample. The cell assembly includes specialized acoustic platens designed to facilitate the transmission of compressional (P) and shear (S1/S2) waves through rock specimens under controlled overburden pressure and temperature conditions. The cell is equipped with four electrodes designed for 2-point and 4-point electrical resistivity measurements. Two of these electrodes are in contact with the acoustic platens, which are electrically isolated from the rest of the system. The other two are circumferential electrodes embedded within the Viton electrical sleeve, positioned at the longitudinal midsection of the sleeve and spaced one inch apart. These coreholders are critical for understanding how fluid saturations, pressure, and temperature affect the mechanical (compressional and orthogonal shear wave velocities, dynamic elastic constants) and electrical properties of rocks, especially in applications like CO2 sequestration, hydrocarbon recovery, and reservoir characterization.

## Specifications

| | |
|---|---|
| Standard | ASTM D2845 |
| Max confining pressure | 10,000 psi |
| Max temperature | 120°C |
| Acoustic waves | P, S1 & S2 |
| Frequency | 1 MHz |
| Resistivity | 2 and 4 points |
| Sample diameter | 1 and 1.5 inches |
| Sample length | Twice the diameter |
| Wetted part material | Stainless steel / Hastelloy |
| Loading | Hydrostatic or triaxial |

## Benefits

- Tests performed on a series of rock specimens under different pressures and temperatures
- Compression and two orthogonal shear wave velocities
- Dynamic elastic constants
- Rock resistivities



## Description

The PC-series triaxial cell functions as a specialized chamber designed to apply both axial and radial compressive forces on cylindrical rock samples. This dual-directional stress is achieved by exerting a surrounding confining pressure alongside an axial force. To operate, the cell needs to be situated within a specialized axial load frame. Within the cell, the rock sample is encased in a Teflon sleeve and sandwiched between hardened steel end caps. This setup is then submerged in pressurized oil for confinement. Built-in electrical connectors at the base of the cell enable the addition of internal measurement instruments, such as devices for tracking axial and radial deformations, ultrasonic platens, and various specialized transducers. The cell's design incorporates top and bottom ports for conducting pore pressure tests on both the upper and lower platens. The unit comes equipped with a low-friction loading piston and offers the option for various sizes of platens, pistons, and extra electrical connectors for tailored testing requirements. Additionally, a heating system can be included in the cell if needed.

## Specifications

| | |
|---|---|
| Maximum cell pressure | 70 /140 MPa |
| Specimen diameter | Model 1: up to 54.7 mm (NX)<br>Model 2: up to 100 mm |
| Specimen length | twice the diameter |
| Temperature | ambient to 150°C (optional) |
| Pore pressure port | 1/8 inch LP |
| Confining port | 1/4 inch HP |
| Sleeve material | Teflon |
| Wetted part material | Stainless steel |

## Benefits

- Easy to operate
- Models available for different specimen sizes
- High pressure, high temperature capability
- ASTM-compliant

## Description

The BPC-series balanced passive triaxial cells are designed for specialized compression testing of rock samples under consistent confining pressures and axial compressive forces. To apply the axial forces, a separate external load frame is necessary. One standout feature of the cell is its self-adjusting axial load ram, which neutralizes the upward force generated by the internal cell pressure. This not only spares the external load frame from bearing the cell's pressure load but also decreases the overall capacity needed from the load frame to achieve the desired deviatoric stress. This design also eliminates any fluctuations in confining pressure during axial loading. Within the cell, rock samples are encased in a Teflon sleeve and flanked by hardened steel end caps. This assembly is then submerged in oil under pressure for confining the specimen. Integrated electrical connectors at the base of the cell make it possible to install a range of internal monitoring instruments, including devices for measuring axial and radial deformations, ultrasonic platens, and various specialized transducers. The cell's design incorporates both upper and lower fluid ports for conducting pore pressure tests, an integral part of its architecture. It comes equipped with a low-friction loading piston, and customization options include different sizes of platens, pistons, and additional electrical connectors for specialized testing. A heating system can also be added to the cell upon request.

## Specifications

| | |
|---|---|
| Maximum cell pressure | 70 /140 MPa |
| Specimen diameter | Model 1: up to 54.7 mm (NX)<br>Model 2: up to 100 mm |
| Specimen length | twice the diameter |
| Temperature | ambient to 150°C (optional) |
| Pore pressure port | 1/8 inch LP |
| Confining port | 1/4 inch HP |
| Sleeve material | Teflon |
| Wetted part material | Stainless steel |

## Benefits

- Self-compensated ram allowing zero ram up thrust
- Require smaller load frame capacity
- Confining pressure changes have no influence on axial loading
- Models available for different specimen sizes

## Description

The DC-series deviatoric triaxial cells are engineered explicitly for rock triaxial testing, eliminating the need for an external frame to apply axial loads. Instead, the cell features an integrated hydraulic deviator chamber that directly exerts the axial force on the sample. Each specimen is housed in a Teflon sleeve, secured between hardened steel end caps, and then submerged in pressurized oil for confinement. Built-in electrical connectors at the base of the cell facilitate the integration of internal monitoring instruments. The cell's design also includes fluid ports on both the upper and lower platens for conducting pore pressure tests, which is a standard feature of its architecture. Customization options include a variety of platen diameters to accommodate different sample geometries. Additionally, a heating system can be incorporated into the cell if necessary.

## Specifications

| | |
|---|---|
| Maximum cell pressure | 70 /140 MPa |
| Maximum axial load | Model 1: 1,000 kN<br>Model 2: 2,500 kN |
| Specimen length | Model 1: up to 54.7 mm (NX)<br>Model 2: up to 100 mm<br>twice the diameter |
| Temperature | ambient to 150°C (optional) |
| Pore pressure port | 1/8 inch LP |
| Confining port | 1/4 inch HP |
| Sleeve material | Teflon |
| Wetted part material | Stainless steel |

## Benefits

- Built in deviatoric chamber, no external load frame required
- Models available for different specimen sizes

## Description

The BDC-series balanced ram deviatoric triaxial cells are purpose-built for conducting rock triaxial tests without the need for an external load frame to deliver axial forces. The cell comes equipped with an integrated hydraulic deviator chamber that administers the axial load directly onto the rock sample. A unique feature of this cell is its self-adjusting axial load ram, which neutralizes the upward thrust generated by the internal cell pressure. This design not only eliminates the need for the external load frame to bear the cell's pressure load but also minimizes the capacity requirements of such a frame to achieve equivalent deviatoric stress. Within the cell, the rock specimen is encased in a Teflon sleeve and sandwiched between hardened steel end caps. This assembly is then submerged in pressurized oil to provide confinement. The cell base incorporates built-in electrical connectors, facilitating the integration of internal monitoring devices. Fluid ports on both the upper and lower platens for pore pressure testing are a standard feature of the cell's design. Various platen diameters are available to accommodate custom sample geometries, and a heating system can be added upon request.

## Specifications

| | |
|---|---|
| Maximum cell pressure | 70 /140 MPa |
| Maximum axial load | Model 1: 1,000 kN<br>Model 2: 2,500 kN |
| Specimen length | Model 1: up to 54.7 mm (NX)<br>Model 2: up to 100 mm<br>twice the diameter |
| Temperature | ambient to 150°C (optional) |
| Pore pressure port | 1/8 inch LP |
| Confining port | 1/4 inch HP |
| Sleeve material | Teflon |
| Wetted part material | Stainless steel |

## Benefits

- Built-in deviatoric chamber, no external load frame required
- Self-compensated ram allowing zero ram up thrust
- Confining pressure changes have no influence on the axial loading
- Models available for different specimen sizes

## Description

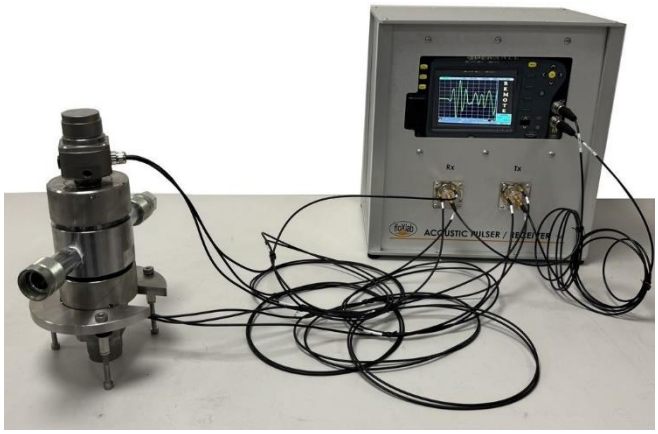
The Hoek Cell is designed for use in triaxial compression tests that provide vital data on rock strength and elasticity, including variables such as shear strength under varying confining pressures, internal friction angle, cohesion intercept, and Young's modulus. This versatile cell can be customized to hold samples with diameters ranging from 21.5 mm to 63.5 mm (HQ). In the testing setup, the rock specimen is positioned between two mobile loading pistons and subjected to compression via a load frame. A specialized sleeve ensures that the sample remains isolated from the hydraulic confining fluid. The Hoek Cell consists of a hollow steel cylinder with screw-on end caps, two high-resistance spherically seated loading pistons, and a protective sleeve. The cylinder features two self-sealing couplings: one for linking to the hydraulic pressure system and another for venting air from the cell chamber. For enhanced data capture, the cell can be optionally fitted with integrated strain gauges, allowing for detailed analysis of the failure envelope in addition to the aforementioned rock properties.

## Specifications

| | |
|---|---|
| Standard | ASTM (D7012) |
| Maximum confining pressure | 70 MPa |
| Loading length | 400 mm |
| specimen diameter | Up to 63.5 mm (HQ) |
| Specimen length | twice the diameter |
| Wetted part material | Stainless steel |
| Pore port | 1/8 inch |
| Confining port | 3/8 inch |

## Benefits

- Easy to operate
- Models available for different specimen sizes
- High pressure capability
- ASTM-compliant



## Description

The triaxial acoustic cell is designed to transmit compressional (P) and shear waves (S1/S2) through rock samples under conditions of overburden pressure and room temperature. The sample is positioned between two adjustable loading pistons and compressed using a load frame. A specialized sleeve serves to isolate the sample from the hydraulic confining fluid. A distinct advantage of this setup is the ability for quick sample loading and unloading, eliminating the need to drain the confining fluid or remove the core sleeve. The cell consists of a hollow steel cylinder with screw-on, detachable ends, along with two high-resistance spherically seated acoustic loading platens, a pair of female spherical seats, and an isolating sleeve. To apply the axial force to the sample, an external compression testing frame is necessary. Additionally, a high-pressure pump is required to produce the confining pressure.

## Specifications

| | |
|---|---|
| Standard | ASTM (D2845) |
| Maximum confining pressure | 70 MPa |
| Waves | P, 1 & S2 |
| Frequency | 1 Mhz |
| specimen diameter | 1-inch, 1.5-inches (other upon request) |
| Specimen length | twice the diameter |
| Wetted part material | Stainless steel |
| Pore port | 1/8 inch |
| Confining port | 3/8 inch |

## Benefits

- Easy to operate
- Models available for different specimen sizes
- High pressure capability
- ASTM-compliant

## Description

The Quick Release Triaxial Cell enables streamlined testing for rock specimens with diameters that vary from 21.5 mm (EX) to 54 mm (NX). The rock sample, along with the top and bottom platens, is enclosed in a heat-shrinkable sleeve. This entire setup is then precisely positioned and centered in the cell using a guiding tool. After alignment, three instrumented lateral actuators equipped with pressure-compensated LVDTs make contact with the sleeve to accurately measure diametral strains. Axial strains are gauged using two averaging vertical LVDTs. For effective operation, the QRT series cell needs to be integrated into a system that includes an external axial load actuator, such as a load frame, and one or more high-pressure pumps for fluid injection and confining pressure application.

## Specifications

| | |
|---|---|
| Maximum confining pressure | 70 MPa (10,000 psi) |
| Maximum Temperature | 150°C |
| Specimen diameter | Up to 54.7 mm (NX) |
| Specimen height | twice the diameter |
| Confining and pore ports | 1/8 inch |
| Wetted part material | Stainless steel |

## Benefits

- Quick specimen setup.
- Axial and radial strain measurements.
- Upper platen provided with a spherical seat to compensate for non-parallel specimen ends.
- Hardened stainless steel construction.
- Bottom pore pressure plumbing provided for effective stress measurements.
- Includes triaxial software and automatic data acquisition
- The LVDTS eliminate the time-consuming task of gluing strain gages onto the specimen to measure radial strains

## Description

The UV-700 serves as a supplementary module for Floxlab's passive and deviatoric triaxial cells, designed to measure the dynamic elastic properties of core samples under varying stress conditions. These properties include dynamic Young's modulus, shear modulus, and Poisson's ratio. The complete system features a rapid-response pulser to stimulate the ultrasonic sensor, an ultra-high-speed analog-to-digital converter for capturing and storing waveform signals, and specialized software for system control and data acquisition. In synchronization with uniaxial and triaxial loading, the system performs and logs acoustic measurements for both compression and shear waves. The piezo-electric crystals used for these measurements are integrated into the compression platens.

## Specifications

| | |
|---|---|
| Standard | ASTM D2845 |
| Mode | compressional (P) and shear (S1 and S2) |
| Center frequency | 500 kHz |
| Temperature | up to 120°C |

## Benefits

- Designed for easy and quick installation
- ASTM-compliant device
- Designed for testing a range of specimen diameters

## Description

The Acoustic Emission (AE) Monitoring Fixture serves as an auxiliary module for Floxlab's passive and deviatoric triaxial cells. Designed to investigate fracture dynamics in geotechnical applications like hydraulic fracturing, this module offers non-intrusive and precise assessment of a sample's mechanical attributes under triaxial test conditions. Once specific in-situ conditions are established, fluctuations in variables like load, confining pressures, pore pressures, and temperatures can trigger ultrasonic events. These events, in turn, yield valuable AE metrics such as hit counts, energy, amplitude, event duration, and the localization of the AE hypocenter.The system features up to 8 AE transducers, strategically arranged in a radial pattern around the test specimen. Additionally, it includes an AE signal processing system and software for 2D and 3D event localization.

## Specifications

| | |
|---|---|
| Peak sensitivity, Ref V/(m/s) | 62 dB |
| Peak sensitivity, Ref V/µbar | -72 dB |
| Operating frequency | 125-750 KHz |
| Resonant frequency, Ref V/(m/s) | 140 kHz |
| Resonant frequency, Ref V/µbar | 300 kHz |
| Directionality | +/11.5 dB |
| Temperature range | -65 to 177°C |
| Dimensions | 0.3” OD x 0.3” H (8 mm OD x 8mm H) |

## Benefits

- State of the art AE monitoring system
- Excellently detects core failure onset during compression tests
- Allows fracture morphology to be reconstructed during hydraulic fracture tests.

## Description

Optimal for various rock formations, the diametral strain gauge extensometer is designed to monitor changes in the specimen's diameter during compression tests. The instrument captures two perpendicular diametral strains on cylindrical samples, offering the option to record each strain individually or as an average. This device is compatible with axial extensometers, enhancing its versatility. Frequently used in triaxial pressure cells for rock sample testing, the unit is engineered to fit inside these vessels. It is well-adapted for environments with high temperatures and high-pressure oil media. The extensometer comprises two pairs of cantilever strain-gauged beams, positioned orthogonally and integrated into Wheatstone bridge circuits for precise measurement. Designed for user convenience, the self-supporting extensometer is secured against the specimen using four long screws, enabling quick and straightforward adjustments for a wide range of sample diameters. Compatible with any electronics designed for strain-gauged transducers, the sensor can be customized to accommodate different specimen sizes.

## Specifications

| | |
|---|---|
| Specimen diameter | Model 1: 25 to 55 mm<br>Model 2: 55 to 75 mm<br>Model 3: 75 to 100 mm |
| Diametral deformation range | 5 mm |
| Linearity | 0.5% F.S |
| Operating Temperature | 0°C to 200°C |

## Benefits

- Easy set-up
- Accommodates a large range of specimens
- Repeatable and direct measurement of diametral deformation
- Sturdy construction to prevent device damage
- Can be used inside a triaxial cell or mounted on specimen for unconfined compression tests

## Description

The circumferential extensometer is designed to directly track average changes in a specimen's circumference as it undergoes compression. Utilizing a high-precision, custom-made roller chain with specialized rollers, the extensometer is securely mounted onto the specimen. Strain gauges are employed to continuously monitor alterations in circumference. As the specimen's diameter expands during the testing phase, the roller chain triggers the extensometer to expand correspondingly. Engineered for self-support, the unit remains in place on the specimen through built-in springs. Various chain lengths can be selected to accommodate specimens of different sizes. The device features a mechanical adjustment function that enables the output to be zeroed out as needed. For added safety, a breakaway mechanism is integrated to protect the extensometer in cases of specimen failure. This model is specifically crafted to fit within testing vessels and is well-suited for operation in high-pressure and high-temperature oil environments. Furthermore, the extensometer is universally compatible with any electronics that are engineered for strain-gauged transducers.

## Specifications

| | |
|---|---|
| Specimen diameter | 25 to 100 mm |
| Circumferential deformation range | 4 mm |
| Linearity | 0.5% F.S |
| Operating Temperature | 0°C to 200°C |

## Benefits

- Easy set-up
- Accommodates a large range of specimens by adding or removing assembly links
- Repeatable and direct measurement of circumferential deformation
- Sturdy construction to prevent device damage
- Can be used inside a triaxial cell or mounted on specimen for unconfined compression tests

## Description

The axial strain LVDT sensor is engineered to monitor average axial deformation during both uniaxial and triaxial testing procedures. The device features three vertically adjustable, immersible LVDTs (Linear Variable Differential Transformers), which are directly affixed to the loading platens at both ends of the specimen. Positioned at 120-degree intervals from each other, these sensors effectively track any uneven axial shifts in the specimen. This model is specifically crafted to fit within testing vessels and is well-suited for operation in high-pressure and high-temperature oil environments. Designed for universal compatibility, the sensors can interface seamlessly with any electronic systems that are built for LVDT sensors. Additionally, they can be custom-manufactured to suit specimens of various sizes.

## Specifications

| | |
|---|---|
| Specimen length | Model 1: 25 to 55 mm<br>Model 2: 55 to 100 mm |
| Axial deformation range | 5 mm |
| Linearity | 0.25% F.S |
| Operating Temperature | 0°C to 200°C |

## Benefits

- The strain sensors can be designed to be either used within our high-pressure triaxial cell or mounted on specimen for unconfined compression tests.
- Available for different specimen sizes

## Description

The CEC-series is designed to calibrate circumferential extensometers, offering corrections for sensor non-linearity and repeatability. Comprising an expandable hub and a micrometer tailored for specific diameters, this calibration tool provides precise measurement of absolute displacements down to an exceptional 0.001 mm resolution. Equipped with a digital indicator, the device can display measurements in both SI and imperial units. Multiple models are available to accommodate a range of specimen diameters.

## Specifications

| | |
|---|---|
| Standard: | ASTM E83 & F2537 |
| Diameter range: | 25 mm to 100 mm |
| Resolution: | 0.001 mm (0.000050 inch) |
| Weight: | 1 kg |
| Dimensions: | 5 x 5 x 7 cm |

## Benefits

- Easy to use
- Accommodate different circumferential extensometer diameter
- ASTM compliant

## Description

The LVDT calibration instrument is designed to calibrate both LVDT transducers and diametral extensometers, addressing issues related to sensor non-linearity and repeatability. This versatile tool can accommodate a broad spectrum of LVDT transducers and offers a high-precision 0.001-mm resolution for measuring either absolute or relative displacements. A digital display is featured on the device, capable of reporting measurements in both SI and imperial units. Additionally, the tool includes an adjustable mounting bracket, allowing for the calibration of transducers of varying sizes. The standard configuration is compatible with sensors having body diameters of 3/8”, 3/4", and 7/8”. Custom dimensions are also available upon request.

## Specifications

| | |
|---|---|
| Standard: | ASTM E83 & F2537 |
| Travel range: | 10 mm |
| Resolution: | 0.001 mm (0.000050 inch) |
| Weight: | 1 kg |
| Dimensions: | 10 x 10 x 25 cm |

## Benefits

- Easy to use, no special tools required.
- ASTM compliant

## Description

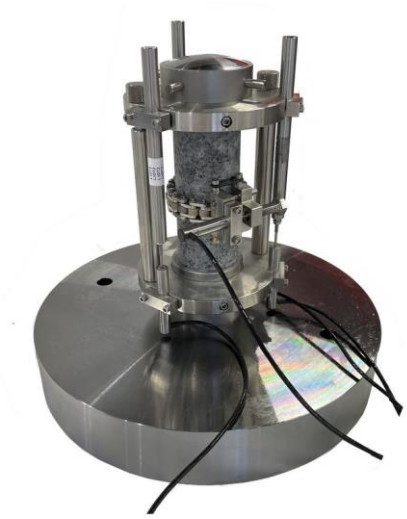
The in-vessel strain-gauged load cell is engineered to provide precise, direct quantification of the axial force being applied to the test specimen. This eliminates errors commonly introduced by factors such as non-linear seal friction and localized pressure anomalies. Constructed for compatibility with approved classes of mineral and synthetic oils, the load cell features a robust and compact design. This makes it suitable for high-stress operational conditions, specifically those involving elevated pressures and temperatures. Multiple configurations are available, each calibrated for different axial load ranges, to cater to a variety of testing requirements.

## Specifications

| | |
|---|---|
| Accuracy | class 0.5 |
| Operating temperature | 0°C to +200°C |
| Sensitivity | approx. 2 mV/V |
| Diameter | approx. 60 mm |
| Height | approx. 75 mm |

## Benefits

- Withstand high temperature temperature.
- Compact enough to be mounted within a triaxial cell



## Description

The versatile uniaxial compression platens are designed for seamless integration into any load frame, facilitating the execution of unconfined rock compression tests to ascertain key static elastic parameters such as compressive strength, stress-strain curves, Young's modulus, and Poisson's ratio. Engineered for optimal stiffness, the platens minimize deflection events even when compressing high-strength rock samples. While the lower platen is stationary, the upper platen incorporates a spherical seating mechanism to ensure impeccable alignment with the specimen's surface. The rock sample is securely wedged between these parallel upper and lower platens and is subjected to load until the point of failure. Throughout this process, both the applied load and resultant displacement are continually monitored. The peak load value is subsequently used for calculating the specimen's unconfined compressive strength (UCS). The platens are offered in multiple dimensions, allowing accommodation of a wide range of specimen diameters.

## Specifications

| | |
|---|---|
| Standard: | ASTM D7012, ASTM D7070 |
| Compression load capacity: | 3,000 kN |
| Specimen diameter: | Model 1: up to 54 mm (NX) |
| | Model 2: up to 100 mm |
| | Model 3: up to 150 mm |
| Wetted parts: | Stainless steel |

## Benefits

Compatible with any load frame
Convenient
Robust and reliable

Standard ITB 250
(Max diameter: 76 mm)

Extended ITB 250
(Max diameter: 150 mm)

## Description

The ITB-250 is specifically engineered to evaluate tensile strength through the application of uniform diametrical line compression on cylindrical test specimens. When subjected to vertical compression between two precision-machined cylindrical seating loading jaws, the specimen experiences induced indirect tensile stress along with a consequent orthogonal deformation. This testing assembly, also commonly referred to as the Brazilian test apparatus, is designed for seamless integration into standardized load frames. The system is comprised of three primary components: a specialized indirect tension fixture for specimen positioning, a calibrated load cell for force measurement, and a dedicated software module optimized for indirect tension test analytics. Collectively, these elements ensure high-precision and reliable data collection for the determination of tensile strength variables.

## Specifications

| | |
|---|---|
| Standard | ASTM D 3967 and ISRM suggested method |
| Specimen diameter | Standard version: up to 76.2 mm (3inches)<br>Extended version: up to 150 mm (6.0 inches) |
| Specimen thickness | Between 0.2 to 0.75 x the specimen diameter |
| Material | High grade stainless steel |
| Rated force capacity | 250 kN |

## Benefits

- Assured excellent alignment between the fixture and the specimen
- Easy installation of removal from the load frame
- Hardened specimen end caps for testing strong rock
- Versatile, allows multiple specimen diameter to be tested using the same fixture


## Description

The PLF-100 is specifically engineered to evaluate the uncorrected point load strength index, denoted as "Is," which is then converted into a point load index standardized to a diameter (De) of 50 mm. This converted value, known as "Is(50)," serves multiple purposes, including rock strength classification and the estimation of parameters such as uniaxial compressive strength (UCS) and rock anisotropy, represented as Ia(50). This setup adheres to the procedures outlined in ASTM D5731, ensuring standardized and reliable testing methodologies. The fixture comes with a set of conical platens designed to accommodate disk-shaped specimens with diameters ranging from 25.4 mm (1-inch) to 101.6 mm (4-inches) and lengths equal to twice their diameter. The tool must be used with a load frame capable of exerting a force of up to 100 kN to fracture the sample.

## Specifications

| | |
|---|---|
| Standard | ASTM D 5731 |
| Load capacity | 100 kN |
| Maximum sample size | 4 inches (101.6 mm) |

## Benefits

- Simple test
- Direct reading of specimen diameter
- Extreme rigidity
- Inexpensive instrument
- Attractive alternative to the UCS test because provides similar data at a lower cost

## Description

The setup is designed to perform rock permeability measurements under elevated pore pressures and triaxial loading conditions, thereby ascertaining the flow characteristics and transport capacity of the rock matrix. Specifically, the device is capable of capturing permeability values that range from 0.01 milliDarcies (mD) to 10 Darcies. The flow conditions for the permeability tests are meticulously regulated by dual high-precision, continuous flow pumps, which are connected to the upstream and downstream termini of the rock sample. The initial pore pressure pump infuses a fluid at a consistent flow rate through the rock specimen housed in the triaxial cell. Concurrently, the secondary pump stabilizes the outlet pressure of the system, mitigating any pressure oscillations within the setup. Pressure gradients across the sample are precisely monitored through the use of high-accuracy pressure transducers. Subsequently, the measured data is processed to calculate the permeability based on Darcy's law, thereby ensuring a rigorous and reliable assessment of the rock's permeability characteristics.

## Specifications

| | |
|---|---|
| Standard | ISRM Suggested method |
| Permeability range | 0.01 md and 10 Darcy |
| Maximum pore pressure | 70 Mpa |
| Fluid | Water, oil |

## Benefits

- Designed for easy and quick installation
- Designed for testing a range of specimen diameters


## Description

The PDP 200 is a specialized instrument engineered for the precise quantification of ultra-low permeability in very tight rock samples. Utilizing the pulse-decay permeability method, the device is calibrated to deliver reliable measurements in the range of approximately 0.01 microdarcies to 0.1 millidarcies. The system monitors the decay of pressure differentials across the rock specimen at predetermined time intervals. The instrument's architecture includes a thermostatically-controlled insulation cabinet for maintaining consistent test conditions. Within this cabinet are two stainless steel reservoirs tasked with fluid storage and management, complemented by dual high-precision pressure transducers for meticulous pressure gradient monitoring. The system also incorporates multiple zero-volume-change valves, as well as a dedicated needle valve to initiate the pulse-decay process. Data acquisition and analysis are facilitated by an integrated computer station, ensuring the accurate capture and interpretation of permeability metrics.

## Specifications

| | |
|---|---|
| Standard | ISRM Suggested method |
| Permeability range | 0.01 microdarcy and 0.1 millidarcy |
| Maximum pore pressure | 20 Mpa |
| Fluid | Nitrogen gas |

## Benefits

- Designed for measuring ultra-low permeability in tight rock samples with high precision across a specific range
- Ensures consistent test conditions through a temperature-controlled environment
- Provides reliable and repeatable results with its sophisticated pressure monitoring system
- Offers seamless data handling with its integrated computer station


## Description

The PCM-1000 is a specialized system engineered for assessing the performance of proppants in hydraulic fracturing enhancement projects. Specifically, the device measures short-term proppant pack conductivity under a range of closure pressures and temperature conditions. The experimental procedure involves the controlled displacement of a thermally regulated reservoir fluid through a compressed proppant pack. This pack is sandwiched between two parallel, flat, and identical sandstone slabs. Both differential pressure and fluid flow rate across the proppant pack are meticulously recorded during this process. Utilizing the collected data in conjunction with Darcy's law allows for the precise calculation of proppant conductivity. The sandstone slabs, which are actuated by a hydraulic press, apply a closure stress to simulate the compressive stress conditions experienced within the reservoir rock.

## Specifications

| | |
|---|---|
| Standard | ISO 13503-5, API 61 & 19D |
| Load | 1,000 kN (100 tons) |
| Maximum closure stress | 20,000 psi |
| Maximum pore pressure | 1,000 psi |
| Maximum working temperature | up to 177°C (350°C) |
| Pack width accuracy | +/- 0.001 inches (+/- 0.025 mm) |
| Sample length: | 7 inches |
| Sample width: | 1.5 inches |
| Sample height: | 2x 3/8 inch |
| Wetted parts | Stainless steel |
| Power supply: | 220VAC, 50 or 60 Hz |

## Benefits

- Proppant pack conductivity with brine and gas
- Several API cell configuration available ( single ,multi API cell)

## Description

The conductivity cell is constructed in accordance with ISO 13503-5, as well as API RP 61 & 19D guidelines. The cell primarily consists of width slats, platens, and slabs made from Ohio sandstone. It features three pressure taps for tracking longitudinal pressure variations throughout the proppant pack. Electric cartridges heat the steel platens to maintain isothermal conditions, with temperature regulation controlled through a dedicated port by an onboard thermocouple. Additionally, thermal insulation is provided. To gauge the proppant pack's width under varying closure stresses, four LVDTs (Linear Variable Differential Transformers) are positioned on each side of the API conductivity cell.

## Specifications

| | |
|---|---|
| Standard | ISO 13503-5, API 61 &19D |
| Load | 1,000 kN (100 tons) |
| Fluid pressure | 1,000 psi |
| Maximum closure stress | 20,000 psi |
| Temperature | Ambient to 177°C (350°C) |
| Sample length: | 7 inches |
| Sample width: | 1.5 inches |
| Sample height: | 2 x 3/8 inch |
| Wetted part material | Stainless steel |

## Benefits

- Compliant with ISO 13503-5 and API RP 61 & 19D standards

Two stack API cell

Three stack API cell

## Description

The conductivity cell is fabricated in adherence to ISO 13503-5 and API RP 61 & 19D protocols. Designed for vertical stacking, these multi-stack API Conductivity Cells enable concurrent testing of multiple proppant conductivities. Engineered for shared piston operation, these cells ensure uniform distribution of compressive stresses. Pressure drop across the cell can be monitored through three side ports, each fitted with high-accuracy differential pressure transducers. Components include width slats, O-rings, stainless steel platens, and Ohio sandstone slabs. Isothermal conditions within the cells are maintained by electrical cartridge heaters embedded in the steel platens. Temperature regulation is achieved through a specialized port connected to an in-vessel thermocouple. Additionally, a thermal insulation mantle is incorporated. For real-time measurement of the proppant pack width under varying closure stresses, Linear Variable Differential Transformers (LVDTs) are affixed to each lateral face of the API conductivity cell.

## Specifications

| | |
|---|---|
| Standard | ISO 13503-5, API 61 &19D |
| Load | 1,000 kN (100 tons) |
| Fluid pressure | 1,000 psi |
| Maximum closure stress | 20,000 psi |
| Temperature | Ambient to 177°C (350°C) |
| Sample length: | 7 inches |
| Sample width: | 1.5 inches |
| Sample height: | 2 x 3/8 inch |
| Wetted part material | Stainless steel (optional hastelloy) |

## Benefits

- Reduced operation cost
- Compliant with ISO 13503-5 and API RP 61 & 19D standards


## Description

The PCT apparatus is designed to execute proppant crush-resistance tests, adhering to the ISO 13503-2 standard methodologies for determining the extent of proppant crushing under specific closure stresses. Equipped with a 50 mm (2 in) diameter piston, the device can generate pressures reaching up to 20,000 psi. The apparatus operates at a controlled piston displacement rate, capable of attaining speeds up to 2,000 psi per minute. The primary components of the system include a servo-controlled load frame and a cylindrical proppant cell. Continuous monitoring of the applied load is conducted, and this data is fed back into the controller. This real-time feedback adjusts the crosshead motion to sustain the targeted loading rate.

## Specifications

| | |
|---|---|
| Standard: | ISO 13503-2, API56 &58 & 60 |
| Maximum crush pressure: | 20,000 psi |
| Temperature: | ambient |
| Cell inside diameter: | 2.0 inches (50.8 mm) |
| Cell outside diameter: | 3.5 inches (89mm) |
| Piston height: | 3.5 inches (89mm) |
| Part material: | stainless steel |
| Power supply | 110-220 VAC– 50/60 Hz |

## Benefits

- Fully automated apparatus
- Rapid, accurate and reproducible data
- Precision control
- Improved test consistency and accuracy

## Description

The CC-series crush cell is engineered to evaluate the crushing resistance and degradation properties of proppants employed in hydraulic fracturing processes. According to API definitions, crush resistance is quantified as the weight percentage of proppant that passes through the smallest mesh size in the pre-specified original size distributions. The piston utilized in the apparatus has dimensions of 2.0x3.5 inches (50.8x89 mm). Testing is executed in alignment with API RP 19C and ISO 13503-2 standards, carried out at ambient temperatures and under various closure stresses, with a maximum limit of 15,000 psi.

## Specifications

| | |
|---|---|
| Standard: | API RP 19C and ISO 13503-2 |
| Cell inside diameter: | 2.0 inches (50.8 mm) |
| Cell outside diameter: | 3.5 inches (89mm) |
| Piston height: | 3.5 inches (89mm) |
| Part material: | stainless steel |

## Benefits

- Compliant with the API RP 19C and ISO 13503-2 standard


## Description

The FLC-series fluid loss curing cell is engineered to precondition resin-coated proppant packs under elevated temperatures and variable closure stresses before conducting a uniaxial compressive strength (UCS) test. The apparatus features a floating piston accumulator that can be nitrogen-charged to produce the requisite closure pressure. The proppant slurry is confined between this piston and a removable cap on the opposite side, which is equipped with a leak-off port and sand screen. As axial closure is applied, fracturing fluid is permitted to leak off. Typically, a set of 3 to 6 cells, each containing one plug, are run concurrently. These cells are then placed in an oven to facilitate curing of the samples (oven not included). After curing, the plugs are extracted and the samples undergo compressive strength testing using a press. The cells are offered in a broad spectrum of diameters.

## Specifications

| | |
|---|---|
| Standard: | API RP 60 |
| Maximum closure pressure: | 3,000 psi |
| Temperature: | Ambient to 177°C (350°C) |
| Proppant pack diameter: | 1 inch, 1.5 inches, 2 inches, 4 inches |
| Proppant pack length: | Twice the diameter |
| Wetted part material: | Stainless steel |

## Benefits

- Available in different diameters
- Does not need of external press

## Description

The FTC-series flow-through curing cell is engineered for the purpose of curing resin-coated proppant packs in the presence of fracturing fluid, under elevated temperatures and varying closure stresses, prior to undergoing a uniaxial compressive strength (UCS) test. The apparatus features a chamber that houses two sets of hardened steel platens, both at the upper and lower positions. Axial compressive loading is applied to the proppant pack to mimic closure pressure conditions. Ports for pore fluid are embedded in both sets of platens, facilitating the execution of pore pressure assessments. The system also allows for the monitoring of fracturing fluid leak-off as axial closure is implemented. Additionally, when fitted with a back-pressure regulator, the cell enables fluid flow through the specimen while maintaining specified temperatures. A thermal heating mantle surrounds the cell, ensuring a consistent and uniform temperature range for the proppant pack from ambient levels up to 177°C. The cells are offered in a diverse array of diameters. The application of axial load to the specimen necessitates the use of a dedicated laboratory press.

## Specifications

| | |
|---|---|
| Standard: | API RP 60 |
| Maximum closure pressure: | 10,000 psi |
| Temperature: | Ambient to 177°C (350°C) |
| Proppant pack diameter: | 1 inch, 1.5 inches, 2 inches, 4 inches |
| Proppant pack length: | Twice the diameter |
| Wetted part material: | Stainless steel (optional hastelloy) |
| Power supply: | 220 VAC, 50/60 Hz |

## Benefits

- Can cure resin-coated proppant packs with fracturing fluid at high temperatures and variable closure stress

## Description

The cell functions as an enclosure where cylindrical specimens of resin-coated proppants are exposed to both axial and radial compression forces. To simulate triaxial stresses, a circumferential confining pressure is applied concurrently with an axial load. The specimen is encased in a Viton sleeve and positioned between hardened steel endcaps; this entire assembly is then submerged in oil under confining pressure. A top pore fluid port, located at the upper platen, facilitates the expulsion of fracturing fluids during compression tests. The cell is equipped with a low-friction loading piston specifically for triaxial applications. Additionally, a heating mantle is supplied with the cell to maintain temperature control.

## Specifications

| | |
|---|---|
| Standard: | API RP 60 |
| Maximum closure pressure: | 10,000 psi |
| Temperature: | Ambient to 177°C (350°C) |
| Proppant pack diameter: | 1 inch, 1.5 inches, 2 inches |
| Proppant pack length: | Twice the diameter |
| Wetted part material: | Stainless steel |
| Power supply: | 220 VAC, 50/60 Hz |

## Benefits

- Available in different diameters


## Description

The RCP tester, under computer control, assesses both unconfined and triaxial compressive strengths of curable resin-coated proppants, either with or without fracturing fluid, under downhole stress and temperature conditions. Additionally, the system allows for the curing of resin-coated proppant packs at elevated temperatures and varying closure stresses before undertaking a uniaxial compressive strength test. The setup includes a comprehensive range of components: a curing cell, a triaxial cell, a load frame and a confining pressure intensifier. Compressive strength data serves as an indicator of the bonding capability of curable resin-coated proppants, as well as their resilience against flowback. The system also enables studies on the impact of temperature and curing kinetics on the consolidation strength and stability of resin-coated proppants.

## Specifications

| | |
|---|---|
| Standard: | API RP 60 |
| Maximum closure pressure: | 10,000 psi |
| Temperature: | Ambient to 177°C (350°C) |
| Proppant pack diameter: | 1 inch, 1.5 inches, 2 inches |
| Proppant pack length: | Twice the diameter |
| Wetted part material: | Stainless steel |
| Power supply: | 220 VAC, 50/60 Hz |

## Benefits

- Available in different diameters
- Can be used for both proppant curing and compressive strength testing


## Description

The FRACLAB Hydraulic Fracture Test System is designed to conduct hydraulic fracturing experiments while enabling micro-seismic activity monitoring under various triaxial stress conditions and elevated temperatures. The apparatus features a deviatoric triaxial cell integrated with an acoustic emission (AE) monitoring system. It employs four servo-controlled syringe pumps to regulate the pressures of the confining fluid, axial load, pore fluid, and fracturing fluid. A built-in lifting mechanism aids in specimen positioning. The system is capable of determining the breakdown pressure of a specimen under specified confining and pore pressures; subsequent to this, tensile strength and frac-coefficient values are calculated. The AE monitoring system offers insights into fracture growth for geotechnical investigations like hydraulic fracturing. It provides a range of characteristic AE parameters, including hit counts, energy levels, amplitude, event durations, and AE hypocenter localizations. Additionally, the apparatus is equipped with high-precision in-vessel deformation sensors that measure both axial and diametral strains throughout the test.

## Specifications

| | |
|---|---|
| Maximum force stress | 424 Mpa |
| Maximum confining pressure | 70 MPa |
| Maximum pore pressure | 70 MPa |
| Temperature range | ambient to 150°C (300F) |
| Specimen diameter | 54.7 mm (other upon request) |
| Specimen length | twice the diameter |
| Injection flow rate range | 0.0001 to 60 cc/min |
| Wetted parts | Stainless steel |
| Power supply | 110-220VAC, 50/60Hz |

## Benefits

- Versatile machine with an ample range of triaxial and hydraulic fracture testing capabilities.
- Automated tests
- Delivers unparalleled accuracy and reliability
- Achieve any desired stress path
- State of the art Acoustic Emission monitoring system


## Description

The FCM-1000 is adept at accurately determining both short-term and long-term fracture conductivities under realistic down-hole conditions, including stress, temperature, and fluid flow. This enables a comprehensive understanding of how variables such as temperature, fracture closure stress, proppant type and concentration, proppant embedment, and fracturing fluid composition interact to influence fracture conductivity. Conductivity assessments can be conducted using either brine or nitrogen as the testing fluid. The standard configuration of the system includes an injection pump, dual brine accumulators, an inline heater, a heated fracture conductivity cell, a hydraulic press, pressure and differential pressure transducers, a nitrogen gas flow line, a pair of back-pressure regulators, dual electronic balances, an array of valves and plumbing fixtures, as well as a dedicated data acquisition computer station.

## Specifications

| | |
|---|---|
| Standard | ISO 13503-5, API 56 & 58 |
| Maximum closure stress | 20,000 psi |
| Maximum pore pressure | 1,000 psi |
| Maximum working temperature | up to 177°C (350F) |
| Sample length: | 7 inches |
| Sample width: | 1.5 inches |
| Sample height: | 2 x 1 inch |
| Wetted parts | Stainless steel |
| Power supply: | 220VAC, 50 or 60 Hz |
| N2 Pressure requirements: | 2,000 psi |

## Benefits

- Fully automated apparatus
- Perform both short term and long term conductivity tests
- Achieved any desired closure stress
- Simulates leak off, and therefore accounts for damaging effects of fracturing fluids.

## Description

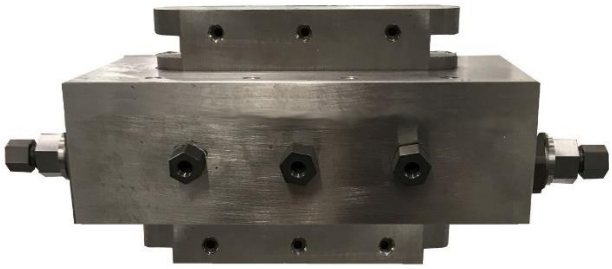
The ACM-3000 is designed to faithfully simulate the acid fracturing process specific to carbonate geological formations. It conducts acid etching on carbonate core samples that are confined within a fracture conductivity cell, while replicating realistic conditions of temperature, acid pressure, and fluid flow. The system also monitors fluid loss during the leak-off phase. The device utilizes specimens with extensive exposed surface areas, allowing for more authentic etching patterns and enhanced leak-off penetration. Moreover, the system assesses both short-term and long-term conductivities of acid fractures, both unpropped and propped, under actual down-hole conditions involving stress and temperature. Various fluids like brine or nitrogen gas can be used in the evaluation. Short-term conductivity tests focus on analyzing the influence of variables such as formation type, acid-rock contact duration, acid type and concentration, temperature, flow dynamics, and high closure stress on the acid-etched fracture's conductivity. Long-term tests delve into examining factors like creep deformation of acid-etched fractures, proppant embedment, and the effects of proppant size and concentration under conditions of high closure stress.

## Specifications

| | |
|---|---|
| Maximum closure stress | 20,000 psi |
| Maximum working temperature | Ambient to 177°C (350 F) |
| Fracture pressure | up to 3,000 psi |
| Sample length | 7 inches |
| Sample width | 1.5 inches |
| Sample height | 2 x 3 inches |
| Wetted parts | Hastelloy |
| Power supply | 220VAC, 50 or 60 Hz |
| N2 Pressure requirements | 2,000 psi |

## Benefits

- Fully automated apparatus
- Uses specimen with large exposed surface area to acid
- The use of thick core samples allows the leakoff and wormhole phenomenon to be monitored during acid injection
- Perform both short term and long term conductivity tests
- Achieved any desired closure stress
- Simulates fluid leak off, and therefore accounts for damaging effects of fracturing fluids.



## Description

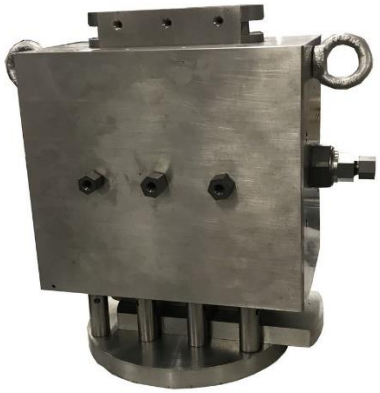
The fracture conductivity cell primarily consists of a main chamber, top and bottom pistons, and a pair of flow inserts situated on the right and left sides. Pressure is monitored through three taps that measure the pressure drop along the fracture. The upper and lower pistons feature three interconnected leak-off ports, which facilitate leak-off tests by creating a flow route through the cores at a right angle to the primary flow. The cell's heated steel structure maintains a constant, optimal temperature throughout the test, monitored by a thermocouple situated in a specialized port. Additionally, unique detachable end inserts allow for the simultaneous performance of conductivity and flow-back tests within the same chamber.

## Specifications

| | |
|---|---|
| Maximum closure stress | 20,000 psi |
| Fluid pressure | 3,000 psi |
| Temperature | Ambient to 177°C (350°C) |
| Sample length: | 7 inches |
| Sample width: | 1.5 inches |
| Sample height: | 2 x 1 inch |
| Wetted part material | Stainless steel or hastelloy |

## Benefits

- Simulates leak off, and therefore accounts for damaging effects of fracturing fluids.



## Description

The acid fracture conductivity cell, mounted horizontally, is designed for etching core samples with acid and subsequently assessing both short-term and long-term fracture conductivities under in-situ conditions of pressure, closure stress, and temperature. The core components of the cell include a main chamber, top and bottom pistons, and a duo of flow inserts located on the right and left sides. Pressure variations along the fracture are tracked by three built-in pressure taps. Additionally, the upper and lower pistons are equipped with three interconnected leak-off ports, which enable leak-off tests to be conducted during both acid etching and conductivity evaluations. The cell's steel structure, which is heated, ensures a stable and appropriate temperature throughout the testing process. This temperature is monitored by a thermocouple situated in a designated port. The cell also features unique detachable end inserts that allow for a combination of acid etching, conductivity measurements, and flow-back tests to be executed within the same testing chamber.

## Specifications

| | |
|---|---|
| Maximum closure stress | 20,000 psi |
| Fluid pressure | 3,000 psi |
| Temperature | Ambient to 177°C (350°C) |
| Sample length: | 7 inches |
| Sample width: | 1.5 inches |
| Sample height: | 2 x 3 inches |
| Wetted part material | hastelloy |

## Benefits

- Multi-purpose cell (acid etching, leak-off test, fracture conductivity tests)
- Uses specimen with large exposed surface area to acid
- The use of thick core samples allows the leak off and wormhole phenomenon to be monitored during acid injection
- Simulates fluid leak off, and therefore accounts for damaging effects of fracturing fluids.


## Description

The RDR-350 is designed to facilitate studies on the reaction rates between various fluids and solid surfaces. The device features a rock disk that spins at a fixed speed within a sealed chamber filled with reactive fluid. The degree of mass transfer and chemical reactions can be modulated by adjusting the rotational velocity and the temperature of the experiment. Fluid samples, which include products of the chemical interaction between the rock and fluid, are collected at predetermined intervals. Concentrations of calcium or magnesium in these samples are then quantified using atomic absorption spectrophotometry. The overall reaction rate at a specific angular speed is calculated based on the change in reactant concentration over a set period. To gather data on the reaction rate relative to angular velocity, the experiment is replicated at varying speeds. Further tests can be conducted at different temperatures or with altered fluid concentrations to fully establish the rate law governing the reaction system.

## Specifications

| | |
|---|---|
| Maximum pressure | 5,000 psi |
| Maximum temperature | up to 250°C |
| Reservoir vessel volume | 500 cc |
| Reaction vessel volume | 500 cc |
| Sample disk diameter | 1.5 inches (3.81 cm) |
| Sample disk thickness | 1 inch (2.54 cm) |
| Disk rotational speed | 100 to 2,000 RPM |
| Wetted parts | Hastelloy |
| Power supply | 110-220VAC, 50/60 Hz |
| N2 Pressure requirements | 2,000 psi |
| Air Pressure requirements | 150 psi, dry |

## Benefits

- Semi-automated system
- Rapid, accurate and reproducible data
- Acid resistant material
- Small test fluid volume required

## Description

The BTSP-series are meticulously engineered for advanced applications requiring ultra-precise, pulse-free regulation of fluid flow, suitable for both inorganic fluids (e.g., brine, solvents) and organic fluids (e.g., hydrocarbons, microbial solutions). Capable of delivering specified hydraulic pressures, volumetric flow rates, and dispensed volumes, these pumps are adaptable with pressure capacities reaching as high as 40,000 psi. The unit offers multiple operating modes, including constant-pressure and constant-flow rate settings, and incorporates a high-precision pressure transducer for real-time monitoring. A dual manually-operated isolation valves is provided for controlled fluid inlet and outlet. The system is further complemented with dedicated data acquisition and control software, capable of advanced data analytics and system supervision. As for optional customizations, a digital control panel interface can be integrated for direct, computer-independent pump manipulation. Additionally, a variable-temperature heating mantle is available for fluidic thermal control up to 150°C. For applications requiring temperatures below ambient, an optional cooling jacket is available. This jacket encases the pump cylinder, allowing for thermally stable liquid flow through both the upper and lower hose connectors, thus ensuring consistent fluid temperature during operation. Occasionally, the pump cylinders can be equipped with a magnetically actuated stirring mechanism, enabling in-situ, comprehensive fluid mixing across a broad spectrum of pressure and temperature conditions. In terms of volumetric dispensing, the BTSP series offers customizable cylinder capacities to meet specific application requirements. While the standard material for wetted parts is a high grade stainless steel, hastelloy can be requested for corrosive fluid applications.

## Specifications

| Model | Volume (ml) | Pressure (psi) | Max. flow rate (ml/min) | Min. flow rate (ml/min) |
|---|---|---|---|---|
| BTSP 20-40 | 20 | 40,000 | 7.5 | 0.0001 |
| BTSP 50-30 | 50 | 30,000 | 20 | 0.0001 |
| BTSP 100-10 | 100 | 10,000 | 45 | 0.0003 |
| BTSP 125-20 | 125 | 20,000 | 30 | 0.0003 |
| BTSP 175-15 | 175 | 15,000 | 30 | 0.0003 |
| BTSP 250-10 | 250 | 10,000 | 60 | 0.0003 |
| BTSP 500- 5 | 500 | 5,000 | 130 | 0.001 |
| BTSP 1000 | 1000 | 1,875 | 250 | 0.002 |

## Benefits

- Pulse-free flow at all rates and pressures
- Control pump based on time, pressure, flow rate, fluid volume or events
- Stainless steel or Hastelloy® wetted parts
- Touch screen front panel (optional)
- High temperature operation (optional)
- Mixer pump (optional)

## Description

The extended BTSP-series of benchtop single syringe pumps are engineered to accommodate applications that demand elevated volumetric capacities, flow rates, and pressures, exceeding the specifications of the standard BTSP series. Despite these advanced capabilities, both the hardware and software functionalities remain congruent across the series.

## Specifications

| Model | Volume (ml) | Pressure (psi) | Max. flow rate (ml/min) | Min. flow rate (ml/min) |
|---|---|---|---|---|
| BTSP 150-30 | 150 | 30,000 | 20 | 0.0001 |
| BTSP 250-20 | 250 | 20,000 | 35 | 0.0002 |
| BTSP 300-15 | 300 | 15,000 | 40 | 0.0002 |
| BTSP 500-10 | 500 | 10,000 | 70 | 0.0004 |
| BTSP 1000-5 | 1000 | 5,000 | 130 | 0.001 |

## Benefits

- Pulse-free flow at all rates and pressures
- Control pump based on time, pressure, flow rate, fluid volume or events
- Stainless steel or Hastelloy® wetted parts
- Touch screen front panel (optional)
- High temperature operation (optional)
- Mixer pump (optional)

## Description

The BTDP series combines two BTSP pump modules, enhancing system capabilities. Equipped with a pair of pneumatic powered three-way valves for both tank inlet and outlet delivery, the dual pump provides uninterrupted, continuous fluid flow across a comprehensive range of both pressure and temperature conditions. All functionalities and optional features inherent to the BTSP series pumps remain accessible as both individual pump modules can still operate autonomously.

## Specifications

| Model | Volume (ml) | Pressure (psi) | Max. flow rate (ml/min) | Min. flow rate (ml/min) |
|---|---|---|---|---|
| BTDP 50-30 | 50 | 30,000 | 20 | 0.0001 |
| BTDP 100-10 | 100 | 10,000 | 45 | 0.0001 |
| BTDP 125-20 | 125 | 20,000 | 30 | 0.0003 |
| BTDP 175-15 | 175 | 15,000 | 30 | 0.0003 |
| BTDP 250-10 | 250 | 10,000 | 60 | 0.0003 |
| BTDP 500- 5 | 500 | 5,000 | 130 | 0.001 |
| BTDP 1000 | 1000 | 1,875 | 250 | 0.002 |

## Benefits

- Pulse-free flow at all rates and pressures
- Control pump based on time, pressure, flow rate, fluid volume or events
- Stainless steel or Hastelloy® wetted parts
- Touch screen front panel (optional)
- Unlimited continuous flow (optional)
- High temperature operation (optional)
- Mixer pump (optional)

## Description

The extended BTDP-series of benchtop single syringe pumps are engineered to accommodate applications that demand elevated volumetric capacities, flow rates, and pressures, exceeding the specifications of the standard BTDP series. Despite these advanced capabilities, both the hardware and software functionalities remain congruent across the series.

## Specifications

| Model | Volume (ml) | Pressure (psi) | Max. flow rate (ml/min) | Min. flow rate (ml/min) |
|---|---|---|---|---|
| BTDP 150-30 | 150 | 30,000 | 20 | 0.0001 |
| BTDP 250-20 | 250 | 20,000 | 35 | 0.0002 |
| BTDP 300-15 | 300 | 15,000 | 40 | 0.0002 |
| BTDP 500-10 | 500 | 10,000 | 70 | 0.0004 |
| BTDP 1000-5 | 1000 | 5,000 | 130 | 0.001 |

## Benefits

- Pulse-free flow at all rates and pressures
- Control pump based on time, pressure, flow rate, fluid volume or events
- Stainless steel or Hastelloy® wetted parts
- Touch screen front panel (optional)
- Unlimited continuous flow (optional)
- High temperature operation (optional)
- Mixer pump (optional)

## Description

The BTSP and BTDP-series pumps offer an optional magnetically-driven stirrer for comprehensive, in-situ fluid mixing across a wide range of operating pressures and temperatures. The stirring mechanism consists of a permanent magnet, which is actuated by a variable-speed DC motor and is affixed through the pump cylinder's end cap. A dedicated controller unit provides functionalities for initiating, halting, and modulating the stirrer's rotational speed, which can reach up to 1,500 RPM.

## Specifications

| | |
|---|---|
| Pressure range | 10,000 / 15,000 / 20,000 psi |
| Volume | 250 / 175 / 125 ml |
| Wetted materials | Stainless Steel |
| Temperature | ambient to 150°C (300F) |
| Type of fluids | hydraulic fluid |
| Maximum speed | Up to 1,500 RPM |
| Power supply requirement | 110-220 VAC, 50/60 Hz |
| Pressure control interface | Ethernet |

## Benefits

- Very efficient mixing
- Can be used with viscous fluid and slurries


23 rue du Port 92000 Nanterre- France
www.floxlab.com

## Description

The Floxlab CF Series pumps deliver unparalleled accuracy and repeatability, ensuring the critical pulse-free, high-pressure flow metering needed in diverse industrial and research environments. The CF Series pumps feature dual motor-driven pistons, each independently controlled, and employ a unique pre-pressurization step in every piston cycle, moving away from the traditional use of reciprocating pistons. As one cylinder dispenses fluid, its counterpart rapidly refills and then initiates pre-pressurization to equalize the pressure with the first cylinder. The system utilizes individual pressure transducers for each cylinder, a bespoke microcontroller, and advanced software algorithms to guarantee exact pressure measurement and synchronization. This ensures a seamless transition between cylinders without any noticeable pulse. The smooth, pulse-free fluid flow is further refined by an automatic valve with zero dead volume. Additionally, the pistons can be operated independently for greater operational versatility.

## Specifications

| Model | Pressure (psi) | Volume (ml) | Max. flow rate (ml/min) | Min. flow rate (ml/min) |
|---|---|---|---|---|
| CF 3 | 3,000 | 2 x 40 | 80 | 0.0001 |
| CF 6 | 6,000 | 2 x 32 | 55 | 0.0001 |
| CF 12 | 12,000 | 2 x 15 | 30 | 0.0001 |
| CF 15 | 15,000 | 2 x 12 | 25 | 0.0001 |
| CF 20 | 20,000 | 2 x 10 | 15 | 0.0001 |
| CF 30 | 30,000 | 2 x 5 | 5 | 0.0001 |

## Benefits

- Unlimited continuous flow
- Pulse-free flow at all rates and pressures
- Deliver or receive fluid
- Control pump based on time, pressure, flow rate, fluid volume or events
- Stainless steel or Hastelloy® wetted parts
- Ambient and high temperature versions

## Description

The BFSP-series bench floor single-cylinder pumps offer precise control over pressure, flow rate, and volume under both ambient and reservoir conditions. These versatile pumps can function in either a constant pressure or constant flow rate mode. Each pump is outfitted with a precision pressure sensor, dual manual valves for reservoir filling and fluid dispensing, a control panel, and an integrated storage tank. The entire setup is mounted on a sturdy chassis that rides on four robust casters for easy mobility. Optional features include a computerized data acquisition and monitoring system, as well as a variable-temperature heating mantle capable of elevating fluid temperatures up to 150°C. The BFSP series also offers customizable volumetric capacities. Standard construction materials for parts in contact with fluids are of high-grade stainless steel, but hastelloy is available for corrosive fluid applications.

## Specifications

| Model | Volume (ml) | Pressure (psi) | Max. flow rate (ml/min) | Min. flow rate (ml/min) |
|---|---|---|---|---|
| BFSP 500-15 | 500 | 15,000 | 40 | 0.0005 |
| BFSP 1000-15 | 1000 | 15,000 | 80 | 0.0005 |
| BFSP 500-25 | 500 | 25,000 | 50 | 0.0005 |

## Benefits

- Ready to use pump
- Touch screen front panel
- Pulse-free flow at all rates and pressures
- Deliver or receive fluid
- Control pump based on time, pressure, flow rate, fluid volume or events
- Stainless steel or Hastelloy® wetted parts
- High temperature operation (optional)
- Mixer pump (optional)


## Description

The BFDP-series bench floor dual-syringe pumps deliver precise control over pressure, flow rate, and volume under both ambient and reservoir settings. These pumps can operate in either constant pressure or constant flow rate modes. Each unit comes equipped with dual high-precision pressure sensors, four manual valves for reservoir filling and fluid output, a user-friendly control panel, and a built-in storage reservoir. The entire assembly is securely mounted on a rugged chassis, featuring four heavy-duty casters for effortless mobility. Optional enhancements include a computerized data collection and management system, as well as a variable-temperature heating mantle capable of heating the fluid up to 150°C. The BFDP series offers adaptable volumetric capacities to meet your specific needs. While the wetted parts are constructed from high-grade stainless steel as standard, Hastelloy can be opted for in corrosive fluid applications. Additionally, the system can be upgraded with two automatic three-way, air-powered valves for both reservoir feeding and fluid output, facilitating uninterrupted continuous flow.

## Specifications

| Model | Volume (ml) | Pressure (psi) | Max. flow rate (ml/min) | Min. flow rate (ml/min) |
|---|---|---|---|---|
| BFDP 500-15 | 500 | 15,000 | 40 | 0.0005 |
| BFDP 1000-15 | 1000 | 15,000 | 80 | 0.0005 |
| BFDP 500-25 | 500 | 25,000 | 50 | 0.0005 |

## Benefits

- Ready to use pump
- Touch screen front panel
- Pulse-free flow at all rates and pressures
- Deliver or receive fluid
- Control pump based on time, pressure, flow rate, fluid volume or events
- Stainless steel or Hastelloy® wetted parts
- Unlimited continuous flow (optional)
- High temperature operation (optional)
- Mixer pump (optional)


## Description

The PV-series pumps are engineered for applications that demand meticulous volume adjustments and low-pressure control of fluids. Capable of providing specific pressure, flow rates, and volumes at room temperature, these pumps can function in either a constant pressure or constant flow rate setting. Pressurization is achieved through a motor-driven piston. The unit comes standard with a high-precision pressure sensor and proprietary remote control software. Optional manual valves can be added for both reservoir filling and fluid dispensing. Operational control of the unit is facilitated through the mandatory supervision software, which can be installed on a dedicated computer terminal. The software provides a range of operating modes, significantly enhancing the adaptability and capabilities of Floxlab pumps.

## Specifications

| Model | Volume (ml) | Pressure (psi) | Max. flow rate (ml/min) | Min. flow rate (ml/min) |
|---|---|---|---|---|
| PV-200 | 200 | 600 | 70 | 0.0001 |
| PV-500 | 500 | 225 | 150 | 0.0002 |

**Other specifications:**

| | |
|---|---|
| Temperature | ambient |
| Wetted materials | Stainless Steel |
| Position | Horizontal or vertical |
| Type of fluids | hydraulic fluid, gas |
| Pressure accuracy | 0.2% |
| Power supply requirement | 110-220 VAC, 50/60 Hz |
| Pressure control interface | Ethernet |

## Benefits

- Suitable for low pressure applications such as soil studies
- Easy to set up, use and maintain
- Cost effective
- Extreme pressure and volume accuracy

## Description

The ABPR-series represents the pinnacle of automated back pressure regulation technology, designed for both single and multi-phase fluids, and capable of maintaining stable pressure control up to 20,000 psi. The architecture of the ABPR integrates a motor-driven piston pump, a high-precision pressure transducer, and a dome-loaded valve. The valve features a dual-chamber design, separated by a piston that employs a high-strength stainless steel needle coupled with a reinforced PEEK seat on the lower side. The lower chamber pressure control the process fluid flow, while the upper chamber pressure is regulated by a high accuracy motor driven piston pump, containing nitrogen gas. The Back Pressure Regulator (BPR) serves as a comparator: if the dome pressure surpasses the process pressure, the needle seals the outlet, facilitating pressure build-up. On the other hand, when the process pressure exceeds the dome pressure, the needle retracts, allowing excess process fluid to be released, thereby reducing system pressure. These oscillatory actions result in exceptionally reliable pressure regulation. Through an Ethernet interface and specialized software, the ABPR can be effortlessly programmed to execute complex pressure cycles.

## Specifications

| | |
|---|---|
| Maximum pressure range | 10,000 / 20,000 psi |
| Wetted materials | Stainless Steel/ Hastelloy |
| Temperature | ambient to 150°C (300F) |
| Flow rate | from 0.001 to 30 cc/min |
| Type of fluids | gas, liquid, supercritical fluid |
| Nitrogen gas pressure requirement | 1,000/ 5000 psi |
| Power supply requirement | 110-220 VAC, 50/60 Hz |
| Pressure control interface | Ethernet |

## Benefits

- Extremely fast response to system pressure fluctuations
- Stable pressure control over the entire flow range
- Accurate control even during multiphase flow
- Corrosion and chemical resistant
- Pressure control via Ethernet communication port


## Description

The ACP-series is engineered to produce and sustain a constant confining pressure, as required in rock testing experiments. Additionally, it can maintain a stable differential pressure between pore and confining pressures. The system features a positive displacement pump, an automated dual valve, a fluid reservoir, and dual pressure transducers specifically for monitoring and controlling both pore and confining pressures.

## Specifications

| | |
|---|---|
| Maximum pressure range | 10,000 / 15,000 / 20,000 psi |
| Volume | 250 / 175 / 125 ml |
| Wetted materials | Stainless Steel |
| Temperature | ambient to 150°C (300F) |
| Type of fluids | hydraulic fluid |
| Nitrogen gas pressure requirement | 100 psi |
| Power supply requirement | 110-220 VAC, 50/60 Hz |
| Pressure control interface | Ethernet |

## Benefits

- Extremely fast response to system pressure fluctuations
- Can work at constant pressure or at constant net pressure
- Pressure control via Ethernet communication port


## Description

The ACP-150 series is specifically engineered to create and sustain precise confining pressures and temperatures during studies involving porous media. This makes it especially advantageous for experimental setups like NMR, CT scans, and linear X-RAY experiments that employ composite core holders and where air baths are not applicable. The system is outfitted with a high-pressure syringe pump, a recirculation pump, a pneumatic dual valve, a fluid reservoir, and dual pressure transducers for real-time monitoring of both pore and confining pressures. The high-pressure syringe pump is responsible for generating and holding a constant pressure, while the recirculation pump ensures a constant flow within the high-temperature confining circuit. As a result, the core sample housed in the core holder is maintained at constant temperature and pressure conditions. The system also has the capability to sustain a uniform differential pressure between the pore and confining pressures. Connectivity via an Ethernet interface, coupled with specialized software, enables the ACP-150 series to be conveniently programmed for executing complex schedules for the maintenance of both pressure and temperature.

## Specifications

| | |
|---|---|
| Maximum pressure range | ACP-350-150 model: 5,000 psi<br>ACP-700-150 model: 10,000 psi |
| Temperature | up to 150°C |
| Volume | 250 ml |
| Fluid circulation flow | up to 1 liter/min |
| Wetted materials | Stainless Steel |
| Temperature | ambient to 150°C (300F) |
| Type of fluids | hydraulic fluid |
| Nitrogen gas pressure requirement | 100 psi |
| Power supply requirement | 110-220 VAC, 50/60 Hz |
| Pressure control interface | Ethernet |

## Benefits

- Well-suited for porous media research using NMR, CT-scan, and linear X-ray scanners
- Quick response to changes in system pressure
- Rapid and precise heating of core samples
- Ability to operate at either a constant pressure or a constant net pressure
- Pressure regulation enabled through an Ethernet communication port