

VINCI TECHNOLOGIES

CONVENTIONAL ROCK ANALYSIS

PRODUCT CATALOG

2020



CONVENTIONAL ROCK ANALYSIS



Core preparation



Core preparation



Core analysis



Core analysis

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CORE PREPARATION



Core cutting



Core cleaning



Core drying



Core saturation

PLUGGING MACHINE

The heavy diamond-tooled drill press is specially designed to deliver various core sample sizes. The standard machine comes with a floor standing drill press, a rotary union, a coolant feeding system, a coolant recovery pan with splash guard and a core clamping vise. The heavy duty fluid swivel connects the coring bits to the drill press while circulating coolant to the bit. The vise assembly is mounted on the pan table and allows the core to be positioned. Various size of coring bits as well as a recirculating coolant system are available.



FEATURES

Coring bit internal diameter:.....1", 1.5", 2"
 Maximum coring depth:.....5 inches (12.5 cm)
 Drip pan dimension:.....L x W x H: 600 x 300 x 250 mm
 Compatible coolant:.....Water, Oil
 Drill speed:.....Adjustable
 Motor power:.....1500 watts
 Electrical:.....220 VAC 1 phase, 50 or 60 Hz
 Weight:.....150 kg
 Volume:.....500 x 500 x 1800 mm



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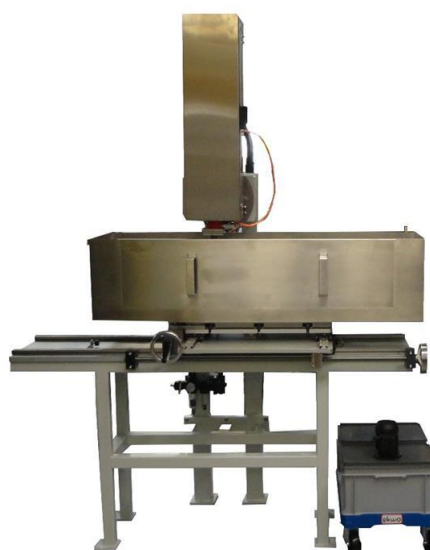
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AUTOMATED PLUGGING MACHINE

The heavy diamond-tooled drill press is specially designed to deliver various core sample sizes with an automatic, variable force, constant pressure feed. A constant pressure feed enables the coring bit to drill fast in soft rock, but the rate of penetration will automatically decrease in harder rock. The constant pressure feed uses a hydraulic actuator for smooth operation at low penetration rates. The rapid-retract position removes the coring bit from the rock therefore allowing the plug to be retrieved. The coring operation can be performed using water/oil coolant or optionally liquid nitrogen for unconsolidated samples. The core clamping assembly is mounted on the pan table. An XY table allows the pan to be correctly positioned prior the plugging. In addition to drilling vertically, the head of the drill press can be titled so that the sample is drilled at an angle.



FEATURES

Coring bit internal diameter___ 1", 1.5", 2"
 Maximum coring depth_____ 5 inches (12.5 cm), 30 cm (option)
 Drip pan dimensions_____ L x W x H: 1340 x 380 x 340 mm
 Coring position_____ any position from -45° to +45°
 Pan position_____ X: +/- 1000 mm, Y: +/-125 mm
 Compatible coolant_____ Water, Oil , liquid N2 (option)
 Drill speed_____ 550, 1120, 1680 RPM
 Electrical_____ 230 VAC 1 phase, 50 or 60 Hz, 11.5 A
 Weight_____ 300 kg
 Water_____ 100 psi
 Overall dimensions_____ L x W x H: 1700 x 680 x 2140 mm



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RADIAL CORE SLABBING SAW

Versatile diamond impregnated radial blade utilised either to slab core samples in two halves or to trim full diameter rock samples. The standard machine comes with a worktable, blade guard, motor to power the saw, core clamp assembly for holding core, sample trolley on ball bearing guide, coolant feeding system, coolant recovery pan and diamond impregnated saw blade. The coolant recirculation system is also available.



FEATURES

Saw blade diameter.....	400 mm (16")
Maximum cutting depth.....	125 mm (5")
Max core length.....	300 mm
Compatible coolants.....	Water and oil
Power supply.....	220 VAC, 50 or 60 Hz
Weight.....	100 kg



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AUTOMATIC SLABBING SAW

Versatile diamond impregnated radial blade utilized either to slab core samples in two halves or to trim full diameter rock samples. A variable rate feed mechanism enables the long section cuttings of ultra-high density core in one pass without fracturing, grooving or chipping, thereby producing regular high-finished surfaces.



FEATURES

Saw blade diameter.....	500 mm (20")
Maximum cutting depth.....	150 mm (6")
Maximum core length.....	1 meter
Compatible coolants.....	Water and oil
Power supply.....	220 VAC 1 Phase, 50 or 60 Hz, 2,200 W
Weight.....	500 kg
Dimensions.....	300cm x 170cm x 90cm (LxHxD)



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CORE CUTTING SAW

Versatile bench top diamond impregnated radial blade utilized either to cut core samples in two halves or to trim rock samples. The standard machine comes with a blade guard, a motor to power the saw, a sample trolley on ball bearing guide, a shut off button, a coolant feeding system, a coolant recovery pan and a diamond impregnated saw blade.



FEATURES

Saw blade diameter	350 mm (14")
Maximum cutting depth	100 mm (4")
Max core length	300 mm
Compatible coolants	Water and oil
Power supply	220 VAC, 50 or 60 Hz, 3 horses
Weight	82 kg
Volume	1120x620x710 mm

TRIMMING SAW

Bench top tool designed to cut preset core sample lengths. The preset sample lengths can be adjusted at any time by rearranging machined spacers to the desired length between the blades. The quality of the saw blade allows for extreme precision of the end face after trimming of 0.002 inch (5/100 mm). All wetted components are constructed from stainless steel and anodized aluminium for long lasting corrosion free operation. All bearings are sealed to insure long lasting free movement. The containment pans and splash guards are also constructed of heavy gauge stainless steel, anodized aluminium and corrosion free plastic. Recirculating coolant system is also available.



FEATURES

Saw blade diameter.....	200 mm (8")
Saw blade thickness.....	2 mm
Core diameter.....	up to 2"
Core length.....	2", 3" other upon request
Lubricants.....	water (usually), oil
Power supply.....	220 VAC 1 phase 50 or 60 Hz
Motor power.....	550 W, 3,000 RPM
Weight.....	40 kg
Dimension.....	700x800x600 mm



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END FACE GRINDER

Tool designed to provide flat, parallel end-faces when sample geometry is critical e.g. for advanced rock property tests. The tool comes with a core clamping device, housing and cover parts, a coolant feeding system, a coolant recovery pan and a diamond tool end-face grinding wheel. A core clamping device for whole diameter core samples, a coolant recirculation system and a vacuum cleaner to collect core fines during dry grinding operations are also available.



FEATURES

Core diameter.....	up to 2"
Grinding wheel precision.....	+/- 0.001 inch (2.5 / 100 mm)
Wheel diameter.....	150 mm
Power supply.....	220 VAC 1 ph 50 or 60 Hz
Motor power.....	0,55 kW, 3,000 RPM
Weight.....	30 kg
Volume.....	600x500x500 mm



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FULL SIZE CORE END FACE GRINDER

Tool designed to provide flat, parallel end-faces when sample geometry is critical e.g. for advanced rock property test. The tool can accommodate plug size and full size core sample up to 4 inches diameter.



FEATURES

Core diameter	1" to 4"
Core length	1" to 8" (other upon request)
Grinding wheel precision	+/- 0.001 inch (2.5 / 100 mm)
Wheel diameter	150 mm
Power supply	220 VAC 1 ph50 or 60 Hz
Motor power	0,55 kW, 3,000 RPM
Weight	40 kg
Volume	600x500x500 mm

AUTOMATIC END FACE GRINDER

Tool designed to provide flat, parallel end-faces when specimen geometry is critical. A variable rate feed mechanism enables the entire specimen to be processed in a single-pass at a preset adjustable speed, thereby producing parallel and flat core loading faces conforming to the ASTM specifications. The apparatus comprises a specimen clamping device, a hydraulically operated feed mechanism, a diamond grinding cup wheel, a coolant feeding system and recovery pan. The grinding area is enclosed with a metallic cover encompassing a viewing window. Specimen sizes range from 20-mm to 170-mm in diameter. The unit is an easy-to-use, self-contained machine that surpasses industry standards. Moreover, the high-quality of the genuine diamond-grinding wheel guarantees a perfect, smooth finish.



FEATURES

Core diameter:.....	20 to 170 mm
Core length:.....	up to 400 mm
Grinding wheel precision:.....	+/- 0.001" (2.5 / 100 mm)
Wheel diameter:.....	300 mm
Grinding wheel speed.....	1100 rpm
Power requirement.....	2,200 watts
Power supply:.....	220 VAC specify 50/ 60 Hz
Weight:.....	250 kg
Volume:.....	780x1600x1260 mm

BENEFITS

- ✓ ASTM-compliant
- ✓ Full automated operation
- ✓ Heavy duty design



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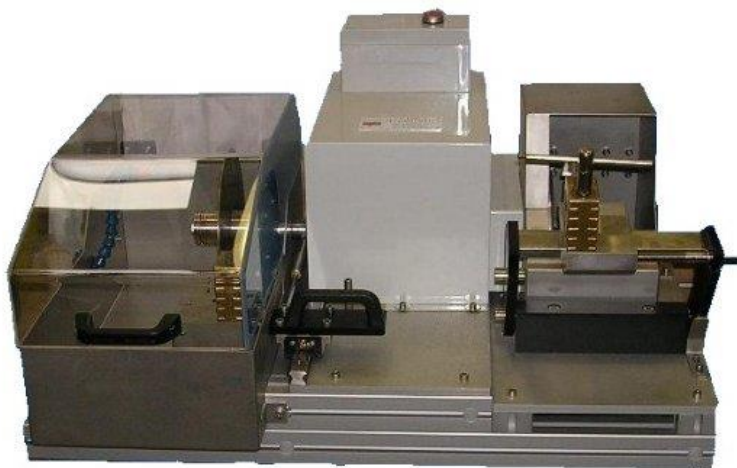
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TRIMMING / END FACE GRINDER

Bench top tool designed to cut core samples to pre-set lengths. The apparatus features an end-face grinder on the other side which yields an extreme precision of 0.002 inch (5/100 mm) of the end face after trimming.



FEATURES

Saw blades diameter.....	200 mm (8'')
Saw blades thickness.....	2 mm
Grinding precision.....	+/- 0.001 inch (2.5 / 100 mm)
Grinding wheel diameter.....	150 mm
Core diameter.....	up to 2''
Core length.....	2'', 3'' other upon request
Lubricants.....	Water (usually), Oil
Power supply.....	220 VAC 1 ph 50 or 60 Hz
Motor power.....	550 W, 3,000 RPM
Weight.....	50 kg
Volume.....	700x800x600 mm

UNCONSOLIDATED CORE MOUNTING SYSTEM

The unconsolidated core mounting system amalgamates friable or unconsolidated materials into a heat- shrink Teflon tubing with dual end screens. First, the sample is compacted into the tubing by means of a hydraulically operated piston compactor. Next, a small controlled axial force is applied to enhance sediment cohesion. Lastly, a heat gun shrinks the Teflon tubing, finalizing the compaction.



FEATURES

Core diameter.....1" and 1.5"
 Core length.....2" (other upon request)
 Screen.....316 Stainless steel
 Heat shrinkable tubing.....Teflon

CENTRIFUGAL EXTRACTOR

The centrifugal extractor combines solvent miscibility to oil and centrifugal forces to remove hydrocarbons from core samples. As the samples are rotated, warm, clean solvent is periodically sprayed on them. The centrifugal acceleration forces the solvent to penetrate and flow through the cores. The oil and solvent form a mobile emulsion phase that also displaces the water phase. Rotation speed should be selected based on sample permeability and degree of consolidation. Most common solvents can be used. A solvent recovery still is also provided to recycle dirty solvent and reinject clean and warm solvent into the centrifugal extractor, forming a closed loop.



FEATURES

Core diameter up to 2"
 Core length up to 3"
 Quantity of sample between 6 to 18 depending on the core length
 Wetted materials Stainless steel, teflon
 Centrifuge speed up to 3000 rpm
 Electrical 220V, 50Hz, 1500W

BENEFITS

Centrifugal Extractor :

Rapid and efficient extraction of oil, water and salt from consolidated core samples
 Speed controller
 Rotor geometry to accommodate the core samples
 Solvent inlet and outlet
 Vibration free chassis

Solvent recovery still :

Heated solvent flask
 Water refrigerant for solvent condensation
 Temperature controller



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CO₂ SOLVENT CORE CLEANER (CSC 70)

The core cleaner is utilized to remove liquid phases (e.g. crude oil, drilling fluids, water...) from either a single whole core or a batch of core plug samples. The former is achieved by submerging samples in a pressurized solvent (toluene) containing dissolved carbon dioxide. Applying sufficient hydraulic pressure will cause the solvent to invade the pores and disturb the phase equilibrium. An oil-solvent emulsion will form and a gradual depressurization to atmospheric pressure will partially remove the residing liquids. Multiple cycles are required to obtain a perfect cleansing and this number highly depends on the rock's properties, e.g. effective porosity, permeability, tortuosity, wettability and fluid characteristics: miscibility, interfacial tension, density... The apparatus fits into a standard size floor hood. The cleaning chamber is an electrically heated pressure vessel enclosed in an explosion-proof housing. With a high pressure pump, the solvent is transferred from an on-board supply tank to the cleaning vessel. A cyclone separator with a stainless steel-packed, water-cooled after-cooler is provided to remove the dissolved CO₂ from the dirty solvent when the vessel is drained. The used solvent is then flowed to an explosion proof electric still where it is filtered and recirculated back to the supply tank. A refrigeration system cools the hot solvent by circulating cold water around the walls of the cyclone separator, thereby preventing heating-related damage. Moreover, the still operation is automated. The process control box is mounted on the outside of the hood. A touch screen panel allows the machine to be operated in both manual and fully automated modes.



FEATURES

Vessel diameter:	Model 1: 4.6" (118 mm) - Model 2: 5.2" (134 mm)
Vessel length	Model 1: 10.7" (274 mm) - Model 2: 27" (685 mm)
CO ₂ pressure	200 psi
Solvent pressure	1,000 psi
Wetted materials	316 Stainless steel
Net weight	500 kg

Requirements:

Air	100 psi
Electrical	220V, 50Hz, 2,000 Watts



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SOXHLET EXTRACTOR

Soxhlet distillation extraction removes liquid phases (oil and brine) from core samples by virtue of a solvent vaporization and condensation process. The cleanliness of the sample is determined from the color of the solvent once it has permeated from the samples and condensed. The samples are placed in the extractor and cleaned by refluxing solvent. The solvent in this closed system is externally heated and vaporized continuously in a flask, flow through the samples in the extraction tube, condenses at the top of the assembly. The condensate falls back into the sample chamber. When the latter is full, the dirty solvent returns to the flask via a siphoning reflux sidearm located at the base of the sample chamber. Due to the difference in boiling point temperatures, only the solvent evaporates while the oil finds itself trapped in the flask. The apparatus consists of a distillation/extraction glassware unit and a heating mantle with thermostatic controller. The first comprises a boiling flask, soxhlet extractor and condenser. Flexible plastic tubing connects the condenser to the water cooling unit. The assembly is supported by a clamp screwed to a vertical rod, itself fixed to the heating mantle.



FEATURES

SOXHLET FOR PLUG SIZED CORE SAMPLES

Configuration.....	Single unit model/ Multiple units model (up to 6 extractors)
Core sample diameter.....	up to 1,5"
Core sample length.....	up to 4"
Extractor capacity.....	250 ml
Boiling flask.....	500 ml
Heating temperature.....	up to 450°C
Water cooling system.....	0.5 to 3 liters per minute, 18°C
Power supply.....	220 VAC 50 Hz

SOXHLET FOR FULL SIZED CORE SAMPLES

Configuration.....	Single unit model / Multiple units model (up to 6 extractors)
Core sample diameter.....	up to 4"
Core sample length.....	up to 6"
Extractor capacity.....	3 liters
Boiling flask.....	6 liters
Heating temperature.....	up to 450°C
Water cooling system.....	0.5 to 3 liters per minute, 18°C
Power supply.....	220 VAC 50 Hz



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COOL & MEDIUM SOXHLET EXTRACTOR (CSE-SERIES)

The CSE series are custom soxhlet extractors utilized to remove hydrocarbons from reservoir core samples with the cool and medium cleaning procedures. With continuous fluid circulation, the device warrants efficient solvent cleaning without damaging delicate minerals such as clays. Mounted on an aluminum frame, the system comprises a heater, bowl, condenser, cold solvent chamber and sample chamber. Accessories include a basket, pumice stone, tubing and various fittings. Solvent is heated up to the boiling point in a flask. The rising vapor flows in to a condenser via a pipe. Condensed solvent drips into a solvent chamber. Once the latter is full, the condensate is siphoned to the base of an independent, thermally insulated sample chamber. Cores are permanently in contact with clean liquid solvent thus enabling efficient cleaning with no risk of damage. Dirty solvent is directed back into the boiling flask where the hydrocarbons remain trapped.



FEATURES

Model.....	CSE 4"x6"
Core sample diameter.....	up to 4"
Core sample length.....	up to 6"
Extractor capacity.....	2.5 liters
Boiling flask.....	6 liters
Heating temperature.....	up to 450°C
Power supply.....	110/220 VAC 50/60 Hz

BENEFITS

Efficient solvent cleaning of core samples without damaging delicate minerals such as clays.



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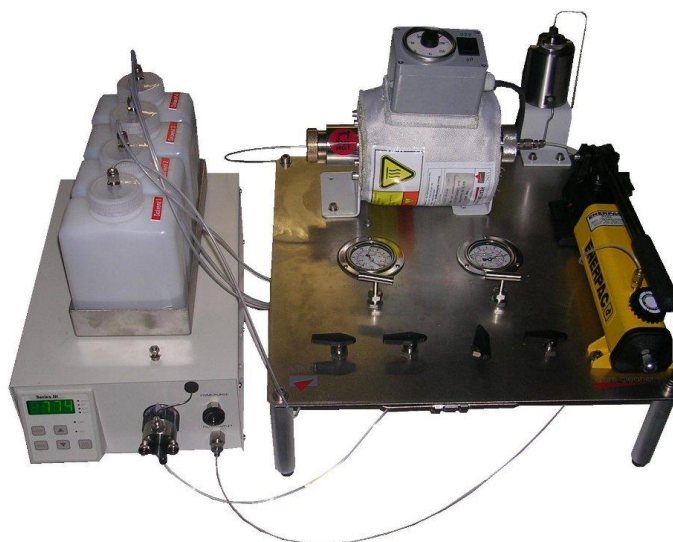
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FLOW THROUGH CORE CLEANER

A rapid and efficient core cleaning system based on controlled sequential solvent displacements at moderate pressures. The standard version is delivered with a single core holder but multiple can be integrated into the assembly upon request. Samples are placed in a quick release Hassler core holder which can be heated up to 80°C. Clean solvents are injected through the core via the constant rate-operable HPLC pump. The clean solvent can be pumped directly from any of the four tanks. After exiting the core, the solvent flows directly through a BPR and into a large capacity waste tank. Cores are considered clean when the effluent is clean.



FEATURES

Maximum confining pressure.....	1,000 psi
Core diameter.....	1.5" (other upon request)
Core length.....	Up to 3" (other upon request)
Fluid flow rate.....	5 cc/min (recommended)
Wetted parts.....	Stainless steel
Electrical.....	110-220 VAC, 50 or 60 Hz
Weight.....	40 Kg

BENEFITS

- Possibility to pump different solvents
- Constant injection flow for solvent
- Easy core loading and unloading operation
- Cleaning at pressure for high permeability sample



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RECOVERY STILL FOR SOLVENT

The recovery still separates crude oil from solvents used in extraction processes. This procedure is achieved via the fractional distillation method, possible as a result of the difference in boiling point temperature of the two liquids. The apparatus consists mainly of an insulated boiler tank electrically heated from the bottom, and a water circulating condenser. Dirty solvent is manually poured into the tank whereas the condensed toluene vapor drips into a separate container. The treatment tank's effortless removal facilitates the cleaning of slug deposits. Although the apparatus is explosion-proof, it should be installed in a hazard-free environment.



FEATURES

Recovery.....	95 %
Recovery time.....	3 to 5 hours for 20 litres
Max temperature.....	200°C
Tank capacity.....	20 litres, other upon request
Protection.....	IP 66
Material.....	stainless steel
House water consumption.....	50 litres per hour
Power supply.....	220 VAC 50 Hz , 2,500 W
Dimensions.....	850x1000x1000 mm
Weight.....	165 Kg

HUMIDITY DRYING OVEN

The humidity drying oven enables fast and efficient desiccation under constant relative humidity conditions. The device comprises a robust air bath, a timer, a highly accurate temperature regulating system, and a state of the art humidity regulation system with a remarkable humidity sensor and strategically positioned water vapor injection nozzles. The temperature and humidity are digitally inputted and monitored. The humidity drying oven is definitely the best solution for preserving the integrity of core samples containing trapped water in their mineral structures (clays, gypsum...).



FEATURES

Capacity.....	240 liters
Humidity range.....	10% to 90%
Temperature.....	+10°C + 90°C
Humidity stability.....	+/- 1%
Temperature stability.....	+/- 0.1 °C
Internal dimensions.....	800 x 500 x 600 mm
Power supply.....	220V / 50Hz , 2500 W
Weight.....	184 kg
Water consumption.....	1 – 10 bar (200 – 500 µS/cm)



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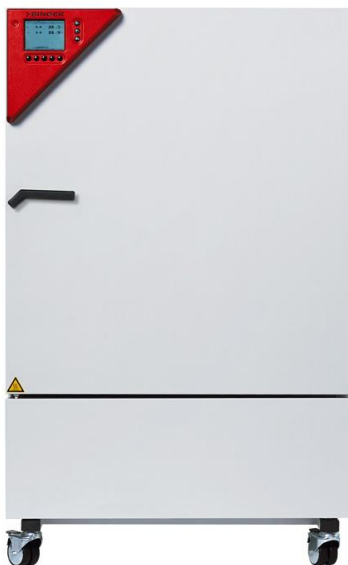
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VACUUM DRYING OVEN

The vacuum drying oven enables fast and efficient desiccation under vacuum conditions. The device comprises a robust vacuum air bath, an electronic temperature regulator and a fully automatic digital vacuum control. The great advantage of this product is its ability to dry at lower temperatures. Indeed by lowering the pressure in the system below atmospheric, will inherently reduce a liquid's vaporization temperature. Therefore the vacuum drying oven is perfectly suited for temperature-sensitive core samples (fragile mineralogy, poor consolidation...).



FEATURES

MODEL 1: 53 LITRES VACUUM OVEN

Capacity.....	53 liters
Temperature.....	20 to 200°C
Vacuum.....	10 mb
Internal dimensions.....	400 x 400 x 330 mm (WxHxD)
Power supply.....	220V, 50Hz, 1200 W
Weight.....	80 kg

MODEL 2: 115 LITRES VACUUM OVEN

Capacity.....	115 liters
Temperature.....	20 to 200°C
Vacuum.....	10 mb
Internal dimensions.....	506 x 506 x 450 mm (WxHxD)
Power supply.....	220V, 50Hz , 1900 W
Weight.....	150 kg



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AIR FORCED DRYING OVEN

The air forced drying oven enables fast and efficient drying of core samples post cleaning and prior to core analysis experiments (porosity, absolute and relative permeability, enhanced oil recovery, rock mechanics...) The device comprises a robust air-forced convection air bath, a variable speed turbine, an electronic temperature regulator and a timer.



FEATURES

53 LITERS MODEL

Capacity 53 liters
 Temperature 220°C
 Internal dimensions.....400 x 330 x 400 mm
 Power supply220V , 50Hz , 2,000 W
 Weight42 kg

108 LITERS MODEL

Capacity 108 liters
 Temperature 220°C
 Internal dimensions..... 556 x 400 x 480mm
 Power supply..... 220V , 50Hz , 2,000 W
 Weight63 kg



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VACUUM HEATED DESICCATOR

The vacuum heated desiccator's sole purpose is to simultaneously dry multiple core samples in a vacuum at temperatures reaching 80°C. A total humidity removal inside rock specimens is crucial before certain studies, e.g. gas permeability or porosity measurements. The system includes a heated desiccator and a vacuum pump. The main components of the portable oven are a machined stainless steel heating plate (Option: Heating plate with Teflon coating) and a glass bell, designed to withstand the internal and external pressure difference. The sealing is secured by a Viton O-ring between the heating plate and the bell. A small volume and compact design guarantee a fast heating process. The portable vacuum oven is safe, user-friendly, and extremely durable.



FEATURES

Temperature..... up to 80°C
 Vacuum... 10^{-3} mbar
 Max pumping speed..... 2.5 m³/h
 Quantity of sample..... around 30
 Materialstainless steel 316L
 Electrical 220V / 50Hz or 110 V / 60 Hz

BENEFITS

Rapid and efficient drying
 Total visibility on the product to be dried
 Compact



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MANUAL SATURATOR

The manual saturator enables the end user to obtain remarkable saturation of clean, dry core samples. Initially, the samples are placed in a wire mesh basket, lowered into the saturation cell and the latter is sealed with a threaded plug. The system is then evacuated by applying high vacuum for a few hours. The vacuum pump is connected to the system via a liquid trap tank and a feed tank. This configuration enables both air evacuation and liquid deaeration. The trap tank protects the vacuum pump by collecting potential vapor droplets. Once vacuum has been established, the pump is turned off and the tubing, manually disconnected. This causes the deaerated liquid in the feed tank to invade the entire system, i.e. cell, tubing and injection pump. Finally, a manual pump is used to pressurize the system up to 2,000 psi. This pressure should be sustained for at least four hours to guarantee maximum core saturation. This is confirmed by a stable reading on the manometer.



FEATURES

Max saturating pressure.....	2,000 psi
Cell diameter.....	58 mm
Cell height.....	300 mm
Wetted materials.....	316 Stainless steel (other on request)
Saturant.....	water, brine, oil or other liquids

BENEFITS

- Rapid and efficient saturation
- Can accommodate plug size sample and full sized core sample in option
- Manual operations
- Loading carrier for easy loading
- Dead volume sets to minimize volume of saturant



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AUTOMATED SATURATOR

The automated saturator sequentially performs vacuum and saturation cycles on both plug and whole core size samples. Initially, the samples are placed in a wire mesh basket, lowered into the saturation cell and the latter is sealed with a threaded plug. Optionally, a large capacity cell can be provided to accommodate full size core samples. The system is then evacuated by applying high vacuum for a few hours. The vacuum pump is connected to the system via a liquid trap tank and a feed tank. This configuration enables both air evacuation and liquid deaeration. The trap tank protects the vacuum pump by collecting potential vapor droplets. Once vacuum has been established, the pump is turned off and the system, vented to atmospheric pressure. This causes the deaerated liquid in the feed tank to invade the entire system. Finally, an electric high-pressure pump pressurizes the saturation liquid up to 2,000 psi. This pressure should be sustained for at least four hours to guarantee maximum core saturation. This is confirmed by a stable reading on the manometer. Automated controls are integrated into the system to accommodate the operator. Specifically, via a computer, he/she can open or close the pneumatic valves, operate the vacuum and high-pressure pumps and run automatic saturation cycles.



FEATURES

Max saturating pressure.....	2,000 psi
Cell diameter.....	58 mm
Cell height.....	300 mm
Wetted materials.....	316 Stainless steel (other on request)
Saturant.....	water, brine, oil or other liquids
Power supply.....	110-220 VAC, 50 or 60 Hz

BENEFITS

- Rapid and efficient saturation
- Can accommodate plug sized sample and full sized core sample
- Fully automated operations
- Loading carrier for easy loading
- Dead volume sets to minimize volume of saturant



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OVERBURDEN CORE SATURATOR

The overburden core saturator enables the end user to obtain remarkable saturation of clean, dry core samples at overburden pressure. Initially, the sample is placed in a Viton sleeve, in a hydrostatic core holder and the latter is evacuated by applying high vacuum for a few hours. Upon request, additional core holders can be added to the assembly. Once vacuum has been established, the saturation liquid, contained in a floating piston accumulator is injected by virtue of a High-Performance Liquid Chromatography (HPLC) pump capable of generating pressures up to 5,000 psi. Finally, a hydraulic manual pump generates a confining pressure on the walls of the Viton sleeve. These conditions should be maintained for at least four hours to guarantee maximum core saturation. This is confirmed by a stable reading on the manometer.



FEATURES

Maximum confining pressure.....	5,000 psi
Maximum working temperature.....	ambient
Core diameter.....	1" and 1.5"
Core length.....	Up to 12"
Fluid flow rate.....	up to 10 cc/min
Wetted parts.....	Stainless steel
Electrical.....	220 VAC 50/60 Hz, 1 ph,
Air requirement	2,000 psi
Vacuum source	10 ⁻³ mbar.
Weight.....	100 Kg

BENEFITS

Rapid and efficient saturation
Overburden pressure conditions.



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STEREOMICROSCOPE

The Stereomicroscope Stemi 2000 is a high-precision, cost-efficient laboratory accessory. The vast 7.7:1 magnification range (pancratic system 0.65x...x5.0) flawlessly delivers a resolution unparalleled by other microscopes in this category. Notably, a non-heating light is integrated into the system.



FEATURES

Model.....	ZEISS STEMI 2000
Magnification.....	x6.5 ...x50
Viewing field.....	Max 23mm
Working distance.....	90 mm
Power supply.....	220 VAC 50Hz

ULTRA VIOLET BOX

Equipped with an ultra violet light tube and a fluorescent white light, this tool enables core and cutting sample observation under both UV light and white light. Specimens can be placed in the box without introducing external light. Two extra UV bulbs and two extra white fluorescent bulbs are included in the order.



FEATURES:

Light..... UV and white fluorescent light
Power supply..... 220 VAC 50Hz

ROUTINE CORE ANALYSIS



Capillary pressure



Coreval 30



Electrical Properties System



BRP 350

HIGH PRECISION DIGITAL BALANCES

Digital balances especially selected for core applications where measurement accuracy is required.



FEATURES

TYPICAL BALANCE FOR PLUG SIZED CORE SAMPLES

Weighing range.....0-600 g, other upon request
 Accuracy.....0.001 g
 Power supply.....110-220 VAC 50/60 Hz

TYPICAL BALANCE FOR FULL SIZED CORE SAMPLES

Weighing range.....6,200 g, other upon request
 Accuracy.....0.01 g
 Power supply.....110-220 VAC 50/60 Hz

DEAN STARK EXTRACTOR

Distillation extraction (Dean stark) enables the determination of fluid saturation in a core sample by virtue of a solvent vaporization and condensation process. This method relies on the miscibility to oil and immiscibility to water of solvents such as toluene. Initially, the saturated sample is weighed. It is then placed in a glass tube connected at the bottom to an externally heated, solvent-containing flask and to a fluid separation system at the top. By heating the system, the in-situ water vaporizes, condenses in the condenser tube and is collected in a graduated receiver. The vaporized solvent also condenses, soaks the sample, and extracts the oil, which falls into the solvent flask. The experiment continues until the extracted solvent displays its original color. The sample is then oven dried and weighed again. The weight measurements (saturated core, dry core, produced water) can be inputted into the mass balance equation to deduce the produced oil volume. The apparatus consists of a distillation/extraction glassware unit and a heating mantle with thermostatic controller. The glassware for a single sample is composed of a boiling flask with extractor, sample support screen, volumetrically graduated water receiving tube, condenser and desiccant drying tube. A flexible plastic tubing connects the condenser to the water cooling unit. All these constituents are supported by a mounting rack.



FEATURES

DEAN STARK FOR PLUG CORE SAMPLE

Configuration.....	Single unit model / Multiple units model (up to 6 extractors)
Core sample diameter.....	up to 1.5"
Core sample length.....	up to 4"
Extractor capacity.....	250 ml
Boiling flask.....	500 ml
Receiving tube	5 and 15 ml, 0.1 ml graduation
Heating temperature.....	up to 450°C
Water cooling system.....	0.5 to 3 liters per minute, 18°C
Power supply.....	220 VAC 50 HZ

DEAN STARK FOR FULL SIZE CORE SAMPLE

Configuration.....	Single unit model / Multiple units model (up to 6 extractors)
Core sample diameter.....	up to 4"
Core sample length.....	up to 6"
Extractor capacity.....	3 liters
Boiling flask.....	6 liters
Receiving tube	40 ml, 0.2 ml graduation with drain valve
Heating temperature.....	up to 450°C
Water cooling system.....	0.5 to 3 liters per minute, 18°C
Power supply.....	220 VAC 50 Hz

RETORT OVEN

The retort oven enables the determination of liquid saturations in cores containing water and/or liquid hydrocarbons. The system comprises a retort cabinet containing two chambers each containing 5 sample canisters capable of accommodating up to 100 grams of crushed core material. Each canister is hermetically sealed with a threaded cap at the top and a narrow opening on the bottom that communicates with a condensing tube and a graduated burette. The tube passes through a water bath thereby accelerating vapor condensation. After condensation, the condensates accumulate in a graduated glass tube. In order to reduce the duration of the experiment, the specimen must first be pulverized prior to its insertion into the canister. The apparatus makes use of the difference in vaporization temperature of the two liquids. The samples are first heated below oil-vaporization temperature so that only water is removed. Once this has been established, the temperature is augmented to 650°C (1,200 F) until complete hydrocarbon extraction.



FEATURES

Sample bomb capacity.....	100 grams of crushed core material
Receiving tube capacity.....	20 ml (other size upon request)
Number of sample bomb / receiving tub.....	10
Max Temperature.....	650°C (1,200 °F)
Material.....	carbon refractory steel
Weight.....	50 kg
Dimensions.....	104 x 88x 32 cm
Electrical.....	220V, 50Hz



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GAMMA RAY LOGGER (NGR 200)

The NGR 200 instrument performs both total and spectral analysis of the natural gamma radiations emitted from recuperated reservoir core samples. The device has the ability to report Potassium (K), Uranium (U) and Thorium (Th) concentrations. The most immediate virtue of the NGR200 is its ability to adjust the estimated original depth of a rock sample or cutting by matching the experimental results to a Gamma Ray log obtained during MWD/LWD (Measurement While Drilling/Logging While Drilling) or wireline logging operations. The apparatus consists of a highly sensitive, strategically placed gamma ray detector, a four meter long linear belt conveyer to displace the core along the detector, and heavy lead shielding to eliminate background gamma radiation. The detector system consists of a shielded scintillation crystal coupled with a photo multiplier. Signals from the detector are processed using a multi-channel spectrum analyzer and a dedicated analytical software. The total gamma ray radiation is reported but more importantly, gamma ray events are energy-sorted and counted over three energy windows K, U and Th. Core samples can be either fully exposed or contained in a barrel. The core is scanned longitudinally from bottom to top, thereby simulating a MWD, LWD or wire-line logging operation. Logging speed is adjustable to suit the nature of the core and data requirements.



FEATURES

Belt length.....	4 meters
Suitable for core.....	up to 5.5''
Shielding area.....	5 & 3.7 cm around the crystal
Sodium Iodine detector.....	3'' by 3''
Variable logging speed.....	up to 2 feet / min
Power supply.....	230 VAC 50/60 Hz 1 phase



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GEOMETRIC BULK VOLUME METER (GBV)

The tool is designed to measure bulk volume of plug sized and/or full diameter cores with excellent accuracy. Multiple axial and radial measurements of a specimen are taken by means of a digital caliper. The latter can optionally be connected to a PC and automatically export the data to a specific statistical analysis software capable of computing Geometric bulk volume, effective flow area, caliper bulk factor and shape factor. A minimum of 4 measurements along the diameter and one every 50 mm along the length are recommended to produce a statistically significant result.



FEATURES

A digital 150 mm caliper for plug cores with accuracy of ± 0.02 mm

A digital 300 mm caliper for full diameter cores with accuracy of ± 0.02 mm

A software to calculate the bulk volume parameters.

Electrical: 110-220V, 50 or 60 Hz

IMMERSED BULK VOLUME METER (IBV)

The immersed bulk volume determination system flawlessly measures the bulk volume of plug-sized core samples by virtue of the Archimedes' principle. The system comprises a mercury bath, a high-precision digital balance and a mechanical linear actuator. The wetted parts of the actuator are a sample plunger and a level rod. Initially, the apparatus is calibrated by lowering the actuator with a rotary crank until the rod tip barely contacts the mercury surface. The balance is then zeroed and the actuator, raised. The sample is placed on the surface of the mercury under the plunger and submerged with the actuator until the tip of the rod brushes the mercury's surface. The rod ensures that the actuator is immersed to the same depth during calibration and measurements.



FEATURES

- A robust base which supports the balance and a vertical post
- An adjustable immersion depth and precision ram with level mark
- A plunger which supports the sample when it is immersed in mercury
- A high precision balance with RS232 communication port
 - Reading accuracy: 0.01 g
 - Max weighing: 6,000 g
 - Repeatability: +/- 0.01 g
 - Linearity: +/- 0.01 g
- A thermometer for mercury density determination
- Mercury immersion container.
- Electrical: 110-220V, 50 or 60 Hz

MERCURY POROMETER

The mercury porosimeter accurately determines the bulk and pore volumes of core samples. The apparatus comprises a mercury cell capable of accommodating between 10 to 15 cm³ samples, and a manual, helical screw pump equipped with a volumetric Vernier calliper graduated in 0.01 cm³ increments. A pressure gauge located on the cell indicates the system pressure up to 100 bar. Initially, the closed cell is entirely filled with mercury by means of the pump's rotary crank, and the corresponding volume is read from the calliper. Mercury is then removed, the cell lid unscrewed, and the sample, placed inside. The system is evacuated by connecting a vacuum pump to a port located on the cell. Once the vacuum has been established and the vacuum pump shut off, the mercury will flow back into the cell to restore atmospheric pressure. The difference between the first volume reading and the current one indicates the bulk volume. To obtain the pore volume, the system must be pressurized to its maximum, i.e. 100 bar, at which point, the mercury will have invaded all the interconnected pore space. The difference between the new volume reading and the previous yields the pore volume.



FEATURES

Max pressure.....	100 bar (1,500 psi)
Sample volume.....	10 to 15 cc
Cell size.....	40 x 70 mm
Pump volume.....	100 cc
Direct reading by vernier.....	0.01 cm ³
Wetted part.....	Stainless steel



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HELIUM POROSIMETER (HEP)

The Helium gas expansion porosimeter enables the determination of a sample's (1" or 1.5" diameter) grain and pore volume via an isothermal helium expansion and the application of Boyle's law and Charles' law. Subsequently, porosity and grain density can be calculated. A data acquisition system performs calibration, data logging and parameter calculation. Optionally, a full diameter matrix cup can be provided for porosity studies on whole diameter core samples. Each sample matrix cup is interchangeable and is supplied with stainless steel calibration check plugs. Pore volume can be measured by placing the core sample in an optional Hassler type core holder, connected to the porosimeter.



FEATURES

Core diameter:	1" and 1.5", (4" optional)
Core length:	up to 3", (up to 12" optional)
Porosity Range:	up to 60%
Charge Pressure in reference volume:	200 psi
Pressure sensor accuracy:	0.1%
Porosity Range:	up to 60%
Electrical requirements:	110-220 VAC, 50 or 60 Hz
N ₂ /Helium requirements:	500 psi
Dry air requirements:	100 psi



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HELIUM POROSIMETER FOR EDUCATIONAL PURPOSES (HEP-E)

The Helium gas expansion porosimeter enables the determination of a sample's (1" or 1.5" diameter) grain and pore volume via an isothermal helium expansion and the application of Boyle's law and Charles' law. Subsequently, porosity and grain density can be calculated. A provided excel template facilitates the computation of these parameters as well as calibration.



FEATURES

Core diameter.....	1" and 1.5"
Core length.....	up to 3"
Porosity Range	up to 60%
Charge Pressure in reference volume.....	200 psi
Pressure sensor accuracy.....	0.1%
Porosity Range	up to 60%
N2/Helium requirements.....	500 psi

BENEFITS

- Cost effective
- Ideal for educational purposes
- Compact system



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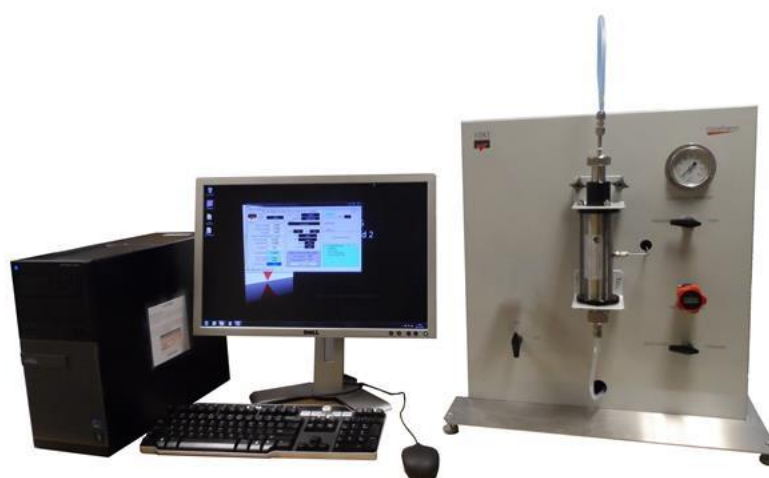
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STEADY STATE GAS PERMEAMETER (GASPERM)

The steady-state gas permeameter accurately determines the permeability to gas of plug-sized core samples at ambient temperature and moderate confining pressure by virtue of the steady state method. The latter implies a constant flow rate across the sample. Gas can be injected over a wide range of pressures and flow rates. The core inlet pressure is continuously monitored by an inline differential pressure transducer while the gas flow rate is reported by a high-grade mass flow meter. A precision metering valve for back-pressure control permits a better Klinkenberg interpolation. The apparatus can be used with both consolidated and unconsolidated core samples previously prepared in metal or plastic sleeves with retaining screens at the ends. An Excel spreadsheet calculation template allows calibration and parameter calculation.



FEATURES

Permeability Range	0.01md to 10 darcies
Flow Pressure	0 to 100 psi
Gas flow	0-50, 0-600 cc/min
Temperature	ambient
Temperature accuracy	+/- 0.1 °C
Pressure transducer accuracy	0.1% F.S.
Flow accuracy	1 % F.S.
Nitrogen supply	250 psi
Power	110-220 VAC, 50 or 60 Hz



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STEADY STATE GAS PERMEAMETER FOR EDUCATIONAL PURPOSES (GPE)

The GPE-E accurately determines the permeability to gas of plug-sized core samples at ambient temperature and moderate confining pressure by virtue of the steady state method. The latter implies a constant flow rate across the sample. Gas can be injected over a wide range of pressures and flow rates. The core inlet pressure is continuously monitored by an inline pressure transducer while the gas flow rate is reported by a high-grade mass flow meter. The apparatus can be used with both consolidated and unconsolidated core samples previously prepared in metal or plastic sleeves with screens at the ends. An Excel spreadsheet calculation template allows for calculation of parameters and also calibration data.



FEATURES

Permeability Range.....	1md to 1 darcy
Flow Pressure.....	0 to 100 psi
Gas flow.....	0-500 cc/min
Temperature.....	ambient
Temperature accuracy.....	+/- 0.1 °C
Pressure transducer accuracy.....	0.1% F.S.
Flow accuracy.....	1 % F.S.
Nitrogen supply.....	250 psi
Power	110-220 VAC, 50 or 60 Hz

BENEFITS

- Cost effective
- Ideal for educational purposes
- Compact system



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MULTI FULL-DIAMETER STEADY STATE GAS PERMEAMETER (WHOLEPERM)

The Wholeperm instrument is dedicated to measuring both horizontal and vertical permeability to gas of full diameter core samples at room conditions. This apparatus can provide enlightening results in the context of heterogeneous, anisotropic rock studies. The unit consists of a base unit with a hydraulic ram and up to four core holders, each designed for a specific range of diameters to be used separately with a maximum length up to 12 inches. Each core holder consists of an outer body and an inner mandrill and sleeve capable of taking core samples in the specified diameter ranges. Standard diameter ranges available for the outer body are for 2 to 2 7/8 inch, 3 to 3 7/8 inch, 4 to 4 7/8 inch and 5 to 5 7/8 inch core samples. Diameters must be decided at time of order. The wholeperm is provided with a gas permeameter console and data acquisition computer station.



FEATURES

Permeability Range.....	0. 01md to 10 darcies
Flow Pressure.....	0 - 100 psi
Confining Pressure.....	0 – 3,000 psi
Gas flow.....	0-50 and 0-600 cc/min
Temperature.....	ambient
Temperature accuracy.....	+/- 0.1 °C
Pressure transducer accuracy.....	0.1% F.S.
Flow accuracy.....	1 % F.S.
Core diameter.....	4” (other upon request)
Core length.....	3 to 12” (other upon request)
Power	110-220 VAC, 50 or 60 Hz

BENEFITS

Fast loading and unloading operation
Wide range of core diameter



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The versatile POROPERM determines both porosity and permeability to gas of plug-sized core samples. Specifically, porosity is determined from an isothermal nitrogen expansion and the application of Boyle's law and Charles' law. Gas permeability determination is achieved via the steady-state method, and subsequently the equivalent liquid permeability and slip is obtained by linear interpolation. The standard configuration consists of a control console, a quick-release Hassler core holder, a matrix cup and a data acquisition computer station enabling both manual and automatic operation. A hydrostatic high-grade stainless steel core holder can be provided for overburden pressure studies.



Permeability Range:.....0.01md to 10 darcies
Flow Pressure:.....0 - 150 psi
Confining Pressure:.....0 - 400 psi
(option 10,000 psi)
Gas flow:.....0-50 and 0-600 cc/min
Temperature:.....Ambient
Pressure transducer accuracy:.....0.1% F.S.
Flow accuracy:.....1 % F.S.
Core diameter:.....1" and 1.5" (option)
Core length:.....Up to 3"
Power.....110-220 VAC, 50 or 60 Hz

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PLUG SIZED PERMEABILITY CHECK PLUGS

The check plugs are used to check and test the calibration of gas permeameters. The set consists of five stainless steel check plugs with different permeability to air. The sensitive porous material is protected by a metal ring. These calibration plugs are not primary standards and have been tested using customary testing methods.



FEATURES

Diameter..... 1.0 inch, 1.5 inch, 30 mm
Length..... 1.0 inch
Permeability range..... 0.05 -0.15 md, 0.7-2md, 8-15 md, 40-70md, 150-220 md

FULL SIZED PERMEABILITY CHECK PLUGS

The check plugs are used to check and test the calibration of full size core gas permeameters. The set consists of five check plugs with different permeability to air. The sensitive porous material is protected by a metal ring. These calibration plugs are not primary standards and have been tested using customary testing methods.



FEATURES

Diameter..... 4.0 inch
Length..... 2.0 inch
Permeability range..... 0.01-0.05 md, 0.08– 1.2 md, 4-5 md, 8-15 md, 30-50md



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ULTRA PERM CHECK PLUGS

The ultraperm check plugs are used to check and test the calibration of gas permeameters that test very high permeability samples. The sensitive porous material is protected by a metal ring. This calibration plug is not primary standard and has been tested using customary testing methods.



FEATURES

Diameter_____1.0 inch, 1.5 inch, 30 mm
Length_____1.0 inch
Permeability range_____between 900 md and 1,100 md



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MICRO PERM CHECK PLUGS

The microperm check plugs are used to check and test the calibration of gas permeameters that test very low permeability samples. The sensitive porous material is protected by a metal ring. This calibration plug is not primary standard and has been tested using customary testing methods.



FEATURES

Diameter..... 1.0 inch, 1.5 inch, 30 mm
Length..... 1.0 inch
Permeability range..... between 5 μ d and 30 μ d

BEREA SANDSTONE ROCK CORE SAMPLES

Excavated from quarries and cut to specific dimensions, these Berea Sandstone™ cores are sedimentary rocks containing sand sized (60 µm – 1 mm) grains, composed of silica-bonded quartz-sand. Their relatively (10-25%) high porosity and permeability (50 to 400 mD) easily classify them as reservoir rocks. Each rock core sample can be measured with our Poroperm instrument using customary testing methods. A test report is provided with each sample and includes core permeability to air, Klinkenberg permeability, porosity, bulk volume, dry bulk density and grain density.



FEATURES

Type.....	Berea Sandstone™
Diameter.....	30 mm, 1 inch, 1.5 inch or 4.0 inches
Length.....	3 inches, 6 inches or 12 inches
Permeability range.....	between 50 to 400 md
Porosity range.....	between 10 to 25%



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UNSTEADY STATE GAS PERMEAMETER AND POROSIMETER AT MODERATE CONFINING PRESSURE (COREVAL 30)

The Coreval 30 instrument accurately measures under confining pressure (up to 400 psi) the porosity and permeability to gas (helium/nitrogen) of plug sized core samples. The apparatus mainly comprises a quick-release Hassler core holder, pressure transducers, a temperature probe, control valves and a data acquisition & calculation computer station. Permeability to gas measurements are performed by virtue of the unsteady-state pressure fall-off method. After collecting enough data points, the Vinci software will execute a linear interpolation and output the equivalent permeability to liquid, slip and turbulence factors. Pore volume and porosity are determined via an isothermal helium/nitrogen expansion and the application of Boyle's law and Charles' law.



FEATURES

Permeability Range.....	0.001md to 10 darcies
Porosity Range.....	up to 60%
Pore Pressure.....	250 psi
Confining pressure.....	up to 400 psi
Temperature.....	ambient
Temperature accuracy.....	+/- 0.1 °C
Pressure transducer accuracy.....	0.1% F.S.
Flow meter.....	0-600 cc/min
Helium.....	400 psi
N2.....	500 psi
Air.....	100 psi (dry)
Power.....	110-220 VAC, 50 or 60 Hz



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UNSTEADY STATE GAS PERMEAMETER AND POROSIMETER AT OVERBURDEN PRESSURE (COREVAL 700)

The Coreval 700 instrument accurately measures at overburden confining pressure (400 psi to 10,000 psi) the porosity and permeability to gas (helium/nitrogen) of plug sized core samples. The apparatus mainly comprises a hydrostatic core holder, pressure transducers, a temperature probe, control valves and a data acquisition & calculation computer station. Permeability to gas measurements are performed by virtue of the unsteady-state pressure fall-off method. After collecting enough data points, the Vinci software will execute a linear interpolation and output the equivalent permeability to liquid, slip and turbulence factors. Pore volume and grain volumes are determined via an isothermal helium/nitrogen expansion and the application of Boyle's law and Charles' law.



FEATURES

Permeability Range.....	0.001md to 10 darcies
Porosity Range.....	up to 60%
Pore Pressure.....	250 psi
Confining Pressure.....	400 psi to 10,000 psi
Temperature.....	ambient
Temperature accuracy.....	+/- 0.1 °C
Pressure transducer accuracy	0.1% F.S.
Flow meter.....	0-600 cc/min
Helium	400 psi
N2.....	500 psi
Air.....	100 psi (dry)
Power.....	110-220 VAC, 50 or 60 Hz



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MULTI SAMPLE UNSTEADY STATE PERMEAMETER AND POROSIMETER AT OVERBURDEN PRESSURE (KEYPHI)

The KEYPHI is a fully automated multi-sample permeameter and porosimeter dedicated to measuring the porosity and permeability to helium/nitrogen of plug-sized core samples at multiple confining pressures ranging from 400 psi to 10,000 psi. Moreover, the instrument is supplied with a data acquisition & calculation computer station. Gas permeability determination is achieved via the unsteady-state, pressure fall-off method, and subsequently the equivalent liquid permeability, slip and turbulence factors are obtained by linear interpolation. Porosity parameters are determined from an isothermal nitrogen expansion and the application of Boyle's law and Charles' law; specifically, pore volume and grain volume are obtained from using the core holder and matrix cup, respectively.



FEATURES

Confining Pressure.....	400-10,000 psi
Pore Pressure.....	250 psi
Core diameter.....	1" or 1.5"
Core length.....	0.75" to 3"
Permeability Range.....	0.001md to 10 darcies
Flow meter.....	0-600 cc/min
Porosity Range.....	0.1 > 60%
Sample capacity.....	13 (1.5" diam. samples) and 16 (1" diam. Sample)
Helium.....	400 psi
Nitrogen.....	500 psi
Air.....	125 psi (dry)
Power.....	110-220 VAC, 50 or 60 Hz



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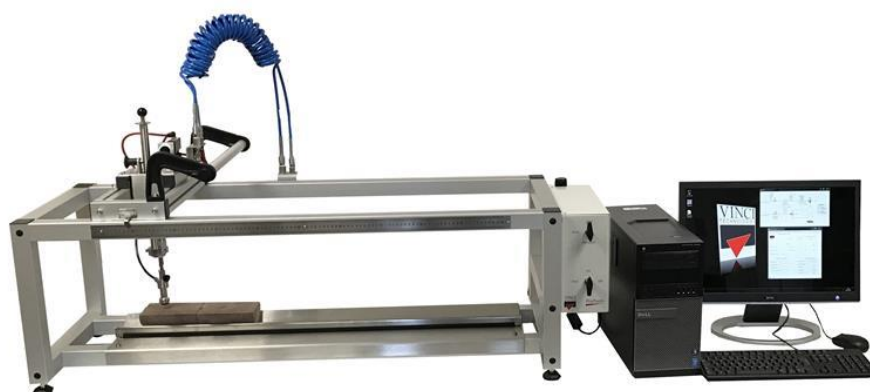
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PROBE PERMEAMETER (PROPERM)

The purpose of the PROPERM is to perform rapid, non-destructive, localized permeability measurements on rock samples using the steady state method. The main components are pressure, flow, core frame, and injection probe modules. A measurement is taken by positioning the probe tip at a desired location on the sample and then pressing against its surface. Hereafter, nitrogen gas is forced to flow at constant pressure through the injection tip and into the permeable sample. A mass flow controller determines the flow rate while the pore pressure is deduced from a highly accurate electronic pressure transducer. The instrument is provided with a data acquisition and calculation computer station. Permeability values are derived from the modified Darcy's law which includes a geometric factor that takes into account flow complexities around the tip seal.



FEATURES

Permeability Range.....	0.01mD to 10 darcies
Flow Pressure.....	0 to 150 psi
Temperature.....	Ambient
Probe actuator pressure.....	0 – 100 psi
Pressure accuracy	0.1% FS
Nitrogen.....	250 psi
Air.....	125 psi (dry)
Power.....	110-220 VAC, 50 or 60 Hz



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LIQUID PERMEAMETER (LIQPERM)

The robust liquid permeameter allows the determination of a plug- sized core sample's absolute permeability at ambient temperature and moderate confining pressure. This is achieved by virtue of the steady-state method; specifically, permeability is obtained by inputting the measured pressure gradient and flow rate into Darcy's law for one dimensional flow in porous media. The instrument comprises a hassler core holder, a fluid transfer vessel, a console with pressure digital display, 3 interchangeable burettes for various permeability ranges, an electronic timer to deduce flow rate and an Excel spread sheet calculation template. The device is specifically designed to teach students the principles of liquid permeability in a clear and efficient manner. The short duration of the experiment reinforces the practicality of this apparatus in an educational setting.



FEATURES

Permeability Range.....0.1 md to 5 darcy
 Flow Pressure.....up to 100 psi
 Confining pressure.....up to 400 psi
 Temperature.....ambient
 Pressure transducer accuracy.....0.25% F.S.
 Air supply.....400 psi



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BENCH TOP PERMEABILITY SYSTEM (BPS 350)

The BPS350 permeameter is a manually operated system that neatly performs liquid permeability determination experiment tests at pore pressures and confining pressures up to 5,000 psi. The standard system includes a low pulsation High Performance Liquid Chromatography (HPLC) pump for fluid delivery at flow rates ranging from 0.01 ml/min to 10 ml/min, and a manually operated hydraulic pump to generate and maintain confining pressure. Two accumulators are used for fluid storage. Core plugs are placed in a horizontally-mounted Hassler core holder. Sample dimensions can be customized upon request. Pressure gradient is measured by a highly accurate differential transducer of 0-500 psid range. A manual bypass valve protects this sensor from dangerous overpressures. To prevent external effects, isobaric outlet pressure conditions are ensured via a dome-loaded backpressure regulator. An optional gas line allows relative gas permeability determination. Gas is injected through the core and the measured flow rate is utilized to calculate the end point relative permeabilities K_{rg} (permeability relative to gas).



FEATURES

Confining pressure.....	350 bar (5,000psi)
Pore pressure.....	350 bar (5,000psi)
Temperature.....	ambient
Core diameter.....	1" or 1 1/2"
Core length.....	1" to 3"
Loading type.....	Hassler
Wetted material.....	stainless steel
Fluid.....	Water and N ₂
Power.....	110-220 VAC, 50 or 60 Hz



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EDUCATIONAL RELATIVE PERMEAMETER (RELPERM)

The Relperm measures the absolute permeabilities to liquid and gas as well as the end-point effective permeabilities of a two phase fluid system. Liquid-liquid and liquid-gas relative permeabilities can be deduced at the saturation end-points. An Excel spreadsheet calculation template allows the operator to input the sample and fluid characteristics and experimental data (pressure gradient and flow rates) after which the above mentioned permeabilities are computed via the Darcy's law. The device is specifically designed to teach students the principles of relative permeability in a clear and efficient manner. The short duration of the experiment reinforces the practicality of this apparatus in an educational setting.



FEATURES

Confining pressure	400 psi
Pore pressure	100 psi
Temperature	ambient
Core diameter	1" or 1 1/2"
Core length	1" to 3"
Loading type	Hassler
Wetted material	stainless steel
N ₂	2,000 psi
Power	110-220 VAC, 50 or 60 Hz



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BENCH TOP UNSTEADY STATE RELATIVE PERMEAMETER (BRP 350)

The BRP350 determines, under reservoir-representative confining pressure, both absolute and two-phase relative permeabilities to liquids. A core plug is fitted into a Viton sleeve and inserted into a Hassler core holder. Liquid is injected at constant flow rate into the core via the single inlet. Absolute permeability is determined via the Darcy method, while the unsteady state relative permeability is calculated by virtue of the standard Jones and Rozelle equations. The system comprises two floating piston accumulators, an injection HPLC pump, a Hassler core holder, an overburden pressure pump, a back pressure regulator and a video separator for produced fluid measurement. Optionally, the system can be upgraded to perform liquid/gas relative permeability measurements.



FEATURES

Confining pressure.....	350 bar (5,000psi)
Pore pressure.....	350 bar (5,000psi)
Temperature.....	ambient
Core diameter.....	1" or 1 1/2"
Core length.....	1" to 3"
Loading type.....	Hassler
Wetted material.....	stainless steel
N ₂	2,000 psi
Power.....	110-220 VAC, 50 or 60 Hz



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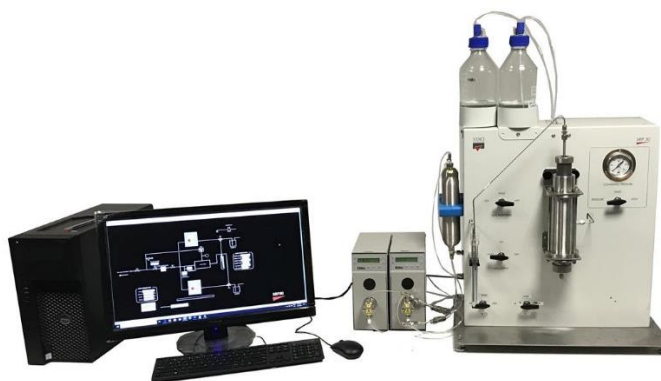
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EDUCATIONAL UNSTEADY STATE RELATIVE PERMEAMETER (SRP 30)

The SRP 30 is a semi-automated relative permeameter specifically designed for educational purposes. The SRP30 flawlessly performs unsteady-state liquid/liquid and liquid/gas relative permeability determination studies on plug-sized core samples at moderate confining pressure and ambient temperature. A core plug is fitted into a Viton sleeve and inserted in a quick-release Hassler core holder. Liquid phases are injected through the core sample at different constant flow rates while gas phases are injected either at constant pressure or at constant flow rate using a mass flow controller. Saturations are deduced from produced volume measurements in an automated video separator. Absolute permeability is determined via the Darcy method, while the unsteady state relative permeability is calculated by virtue of the standard Jones and Rozelle equations.



FEATURES

Confining pressure.....	400 psi
Pore pressure.....	150 psi
Temperature.....	ambient
Core diameter.....	1" or 1 1/2"
Core length.....	1" to 3"
Loading type.....	Hassler
Wetted material.....	stainless steel
N ₂	450 psi
Power.....	110-220 VAC, 50 or 60 Hz



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BENCH TOP UNSTEADY & STEADY STATE RELATIVE PERMEAMETER (SRP 350)

The versatile SRP350 flawlessly performs both unsteady-state and steady-state liquid/liquid and liquid/gas relative permeability determination studies on plug-sized core samples at reservoir-representative pressure and ambient temperature. A core plug is fitted into a Viton sleeve and inserted in a hassler core holder. Liquid phases are injected and recirculated through the core sample at different constant flow rates while gas phases are injected either at constant pressure or at constant flow rate using mass flow controllers. Saturations are deduced from produced volume measurements in a video separator. In the S.S. mode, absolute or relative permeability is determined via the Darcy method, whereas the U.S. method makes use of the standard Jones and Rozelle equations.



FEATURES

Confining pressure.....	350 bar (5,000psi)
Pore pressure.....	350 bar (5,000psi)
Temperature.....	ambient
Core diameter.....	1" or 1 1/2"
Core length.....	2" to 3"
Loading type.....	Hassler
Wetted material.....	stainless steel
N ₂	3,000 psi
Power.....	110-220 VAC, 50 or 60 Hz



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ELECTRICAL PROPERTIES SYSTEM @ AMBIENT CONDITIONS (EPS-A)

The EPS A determines at ambient conditions, rock and brine resistivity for both fully and partially brine saturated core samples. The data obtained from this device can be utilized to derive Formation factor, cementation exponent m , resistivity index and Archie saturation exponent n and also aid depth adjustment in a drilling or wireline log. The apparatus can be operated with either two or four electrodes. Platens press against the core end faces with a constant contact pressure. This mechanism minimizes contact resistance artefacts which are often found when a screw or jack mechanism is used to load the sample onto the electrode platens. Two electrodes are clamped around the circumference of the core sample. The core holder is provided with a plastic cover box to isolate the sample being tested from the external environment therefore preserving the saturation profile.



FEATURES

Core diameter.....	1" and 1.5"
Core Length.....	up to 3"
Resistivity measurement.....	2 and 4 electrodes
Max pressure.....	Atmospheric
Temperature.....	Room condition
Power supply.....	110-220 VAC, 50 or 60 Hz
Air.....	150 psi



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ELECTRICAL PROPERTIES SYSTEM @ OVERBURDEN PRESSURE (EPS 700)

The EPS 700 determines at overburden (up to 700 bar) conditions, rock and brine resistivity for both fully and partially brine saturated core samples. The data obtained from this device can be utilized to derive Formation factor, cementation exponent m , resistivity index and Archie saturation exponent n and also aid depth adjustment in a drilling or wireline log. The apparatus also serves as a desaturator thereby enabling the determination of capillary pressure-saturation curves. The system includes a hydrostatic electrical core holder, a manual hydraulic pump to generate confining pressure, and a pressure control panel for core desaturation. The system can be proposed for multi sample core holders.



FEATURES

Core diameter.....	1" and 1.5"
Core Length.....	up to 3"
Resistivity measurement.....	2 and 4 electrodes
Overburden pressure.....	700 bar (10,000 psi)
Temperature.....	Room condition
Power supply.....	110-220 VAC, 50 or 60 Hz
Air.....	150 psi



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CALIBRATED ELECTRICAL RESISTANCE CHECK PLUGS

These check plugs are used to check and test a resistivity meter's calibration. The set comprises two stainless steel check plugs with different resistivities. These calibration plugs are not primary standards and have been tested using customary testing methods.



FEATURES

Diameter.....1.0 inch, 1.5 inch, 30 mm, 50 mm (other upon request)
Length.....3.0 inches
Resistance range..... 10 ohms and 1,000 ohms



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CAPILLARY PRESSURE AND RESISTIVITY SYSTEM (PC/RI)

The PC/RI system simultaneously determines on rock samples, the capillary pressure - air/water saturation relationship, by virtue of the porous plate method, as well as the rock and fluid electrical properties via the two point method. The system's modular architecture easily warrants the integration of multiple core holders into the apparatus. Samples can be subjected to moderate temperature and high, reservoir-representative confining pressure. A cylindrical sample fitted in a Viton sleeve, is inserted into the core holder and the desired confining pressure, applied. The drainage process is achieved by injecting pressurized gas into the core. At a particular injection pressure, the gas will displace a specific quantity of water. A semi-permeable porous plate, placed on the bottom of the core (outlet) enables desaturation at specified pressure increments while retaining the gas phase. The amount of water produced is recorded in a volumetric burette placed at the core holder outlet. The capillary pressure corresponds to the measured pressure drop across the sample, while the electrical properties are determined from a two-electrode resistivity meter.



FEATURES

Pore pressure.....	up to 200 psi
Overburden pressure.....	10,000 psi
Temperature.....	up to 90°C
Core diameter.....	1" and 1.5"
Core Length.....	up to 3"
Resistivity measurement.....	2 electrodes
Resistivity accuracy.....	0.1%
Test.....	gas/liquid and liquid/liquid
Wetted parts.....	stainless steel
Cap. pressure measuring cycle.....	forced drainage
Power supply.....	110-220 VAC, 50 or 60 Hz
Fluid types.....	stock tank oil, lab-oil, brine, nitrogen gas
Nitrogen.....	300 psi



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SINGLE SAMPLE CAPILLARY PRESSURE CELL

The single sample desaturation cell desaturates a core sample by virtue of the porous plate method. The sample desaturation cell is manufactured from stainless steel and resting on its base is a semi-permeable ceramic plate. It consists of a pressure vessel with an easy opening lid, clamping bolts, O-rings, seals, tubing and a pressure control panel. Three different operating pressure ceramic plates are provided with the system; namely, 1 bar, 5 bar and 15 bar. The control panel includes a digital pressure display, two low and high range pressure regulators and a set of control valves. Moreover, an in-line gas humidifier is integrated into the circuit to prevent in-situ evaporation during the desaturation process.



FEATURES

Diameter.....	40 mm
Height.....	80 mm
Maximum desaturation process.....	200 psi
Minimum desaturation process.....	0.1 psi
Ceramic plate pressure.....	3 bar, 5 bar and 15 bar
Wetted materials.....	316 Stainless steel
Electrical requirements.....	110-220 VAC, 50 or 60 Hz
Air Pressure requirements.....	0- 150 psi (10 bar)



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MULTI SAMPLE CAPILLARY PRESSURE CELL

The multi-sample desaturation cell simultaneously desaturates a set of consolidated core samples by virtue of the porous plate method. The multiple sample desaturation cell is manufactured from stainless steel and resting on its base is a semi-permeable ceramic plate. The desaturation cell consists of a pressure vessel, with an easy opening lid, clamping bolts, O-rings, seals, tubing and a pressure control panel. Three different operating pressure ceramic plates are provided with the systems; namely, 1 bar, 5 bar and 15 bar. The control panel includes a digital pressure display, two low and high range pressure regulators and a set of control valves. Moreover, an in-line gas humidifier is integrated into the circuit to prevent in-situ evaporation during the desaturation process.

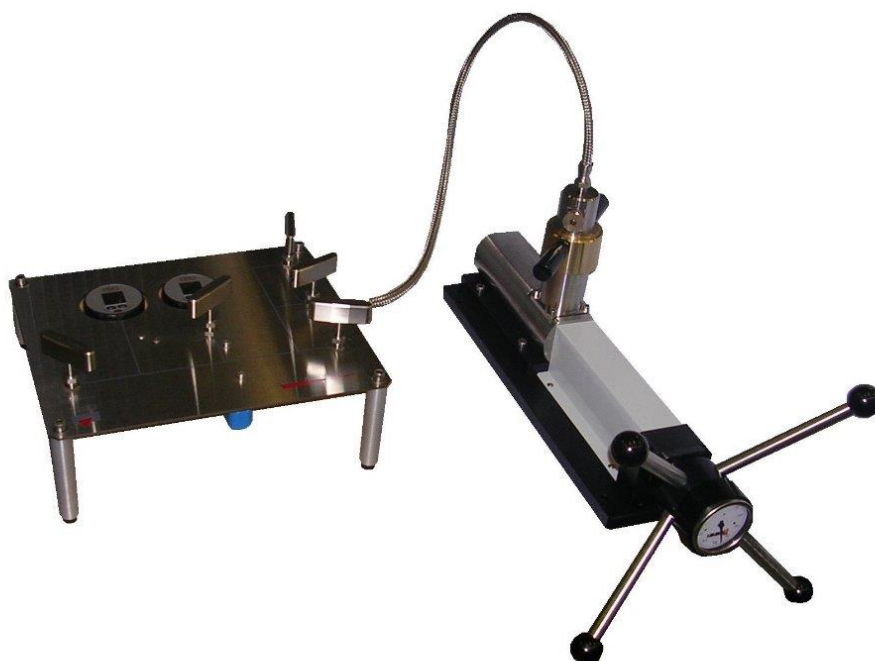


FEATURES

Diameter.....	300 mm
Maximum desaturation process.....	200 psi
Minimum desaturation process.....	0.1 psi
Ceramic plate pressure.....	3 bar, 5 bar and 15 bar
Wetted materials.....	316 Stainless steel
Electrical requirements.....	110-220 VAC, 50 or 60 Hz
Air Pressure requirements.....	0- 200 psi (15 bar)

CAPILLARY PRESSURE MERCURY SYSTEM (CPM 140)

Manually operated system that determines capillary pressure and pore volume by virtue of Purcell's method. A dry core sample is placed in a core holder whose configuration allows easy sample loading/unloading and bulk volume measurement by means of mercury level visualization via a see through window located near the inlet. The core holder is then evacuated and a subsequent mercury injection up to 2,000 psi (140 bar) is performed by means of a nitrogen gas supply. At each pressure increment, the volume of mercury in the core holder is measured with the manual rotary crank pump. The correlations developed by Purcell can then be used to convert mercury capillary pressure to air/water capillary pressure and also get estimates of permeability.



FEATURES

Pressure range.....up to 140 bar (2,000 psi)
 Temperature.....ambient
 Core Diameter.....1" or 1.5"
 Core length.....up to 3 inches
 Vacuum pumping speed2.5 m³/h
 Final vacuum pressure.....10⁻³ mbar.
 Power supply.....110-220 VAC, 50 or 60 Hz
 Nitrogen source.....2,000 psi



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DIGITAL CORE PHOTOGRAPHY SYSTEM (DCP)

The fully automated digital core photography system is specifically designed for complete core photography and archiving purposes, producing high-quality images of whole or slabbed cores under both white and UV light. The device consists of a Heavy-Duty, corrosion-proof, Stainless Steel box, a trolley, a PC station, a high-resolution camera, and white and ultraviolet lights. First, the operator places samples on four shelves inside the container and closes the lid to prevent any outside light from entering. Then either the white or UV light is turned on. The camera mounted above the samples can then sequentially capture images of the specimens. The strategic position of the camera yields a flawless quality. The images are automatically imported, digitized, displayed by the video analysis software. The latter can perform camera calibration functions, image processing, file compression, storage and transfer.



FEATURES

Camera type.....	35 mm Full frame
Camera resolution.....	5616 x 3744 pixels
File size.....	21 Megapixels
Interface.....	USB
Internal PC hard drive.....	80 GB
Maximum frame area.....	600 mm x 900 mm
Data storage on CDROM.....	RAW, JPG
Weight.....	200 kg
Power supply.....	110 VAC, 60 Hz or 220 VAC, 50 Hz



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