

CATALOGUE OF PRODUCTS

2011



PVT



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PVT



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FLUID EVAL FOR OIL AND GAS PVT STUDIES (STANDARD VERSION)

The mercury free Fluid Eval™ analyser in its standard version is designed to study phase behaviour of hydrocarbon fluids at reservoir conditions of pressure and temperature. It is based on an embedded high pressure pump used to generate the pressure and to measure accurately the volume of test fluid. The same instrument can be configured for performing either oil studies or gas condensates studies. A video system allows for determination of the gas and liquid phase interface and so the volume of retrograde condensates during gas condensates studies.



FEATURES

| | |
|-------------------------------|---|
| Pressure:..... | 10,000 psi or 15,000 psi |
| Temperature:..... | Ambient to 175°C (350 °F) higher range upon request option: Cooling : -20°C to ambient |
| Temperature regulation:..... | ± 0.5 °C |
| Cell volume:..... | 500 cc |
| Volume accuracy:..... | 0.01 ml |
| Pressure accuracy:..... | 0.1% Full scale |
| Liquid deposit accuracy:..... | ± 0.01 ml |
| Stirring mechanism:..... | Magnetic drive |
| Power supply:..... | 220 VAC 50 Hz |

BENEFITS

- Versatile, can be used for either oil and gas condensates studies
- Very efficient stirrer based on a combined rocking mechanism and magnetic driven stirrer
- Automatic phase detection provided
- Embedded pump provided



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FLUID EVAL FOR GAS PVT STUDIES (MAXI VERSION)

The mercury free Fluid Eval™ analyser in its maxi version is designed especially to study phase behaviour of lean and rich gas condensates at reservoir conditions of pressure and temperature. It is based on an embedded high pressure pump used to generate the pressure and to measure accurately the volume of test fluid. The design of the PVT cell coupled with a digital video system allow for a very accurate automatic measurement of the retrograde condensates. This version of the Fluid Eval can also be used for oil PVT studies if required.



FEATURES

| | |
|-------------------------------|---|
| Pressure:..... | 10,000 psi or 15,000 psi |
| Temperature:..... | Ambient to 175°C (350 °F) higher range upon request option: Cooling : -20°C to ambient |
| Temperature regulation:..... | ± 0.5 °C |
| Cell volume:..... | 1,000 cc |
| Volume accuracy:..... | 0.01 ml |
| Pressure accuracy:..... | 0.1% Full scale |
| Liquid deposit accuracy:..... | ± 0.01 ml |
| Stirring mechanism:..... | Magnetic drive |
| Power supply:..... | 220 VAC 50 Hz |

BENEFITS

- Versatile, can be used for either oil and gas condensates studies
- Large cell capacity useful for study of lean gas condensates.
- Very efficient stirrer based on a combined rocking mechanism and magnetic driven stirrer
- Automatic phase detection provided
- Embedded pump provided



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FLUID EVAL FOR OIL PVT STUDIES (MINI VERSION)

The mercury free Fluid Eval™ analyser in its mini version is designed especially to study phase behaviour of black oil at reservoir conditions of pressure and temperature. The analyser comes complete with a high pressure bull's eye window cell, heating jacket, high pressure embedded pump, a high accuracy pressure transducer, a rocker arm assembly, a magnetic driven stirrer and a data acquisition system.



FEATURES

| | |
|-------------------------------|---|
| Pressure:..... | 15,000 psi |
| Temperature:..... | Ambient to 175°C (350 °F) higher range upon request |
| Temperature regulation:..... | ± 0.5 °C |
| Cell volume:..... | 200 cc |
| Volume accuracy:..... | 0.01 ml |
| Pressure accuracy:..... | 0.1% Full scale |
| Liquid deposit accuracy:..... | ± 0.01 ml |
| Stirring mechanism:..... | Magnetic drive |
| Power supply:..... | 220 VAC 50 Hz |

BENEFITS

- Cost effective
- Compact
- Require a small volume of sample
- Accurate measurement of volume, pressure and temperature



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FLUID EVAL FOR VISUAL PVT STUDIES (VISUAL VERSION)

The mercury free fluid Eval™ analyser in its visual version is designed to study phase behaviour on hydrocarbon fluids at reservoir conditions of pressure and temperature. The PVT cell which is based on a window through cell offering full sample visibility through front and back windows is particularly interesting when visual observation of the fluid must be accomplished such as hydrates studies, swelling tests, volatile oil studies, gas condensates, etc.



FEATURES

| | |
|-------------------------------|---|
| Pressure:..... | 10,000 psi or 15,000 psi |
| Temperature:..... | Ambient to 175°C (350 °F) higher range upon request option: Cooling : -20°C to ambient |
| Temperature regulation:..... | ± 0.5 °C |
| Cell volume:..... | 200 cc with 100 cc visual |
| Volume accuracy:..... | 0.01 ml |
| Pressure accuracy:..... | 0.1% Full scale |
| Liquid deposit accuracy:..... | ± 0.01 ml |
| Stirring mechanism:..... | Magnetic drive |
| Power supply:..... | 220 VAC 50 Hz |

BENEFITS

- Accurate measurement of volume, pressure and temperature
- Full visibility
- Versatile, can be used for all kinds of PVT studies
- Very efficient stirrer based on a combined rocking mechanism and magnetic driven stirrer



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FLUID EVAL FOR FIELD PVT STUDIES (MOBILE VERSION)

The mercury free mobile fluid Eval™ analyser is designed to study phase behaviour of hydrocarbon fluids at reservoir conditions of pressure and temperature. It can be used either at the field location or in the laboratory. The PVT cell which is based on a window through cell offering full sample visibility through front and back windows is particularly interesting when visual observation of the fluid. The apparatus can perform constant mass expansion tests (i.e. CME), constant mass Depletion (i.e. CMD) differential vaporisation studies (i.e. DV), Constant Volume Depletion (i.e. CVD) flash separator tests and recombination operation on black oil and gas condensates samples. The apparatus provides with the pressure, total volume, retrograde liquid volume, and temperature values and the mean of stirring the fluids efficiently in pressure and temperature. The data are then entered into an excel file to derive the PVT parameters.



FEATURES

| | |
|-------------------------------|---------------------------|
| Pressure:..... | 15,000 psi |
| Temperature:..... | Ambient to 175°C (350 °F) |
| Temperature regulation:..... | ± 0.5 °C |
| Cell volume:..... | 100 cc with 10 cc visual |
| Volume accuracy:..... | 0.01 ml |
| Pressure accuracy:..... | 0.1% Full scale |
| Liquid deposit accuracy:..... | ± 0.01 ml |
| Stirring mechanism:..... | Magnetic drive |
| Power supply:..... | 220 VAC 50 Hz |

BENEFITS

- Transportable
- Touch screen control panel
- Versatile, can be used for all kinds of PVT studies
- Very efficient stirrer based on a combined rocking mechanism and magnetic driven stirrer
- Automated operations



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FLUID EVAL FOR OIL AND GAS PVT STUDIES (EDUCATIONAL VERSION)

The mercury free educational fluid Eval™ analyser is designed to study phase behaviour of hydrocarbon fluids at reservoir conditions of pressure and temperature. This version is adapted to instructional use with a reasonable investment. The PVT cell which is based on a window through cell offering full sample visibility through front and back windows is particularly interesting when visual observation of the fluid is needed. The apparatus can perform constant mass expansion tests (i.e. CME), constant mass Depletion (i.e. CMD) differential vaporisation studies (i.e. DV), Constant Volume Depletion (i.e. CVD) flash separator tests and recombination operation on black oil and gas condensates samples. The apparatus can be upgraded to perform flow assurance studies including asphaltenes and waxes.



FEATURES

Pressure:.....15,000 psi
 Temperature:.....Ambient to 175°C (350 °F)
 Temperature regulation:.....± 0.5 °C
 Cell volume:.....100 cc with 10 cc visual
 Volume accuracy:.....0.01 ml
 Pressure accuracy:.....0.1% Full scale
 Liquid deposit accuracy:.....± 0.01 ml
 Stirring mechanism:.....Magnetic drive
 Power supply:.....220 VAC 50 Hz

BENEFITS

- Cost effective
- Low maintenance
- Multi purposes
- Very efficient stirrer based on a combined rocking mechanism and magnetic driven stirrer
- Automated operations



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MANUAL GASOMETER (MG SERIES)

The manual gasometer is designed to measure gas volumes at ambient conditions of pressure and temperature. The gas enters the calibrated cylinder and raises the floating piston upwards, thus incrementing the volume space in the cylinder. A hand operated crank allows for the operator to adjust the position of the piston at the desired pressure and volume. The volume, temperature and pressure of the gas are continuously monitored and displayed. The gasometer is provided with inlet and outlet valves.



FEATURES

| | |
|------------------------------|--------------------|
| Volume:..... | 4 liters |
| Pressure:..... | Vacuum to 20 psi |
| Volume accuracy:..... | 0.1 ml |
| Pressure accuracy:..... | 0.1% |
| Temperature resolution:..... | 0.1°C |
| Weight..... | 21 Kg |
| LxDxH..... | 350 x 250 x 820 mm |
| Wetted parts:..... | Stainless steel |
| Power supply:..... | 220 VAC 50 Hz |

BENEFITS

- Very easy to use
- Accurate measurement of volume, pressure and temperature



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AUTOMATED GASOMETER (AG SERIES)

The automated gasometer is designed to measure gas volumes at ambient temperature and atmospheric pressure. The gasometer is made of a calibrated stainless steel chamber equipped with a motor driven piston. The gas enters the chamber at constant pressure or at constant flow rate. The volume, temperature and pressure of the gas are continuously monitored and displayed. The gasometer is provided with inlet and outlet valves. The whole is mounted on a chassis equipped with four heavy duty casters.



FEATURES

| | |
|-------------------------------|--------------------------|
| Volume: | Model 1: 10 liters |
| | Model 2: 40 liters |
| Max Gas flow rate: | Model 1: 40 Liters/hour |
| | Model 2: 100 liters/hour |
| Pressure: | Vacuum to 20 psi |
| Volume accuracy: | 0.1 ml |
| Pressure accuracy: | 0.1% |
| Temperature resolution: | 0.1°C |
| Temperature: | Ambient |
| Wetted parts: | Stainless steel |
| Power supply: | 220 VAC 50 Hz |

BENEFITS

- Accurate measurement of volume
- Gas transfer at constant pressure or constant flow rate
- Automated operations



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LIQUID CONDENSATION TRAP

Designed to trap heavy compounds which might be produced during the liberation of the gas phase from the reservoir to the atmospheric conditions. The cooling trap is installed between the PVT cell and the gasometer. It consists of a cooling unit based on Peltier effect and a pyrex trap cylinder of 10 cc capacity. The temperature can reach up to -20°C . The composition of the trapped condensates can be analysed by gas chromatography.



FEATURES

Volume:.....10 cc
Volume accuracy:.....0.1 ml
Temperature:..... -20°C to Ambient
Power supply:.....220 VAC 50 Hz

BENEFITS

- Compact, no use of cooling liquid.



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GAS OIL RATIO APPARATUS

The purpose of the GOR apparatus is to flash pressurised liquids and measure the gas oil ratio at equilibrium conditions. The liberated gas is measured with the gasometer at ambient conditions while the dead oil flashed is determined by gravity technique. The GOR apparatus features the capability of recirculating the evolved gas back through the on board high pressure oil pycnometer and gas pycnometer. This recirculation ensures vapor liquid equilibrium and allows the operator easy access to representative homogeneous samples of atmospheric pressure vapour and liquids. The establishment of equilibrium is essential for high pressure volatile liquids such as those encountered in reservoir fluid studies.



FEATURES

Temperature:..... Ambient
 Flow rate:..... 100 cc/min
 Pressure:..... atmospheric
 Wetted parts:..... Stainless steel

BENEFITS

- Representative homogeneous samples
- Easy to use



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EQUILIBRIUM FLASH SEPARATOR APPARATUS

Designed to flash pressurised liquids and measure the gas oil ratio at equilibrium conditions. The liberated gas is measured with the gasometer at ambient conditions while the liquid is read in a sample graduated burette. It is based on two stage system with first stage at maximum pressure of 500 psi and second at atmospheric pressure. It consists of a precision bore, high pressure Pyrex cylinder of 40 cc capacity with stainless steel closures on both ends, pressure gauge, back pressure regulator, valves and tubing. All components are assembled on a metal panel.



FEATURES

Volume:..... 40 cc
 Pressure:..... Vacuum to 500 psi
 Volume accuracy:..... 0.1 cc
 Wetted parts:..... Pyrex and stainless steel
 Power supply:..... 220 VAC, 50 Hz

BENEFITS

- Very easy to use
- Accurate measurement of liquid volume
- Possibility to heat sample with an external heating fluid

MULTI STAGE SEPARATOR APPARATUS

This equipment is designed to simulate a full-scale field separation unit. It is used to determine the optimum conditions of separation by calculating the changes in formation volume factor and gas-oil ratios with changes in separator pressure and temperature. The same instrument can be used to carry out separator experiments for both oil and gas condensates mixtures. A reservoir fluid sample is brought at its bubble point pressure and reservoir temperature in a PVT cell. A known volume of this sample is then transferred into the separator cell at separator conditions of pressure and temperature. As a result of these thermodynamic changes, gases evolve from the liquids. The volumes of liquid and gas are measured at the separator conditions and the gas released is also measured by a gasometer at standard conditions. The liquid dropping out from the gas is converted to an equivalent gas volume at standard conditions. The separator test is usually carried out at a number of separator pressures in order to determine the optimum field separator conditions. The final step is carried out at atmospheric pressure. The main parameters which are determined by the experiments include the formation volume factor, the separator volume factor and the solution gas-oil ratio.



FEATURES

| | |
|------------------------------------|----------------------------|
| Working pressure:..... | Up to 200 bar (3,000 psi) |
| Working temperature:..... | 0 to 100 °C (215 °F) |
| Volume of the separator cell:..... | 250 ml, 10 cc visual |
| Stirring mechanism:..... | Magnetic driven stirrer |
| Pressure accuracy:..... | 0.1 % |
| Temperature accuracy:..... | +/-0.1 oC |
| Volume accuracy:..... | 0.01 ml |
| Electrical:..... | 220 VAC, 50/60 Hz, 1 phase |

BENEFITS

- Equilibrium conditions are fast to attain
- Accurate measurement of liquid and gas volumes
- Efficient stirring operation of the test fluid



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ROLLING BALL VISCOMETER (RBV 1000)

The rolling ball viscometer is designed to determine the viscosity of bottom-hole and surface oil samples at elevated temperature and pressure. It uses the rolling ball principle where the roll time of a piston is used to obtain viscosity data. Viscosity values are then obtained by correlation of the measured data with curves of fluids with known viscosities. The RBV 1000 consists of a calibrating barrel equipped with a latch at its upper end and an laser detector at its lower end. The latch permits to trap and release the piston while the detector detects the arrival of the piston allowing for the roll time to be determined. The upper end of the barrel also features a gas cap chamber which permits to recover and store the gas released from the oil during the test. The viscometer features a jacket for circulating heating or cooling fluids around the chamber to ensure a constant and homogeneous temperature of the sample. A computer system acquires the roll time and calculates the viscosity value.



FEATURES

| | |
|------------------------------|------------------|
| Pressure range:..... | 15,000 psi |
| Temperature range:..... | ambient to 190°C |
| Viscosity range:..... | 0.2 to 10,000 cP |
| Cylinder slope:..... | 45°, 65° |
| Sample volume required:..... | 11 ml |
| Power supply:..... | 220 VAC, 50 Hz |

BENEFITS

- Easy to use
- Calibration procedure provided
- Accurate measurement for particular heavy oil
- Reservoir conditions of pressure and temperature
- Large range of viscosity
- Cost effective



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CAPILLARY VISCOMETER (CV SERIES)

The capillary viscometer is designed for the determination of viscosity of single phase fluids at reservoir conditions for both vapour and liquid sample. The instrument is based on the Poiseuille's law which defines fluid viscosity as a function of the pressure drop in a fluid flowing laminarily through a capillary. It includes two capillary columns to cover the range of viscosity of most reservoir fluids from 0.3 cp to 10,000 cp and is rated for 10,000 psi. It consists of a high temperature twin syringe pump used to generate the constant flow rate, two capillary tubes, a differential pressure transducer, a temperature probe and a controlled temperature airbath. An additional coil can be added for gas viscosity from 0.02 cP to 0.3 cP.



FEATURES

Pressure:.....10,000 psi (model CV700)
 15,000 psi (model CV1000)
 Temperature:.....Ambient to 175°C (350°F)
 Temperature regulation:.....±0.5°C
 Viscosity range:.....0,3 cP to 10,000 cP (option : 0.02 cP to 0.3 cP)
 Power supply:.....220 VAC 50 Hz

BENEFITS

- Accurate measurement
- Calibration procedure provided
- No need to change any components during the test
- Large range of viscosity



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ELECTROMAGNETIC VISCOMETER (EV 1000)

The EV 1000 instrument is based on a simple and reliable electromagnetic concept. Two coils move the piston back and forth magnetically at a constant force. Proprietary circuitry analyzes the piston's two-way travel time to measure absolute viscosity. A built-in temperature detector (RTD) senses the actual temperature in the sampling chamber. The viscometer consists of a Cambridge Electromagnetic Viscometer SPSL 440, a set of six calibrated pistons to cover viscosity ranging from 0.02 cP to 10,000 cP, a pressure transducer with its digital display, a temperature probe and a controlled heating jacket.



FEATURES

Brand:..... Cambridge Electromagnetic Viscometer, SPSL 440 model
 Temperature range:..... up to 190°C
 Pressure range:..... up to 15,000 psi
 Viscosity range:..... 0.02 cP to 10,000 cP
 Accuracy:..... ±1% FS
 Reproducibility:..... ±0.8 % of reading
 Temperature sensor:..... Internal platinum RTD
 Wetted material:..... Inconel 718
 Temperature regulation:..... ±0.5°C
 Power supply:..... 220 VAC 50 Hz

BENEFITS

- Accurate measurement
- Calibration procedure provided
- Reservoir conditions
- Large range of viscosity



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HEAVY OIL VISCOMETER (HOV 700)

The Heavy Oil Viscometer consists in a straight metal rod maintained in vibration permanently by a constant power. The amplitude of the vibration varies according to the viscosity of the fluid in which the rod is immersed. The electronics ensures an adequate vibration and treats the variations of amplitude to obtain the viscosity value. The viscometer module is assembled with a 15cc measurement cell to get a stand alone viscometer. A magnetic stirrer can be used to homogenize the sample. A drain valve also enables to release gas when saturation pressure is reached. The cell is designed to be removed easily for fast and efficient cleaning.



FEATURES

Viscosity range:.....1 Cp to 10⁶Cp
 Accuracy:.....3% RM
 Repeatability:.....±0.2%
 Volume of sample:.....15cc
 Working temperature:.....up to 200 °C (option: -10°C)
 Working pressure:.....700 bar
 Construction:.....Stainless Steel 316L, Hastelloy

BENEFITS

- Sensor without moving parts
- Very high viscosity range
- Robust and reliable
- Accurate
- Zero maintenance
- Simple operation by immersing the sensor probe into the fluid, measure and wipe after use.



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PYCNOMETER

Calibrated known volume cells are often required for measurement of density and volume of hydrocarbon fluids. The cell is provided with two needle valves and can be isolated and dismantled very easily. Different volumes and pressure are available.



FEATURES

TYPE 1: PYCNOMETER FOR HP – HT DENSITY MEASUREMENT

The pycnometer is weighed empty and filled up with sample at pressure and temperature conditions. The density is determined in dividing the fluid weight by the cell volume.

Volume: 4 cc
 Max pressure: 10,000 psi (700 bar)
 Max temperature: Ambient to 175°C (350°F)
 Material: Titanium

TYPE 2: PYCNOMETER FOR GOR MEASUREMENT

After liberating the gas of the lived oil contained in the pycnometer, the operator measures (a) the gas liberated from the lived oil with a gasometer, (b) the density and the weight of the dead oil remaining in the pycnometer to derive its volume. The GOR is determined in dividing the gas volume by the dead oil volume.

Volume : 75 cc
 Max pressure: 1,800 psi
 Max temperature: Ambient
 Material: Stainless steel

DIGITAL DENSITOMETER

The digital densitometer consists of a high pressure, high temperature cell made from hastelloy to cover the range of density of most reservoir fluids from 0 to 3 g/cm³. It can operate at temperature up to 200°C and at pressure rate up to 15,000 psi. The complete system includes a density measuring cell, a control station and a thermostatic bath.



FEATURES

Model: Anton Paar DMA HPM
 Temperature range: up to 200°C
 Pressure range: up to 1000 bar (15,000 psi)
 Density range: 0 to 3 g/cm³
 Accuracy: ±10⁻³ g/cm³
 Fittings: 1/8"
 Wetted material: Hastelloy
 Power supply: 220 VAC, 50 Hz

DENSITOMETER AND VISCOMETER FOR STOCK TANK OIL (SVM 3000)

Based on the Stabinger Viscometer SVM 3000 which is designed to measure the viscosity and density of petroleum products in the viscosity range from less than 1 to 20 000 cp. It fulfils the requirements of the new ASTM standard D7042-04. It works according to a new patented measuring principle based on a rotational viscometer with a cylindrical geometry. It uses a modified couette principle with a rapidly rotating outer tube and an inner measuring bob which rotates more slowly. Rotational viscosity measurement is based on a torque and speed measurement. A rotating magnet produces an eddy current field with an exact speed – dependent brake torque. The eddy current torque is measured with extremely high resolution. Combined with the integrated thermoelectric thermostating, this ensures unparalleled precision.



FEATURES

| | |
|---------------------------------|---|
| Dynamic viscosity:..... | 0.2 to 20,000 cP |
| Kinetic viscosity:..... | 0.2 to 20,000 mm ² /s |
| Density:..... | 0.65 to 3 (g/cm ³): |
| Viscosity reproducibility:..... | 0.35 % |
| Density reproducibility:..... | 0.0005 g/cm ³ from 0.65 to 1.5 g/cm ³ 0.0020 g/cm ³ from 1.5 to 3 g/cm ³ |
| Viscosity Repeatability:..... | 0.1% |
| Density Repeatability:..... | 0.0001 g/cm ³ |
| Temperature range:..... | 15 to 105°C |
| Required sample volume:..... | 2.5 ml |
| Solvent consumption:..... | 10 ml per sample |
| Volume of solvent bottles:..... | 2 x 0.5 litre |
| Power supply:..... | 230 VAC, 50 Hz, 75 VA |
| Weight net/gross:..... | 15/17 kg |
| Space (L x W x H):..... | 440 x 315 x 220 mm |

HYDROCARBON COMPOSITIONAL ANALYSER

Petroleum reservoir fluids contain thousands of chemical components. Improving the prediction of their thermodynamic properties by means of compositional models depend mainly on improving our analytical knowledge of these fluids. A fast and accurate detailed Hydrocarbon Analysis (DHA) software has been developed to provide automatic identification of the components up to C₃₀.

Two standard Gas Chromatographs are used to analyse the composition of the gaseous and liquids fractions of the sample. The values obtained from the liquid fraction are then treated by the DHA software which identifies the heavy fractions of the sample very accurately up to C₃₀. A mathematical recombination software is also used to determine the recombined composition of the lived sample.



FEATURES

- Natural gas analyzer for wet gas analysis up to C₁₄ based on the standard GPA 2286.
- Liquid analyzer for crude oil and condensates analysis.
- A chemstation for the two chromatographs
- DHA software and PVT identification file for identification of heavy fractions
- Data recombination software
- Cryette for molecular weight determination
- Gasometer with GOR apparatus

BENEFITS

- Detailed analysis of hydrocarbons up to C₃₀
- Weight %, mole %, volume %
- Molecular weight and distribution up to C₃₀
- Automatic recombination of gas and liquid

MOLECULAR WEIGHT TESTER

Automatic cryoscope for molecular weight, solution concentration, and freezing point depression determinations for aqueous and various solvent solutions for 2.0 ml samples. It features a digital readout in millidegrees Celsius of freezing point depression. The adjustable bath temperature allows optimum temperature settings for particular solvent.



FEATURES

| | | |
|-----------------------------|-------|--|
| Cell temperature range: | ..... | -6 to +26°C |
| Operation: | ..... | Automatic or manual |
| Speed: | ..... | 2 minutes per measurement |
| Precision temperature: | ..... | 0.001°C, 1S.D. depends of solvent used |
| Precision molecular weight: | ..... | 1% typical, depends of solvent used |
| Calibration: | ..... | Two non interacting controls |
| Bath: | ..... | 55 ml 15 minute cool down from ambient temperature |
| Power: | ..... | 230 V 50/60Hz |
| Weight: | ..... | 13.6 kg |
| Dimensions (mm): | ..... | 35.5 x 20.3 x 25.4 cm |

SLIM TUBE SYSTEM (STS 700)

The slim tube apparatus is used to obtain, dynamic miscibility information at reservoir conditions. The gas to be tested is injected at a desired pressure through the slim tube previously cleaned and saturated in oil by means of a high pressure pump. A back pressure regulator maintains a constant pressure inside the system. The effluents flowing from the slim tube can be observed through a capillary sight glass tube. They are then expanded to atmospheric pressure and temperature through a back pressure regulator. The volume of liquid effluents is then monitored continuously using a digital volume measuring detector while the produced gas is measured by a wet gas meter. The recovery curve is then plotted using the raw data obtained during the different miscible displacement experiments. Additional components such as density meter and gas chromatograph may be added to extend the capabilities of the instrument.



FEATURES

| | |
|------------------------------|---|
| Tube length:..... | 24 m (80 feet), other length upon request |
| Tube external diameter:..... | 1/4" |
| Material:..... | Stainless steel |
| Porous media:..... | Calibrated 230 – 310 μm silica |
| Approx porosity:..... | 35 % |
| Approx pore volume:..... | 100 cc |
| Working pressure:..... | 700 bar (10,000 psi) |
| Working temperature:..... | Up to 150°C |
| Fluids:..... | Live oil, HC gas, CO ₂ , solvent |
| Power supply:..... | 220 VAC 50 Hz |

BENEFITS

- High level of automation (automated back pressure regulator,...)
- Use of an embedded gas injection pump which make the operations easy for the operator



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RISING BUBBLE APPARATUS (RBA 700)

The RBA test is a reliable and fast way to determine the minimum miscibility pressure (MMP) and minimum miscibility composition (MMC) during a vaporizing gas drive injection study. The method involves direct visual observation of the behaviour of a injected gas bubble rising into a column of reservoir oil. Under miscible conditions, the bubble disappears before it reaches the top; under immiscible conditions, the bubble is visible throughout its flow. The cell is filled with distilled water. Enough oil is injected into the cell to displace all but a short column of water in the cell's lower end. Next, a small bubble of gas of the desired composition is launched into the water. The buoyant force on the bubble causes it to rise through the column of water, then through the water/oil interface. As the bubble rises through the oil, its shape and motion are observed and photographed with two cameras. Between 3 and 30 seconds are needed for the bubble to rise the length of the oil column. After two or three bubbles have risen through the column of oil, the used oil is replaced with fresh oil. For a gas / oil pair, rising bubble experiments are repeated over a range of pressures. From the pressure dependance of the behaviour of the rising bubbles, MMP is inferred.



FEATURES

| | |
|--------------------------|---|
| Working pressure: | 10,000 psi (700 bar) |
| Working Temperature: | 175°C (350 F) |
| Sightglass viewing area: | 250 mm x 8 mm |
| Internal section: | 5 mm x 1 mm |
| Needle tip diameter: | 0.91 mm |
| Material: | Stainless steel, sapphire |
| Fluids: | Water, oil, HC gas, CO ₂ , solvent |
| Electrical requirements: | 220 VAC- 50/60 Hz - 1 phase |

BENEFITS

- Fast results
- Visible results
- Less expensive than slim tube method
- Minimal fluid sample required



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INTERFACIAL TENSION METER (IFT 700)

The apparatus allows for the determination at reservoir conditions of interfacial tension between liquid-gas and liquid-liquid interfaces using pendent drop method as well as the contact angle between liquid and solid interfaces using sessile drop method. A liquid drop is created and put in contact with gas or solid in a cell at reservoir conditions. A camera connected to a computer records the shape of the liquid drop to derive the interfacial and contact angle properties. The Drop Analysis System software allows the fast calculation of surface and interfacial tension of pendent drop and contact angles of sessile drops.



FEATURES

IFT standard measurement:..... 0.1 to 72 mN/m
 Temperature:..... Ambient to 180°C
 Temperature accuracy:..... 0.1°C
 Pressure:..... 700 bar (10,000psi)
 Wetted parts:..... Stainless steel
 Power supply:..... 220 VAC 50 Hz

BENEFITS

- Easy to use
- Provided with an advanced drop analysis software
- Very good stability of the drop



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HYDRATES STUDIES SYSTEM (HYDREVAL)

The mercury free Hydreval™ analyser is designed for the determination of hydrates formation and dissociation conditions as well as the evaluation of hydrates inhibitor. The instrument provides four different methods to study hydrates phenomena: (a) isochoric method (constant volume), isobaric method (constant pressure), isothermal method (constant temperature) and visual method. The apparatus features a fully visual cell allowing for 360° visibility from top to bottom of the sample, an embedded pump for volume and pressure control and a controlled temperature airbath.



FEATURES

Pressure:.....3,000 psi,
 Volume:.....60 cc
 Temperature:..... – 60°C to 175°C
 Volume accuracy:.....0.01 ml
 Pressure accuracy:.....0.1% Full scale
 Temperature accuracy:.....0.1°C
 Stirring mechanism:.....Magnetic drive
 Power supply:.....220 VAC 50 Hz

BENEFITS

- Very easy to use and to maintain
- Accurate measurement of volume, pressure and temperature
- Full visibility



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HYDRATES KINETICS STUDIES SYSTEM (KINETIC-EVAL)

The kinetic-Eval analyser is used for studying the kinetics of gas hydrate formation by measuring the induction time for formation of hydrates and measuring the hydrate growth rate that occurs after nuclei are formed. It is also used for determining the hydrates composition and evaluating kinetic hydrate inhibitors and other inhibitors such as anti agglomerant, emulsion, natural inhibitors, salts. The system consists of a constant volume hydrate cell with a 250 cc volume and pressure rating up to 5,000 psi. The cell temperature is controlled by circulating coolant inside a constant temperature bath. A thermocouple measures the temperature of the cell with an accuracy of 0.1°C. The cell pressure is monitored by a pressure transducer. A magnetic stirrer with adjustable rotation speed is used to agitate the test fluids. The torque required to drive the stirrer at a constant speed is measured and related to the viscosity of the system.



FEATURES

Pressure:.....5,000 psi,
 Volume:.....250 cc
 Temperature:.....- 10°C to 100°C
 Pressure accuracy:.....0.1% Full scale
 Temperature accuracy:.....0.1°C
 Stirring mechanism:.....Magnetic drive
 Power supply:.....220 VAC 50 Hz

BENEFITS

- Very efficient magnetic stirrer with torque measurement
- Can be used to evaluate anti agglomerant inhibitors
- Accurate measurement of torque, pressure and temperature
- Mercury free operations



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VIDEO HYDRATES CELL (VHC SERIES)

The VHC series is a mercury free cell designed to (1) study gas hydrate formation and dissociations, (2) measure the induction time for formation of hydrates by monitoring the pressure drop as a function of time during hydrate formation and (3) take video pictures during the experiments. The system consists of a constant volume hydrate cell with a 250 cc volume and pressure rating up to 3,000 psi. The cell temperature is controlled by a thermostatic bath. A thermocouple measures the temperature of the cell with an accuracy of 0.1°C. The cell pressure is monitored by a pressure transducer. A magnetic stirrer with adjustable rotation speed is used to agitate the test fluids. A computer is used for data acquisition of temperature and pressure versus time. The cell is also equipped with a stethoscopic camera to take pictures.



FEATURES

| | |
|----------------------------|-----------------|
| Pressure:..... | 3,000 psi, |
| Volume:..... | 250 cc |
| Temperature:..... | - 10°C to 60°C |
| Pressure accuracy:..... | 0.1% Full scale |
| Temperature accuracy:..... | 0.1°C |
| Stirring mechanism:..... | Magnetic drive |
| Stirring speed..... | up to 1000 RPM |
| Power supply:..... | 220 VAC 50 Hz |

BENEFITS

- Cost effective
- Accurate measurement of pressure and temperature
- Video image capturing that allows for later retrieval
- Mercury free operations



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ORGANIC SOLID FILTER (OSD 1000)

The organic solid filter is connected to the PVT cell and is used to determine the amount of solids formed in the fluid sample when altering the pressure, temperature or composition of the fluid. The instrument uses a filtration method to isolate and remove the solids from the fluid for qualitative and quantitative analysis. Typically, the fluid sample is mixed with a solvent or equilibrated at temperature or pressure sufficient to induce solid precipitation. The solids are then isolated at temperature and pressure and brought to ambient conditions. The total mass of precipitated solid is then measured. The solids are also analysed to obtain the property and compositional information. The device is composed of a high pressure, high temperature stainless steel filter holder using filter disc to retain the solid particles. The fluid sample is transferred from the PVT cell to the floating piston accumulator through the filter at controlled pressure and flow rate. Different ranges of filter size are given along with the filter.



FEATURES

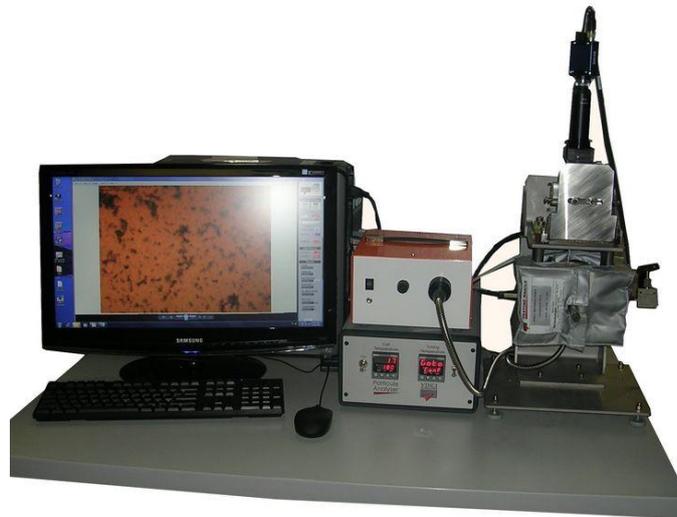
Max pressure:..... 1000 bar (15,000 psi)
 Max temperature:..... 200 °C
 Material:..... Stainless steel
 Filter size range (µm):... 0.02 - 0.1 - 0.2 - 0.45 - 1 - 3 (pack of 50)

BENEFITS

- Easy to dismount

HIGH PRESSURE MICROSCOPE (HPM)

The HPM is designed to visualise accurately the Wax and Asphaltenes precipitation at onset condition up to 15,000 psi and 200°C. The HPM enables to identify the solid particles and monitor the change in size and morphology of Wax crystals and Asphaltenes solids as function of temperature, pressure, time and effect of various chemical treatments. The fluid under consideration is homogenized at the desired conditions in the PVT cell and transferred from the PVT cell to the HPM cell at controlled pressure and flow rate. The HPM cell assembly is stabilised at the reservoir temperature and pressure. Subsequently the fluid is depressurized at known pressure decrements, circulated into the HPM cell and any changes in the observed character of the reservoir fluid are recorded in the HPM video camera. The provided software measures the particle size distribution. The HPM can be delivered as a stand-alone system or an add-on module of the Fluid Eval system.



FEATURES

Pressure range:..... Ambient to 15,000 psi
 Temperature range:..... ambient to 200°C
 Particle size detection:..... from 1 µm
 Wetted material:..... Stainless steel, sapphire.
 Microscope zoom:..... up to x 500
 House software for particle size distribution measurement

BENEFITS

- Can be connected to any End user's PVT cell
- Provides visual definition of the types of solids present in the sample
- Permits to directly observe the onset and growth of organic solid precipitates at pressure and temperature
- Complete system provided with interpretation facilities



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SOLID DETECTION SYSTEM (SDS)

This add-on option of the FLUID EVAL[®], is designed to detect when the organic deposition takes place, in other words it measures the onset conditions of live oil precipitation. The instrument is based on the transmittance of a low intensity laser light through fiber optic transmission probes mounted across a windowed cell.

The instrument is composed of a laser windowed cell to connect the high temperature optical fibers used to emit and receive the laser signal through the oil sample., an optic source to generate the signal crossing the fluid, a power meter to measure the attenuated signal, two fiber optic transmission probes and a data acquisition software used to record the system pressure, temperature, solvent flow rate and the power of the transmitted light.



FEATURES

Pressure:..... Up to 15,000 psi
 Temperature range:..... Ambient to 200°C (400°F)
 Laser power:..... 10 mWatt
 Dual wavelength:..... 1,310 nm/ 1,550 nm
 Detector sensitivity:..... 1 pWatt
 Dynamic range:..... 100 dB

BENEFITS

- Extreme accuracy at high pressure and temperature
- Sample is always at pressure and temperature during experiment



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FLOW ASSURANCE SYSTEM (FLASS)

The Flass[®] analyser incorporates the three major techniques which have been developed to analyse the solid precipitation phenomena in lived oil sample. (1) The High Pressure Microscope (i.e. HPM) is designed to visualise accurately the Wax and Asphaltenes precipitation at onset conditions up to 15,000 psi and 200°C. The system enables to identify the solid particles and monitor the change in size and morphology of Wax crystals and Asphaltenes solids as function of temperature, pressure, time and effect of various chemical treatments. (2) The solid laser detection system is used to detect when the organic deposition takes place, in other words it measures the onset conditions of live oil precipitation. (3) The HP HT organic solid filtration is used to determine the amount of solids formed in the fluid sample when altering the pressure, temperature or composition of the fluid.



FEATURES

Pressure range:.....up to 15,000 psi
 Temperature range:.....Ambient to 200°C (cooling option: -20°C)
 Volume:.....up to 200 cc
 Wetted material:.....Stainless steel, sapphire.
 House software for particle size distribution and light absorbion measurement.

BENEFITS

- Full description of the asphatenes precipitation (pressure, temperature, growth, morphology,..)
- Qualitative and quantitative analysis.
- Unique instrument capable of providing such measurements.



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HP HT FLOCCULOMETER

The flocculometer is designed to determine accurately the precipitation conditions of reservoir fluids at high pressure and high temperature. It is composed of an embedded pump cell combined to a Solid Detection System (i.e. SDS) which is used to detect when the organic deposition takes place. The SDS is based on the transmittance of a low intensity laser light through fiber optic transmission probes mounted across the windowed flocculometer cell. Typical tests performed with the SDS include (1) the determination of asphaltene precipitation onset and (2) the detection of wax appearance temperature of oils. At the precise point of solid onset, the formation of precipitates causes a sharp drop in the transmitted power, which is clearly shown on the graphical display.



FEATURES

| | |
|----------------------------|--------------------------|
| Pressure:..... | Up to 15,000 psi |
| Temperature range:..... | -10 to 175°C (350°F) |
| Flocculometer cell:..... | 100 ml |
| Stirring mechanism:..... | Magnetic mixer |
| Dual wavelength..... | 1310 nm/1550nm |
| Laser power:..... | 10 mWatts |
| Detector sensitivity:..... | 1 pWatts |
| Dynamic range:..... | 100 dB |
| Electrical:..... | 220 VAC 50/60 Hz 1 phase |

BENEFITS

- Cost effective
- Direct measurement of onset conditions
- Can be used for asphaltenes and waxes studies



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SEPARATOR SAMPLING KIT

The separator sampling kit includes a set of tools that allows the operator to perform liquid and gas sampling at the separator location. It is provided with a transportable glass fiber box and consist of:

- two flexible devices for the oil bottle 350 bar, 90°C, length. 2 m, 1 exit - connection bottle, 1 exit NPT ¼ and ½ Male
- two flexible devices for the gas bottle 3,000 psi, 90°C, length. 2 m, 1 exit connection bottle, 1 exit NPT ¼ and ½ Male
- one pressure gauge to measure vacuum 0 - 1 bar
- one pressure gauge to measure the pressure of the gas bottle 0 – 200 bar
- one pressure gauge for measurement pressure of the oil bottle 0 – 700 bar
- one 3 ways valve to connect the pressure gauge between the bottle of sampling and the separator
- one vacuum pump to make the vacuum in the sampling bottle
- one set of spanners
- a temperature sensor with control device to measure the temperature of the separator
- a graduated test-tube of 500 cc to determine the quantity of transferred oil
- one crimper
- 100 leadings
- 200 wire for leading
- 100 green stickers “EMPTY”
- 100 red stickers “FULL”



TRANSFER BENCH

The transfer bench is designed to transfer fluid sample from down-hole sampler to piston type sample cylinder at site location. After the sample has been transferred, the determination of the bubble point pressure can be performed for sample validation. The apparatus comes complete with hydraulic transfer pump, transfer and control valves, two precision gauges, valves, fittings, connections, accessories kit and stainless steel transportation box. All valves are accessible from the front side. The sampler is positioned horizontally in clamps above the rear and the sample cylinder to one side. A set of accessories including all the hoses and attachment necessary to the transfer operation.



FEATURES

| | |
|-------------------------------|--------------------------|
| Max Working pressure..... | 15,000 psi (1,000 bar) |
| Max Working temperature..... | 150°C |
| Pressure accuracy | 0,1 % FS |
| Wetted material..... | Stainless steel |
| Weight..... | 42 kg |
| Dimensions (HxWxL)..... | 450 mm x 430 mm x 340 mm |
| Fluid | Glycol, 2/3 water |
| Recommended air pressure..... | 100 psi |

BENEFITS

- Transportation casing easy to stack
- Light and compact



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HIGH PRESSURE PISTON SAMPLE CYLINDER

(HPP SERIES)

The HPP series sample cylinder is a double end piston type cylinder for safe transportation of the reservoir fluid to the laboratory. The sample fluid is isolated from the secondary driving fluid with a floating piston especially designed to minimize friction and reduce pressure load. The piston accommodates a mixing ball with a minimum of dead volume. All bottles are furnished with a single inlet needle valve for driving fluid and a double inlet needle valve for sample fluid. On the sample side, there is also incorporated an evacuation port nipple and plug. Valves installed at either end of the bottle are protected by valve guards from damage during handling. A carrying case is also available for transportation purposes. The cylinder can be made from stainless steel or titanium.



FEATURES

| Model | Volume ml | Pressur psi | Temp. °C | Weight Kg | Length mm | Diameter mm | Material | Thread connection |
|-------------|--------------|----------------|-------------|--------------|--------------|----------------|----------|----------------------|
| HPP 700-10 | 700 | 10,000 | 150 | 17 | 705 | 88 | SS / Ti | ¼" FNPT |
| HPP 1000-10 | 1,000 | 10,000 | 150 | 19 | 800 | 88 | SS / Ti | ¼" FNPT |
| HPP 700-15 | 700 | 15,000 | 150 | 23 | 825 | 88 | SS / Ti | 1/8" FLP |
| HPP 1000-15 | 1,000 | 15,000 | 150 | 27 | 970 | 88 | SS / Ti | 1/8" FLP |
| HPP 700-20 | 700 | 20,000 | 150 | 29 | 945 | 88 | SS / Ti | ¼" FMP |
| HPP 1000-20 | 1,000 | 20,000 | 150 | 36 | 1150 | 88 | SS / Ti | ¼" FMP |

BENEFITS

- H₂S resistant
- Sample agitation ball mixer
- Safe operation
- Minimum dead volume
- Mercury free



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MICRO HIGH PRESSURE PISTON SAMPLE CYLINDER (MHP SERIES)

The MHP series sample cylinder is a small volume piston type cylinder for safe transportation of the reservoir fluid to the laboratory. The sample fluid is isolated from the secondary driving fluid with a floating piston especially designed to minimize friction and reduce pressure load. The piston accommodates a mixing ring with a minimum of dead volume. All bottles are furnished with a single inlet needle valve for driving fluid and a single inlet needle valve for sample fluid. Valves installed at either end of the bottle are protected by valve guards from damage during handling. A carrying case is also available for transportation purposes.



FEATURES

| Model | Volume ml | Pressure psi | Temp. °C | Weight Kg | Length mm | Diameter mm | Material | Thread connection |
|---------|--------------|-----------------|-------------|--------------|--------------|----------------|-----------------|----------------------|
| MHP 50 | 50 | 15,000 | 150 | 2 | 300 | 50 | Stainless Steel | 1/8" FLP |
| MHP 100 | 100 | 15,000 | 150 | 3 | 350 | 50 | Stainless Steel | 1/8" FLP |
| MHP 250 | 250 | 15,000 | 150 | 4 | 400 | 50 | Stainless Steel | 1/8" FLP |

BENEFITS

- H₂S resistant
- Sample agitation ring mixer
- Safe operation
- Minimum dead volume
- Mercury free



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LIGHT WEIGHT PISTON SAMPLE CYLINDER (CYLIGHT SERIES)

The cylight series cylinder is a very light weight titanium double end piston type cylinder for safe transportation of the reservoir fluid. The sample fluid is isolated from the secondary driving fluid with a floating piston especially designed to minimize friction and reduce pressure load. The piston accommodates a mixing ball with a minimum of dead volume and can be used for agitation during determination of bubble point. The bottle is furnished with a single inlet valve for driving fluid and a double inlet needle valve for sample fluid. A carrying case is also available for transportation purposes.



FEATURES

| Model | Volume ml | Pressure psi | Temp. °C | Weight Kg | Length mm | Diameter mm | Material | Thread connection |
|--------------|--------------|-----------------|-------------|--------------|--------------|----------------|----------|----------------------|
| CYLIGHT 300 | 300 | 10,000 | 150 | 5 | 300 | 70 | Titanium | ¼" FNPT |
| CYLIGHT 650 | 650 | 10,000 | 150 | 6 | 450 | 70 | Titanium | ¼" FNPT |
| CYLIGHT 1000 | 1000 | 10,000 | 150 | 7 | 600 | 70 | Titanium | ¼" FNPT |

BENEFITS

- Very light and compact
- H₂S resistant
- Sample agitation ball mixer
- Safe operation
- Minimum dead volume
- Mercury free



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SINGLE PHASE SAMPLE CYLINDER (SPS SERIES)

The single-phase sample bottle is designed for monophasic PVT sample transportation, keeping the sample at reservoir pressure or above, all the way to the laboratory. The cylinder uses a pressure compensation end cap and a large mass profiled agitation ring to agitate the sample during bubble point determination. All bottles are furnished with a single inlet needle valve for driving fluid, a single inlet needle valve for the nitrogen gas cap and a double inlet needle valve for sample fluid. On the sample side, there is also incorporated an evacuation port nipple and plug. Valves installed at either end of the bottle are protected by valve guards from damage during handling. A carrying case is also available for transportation purposes.



FEATURES

| Model | Volume ml | Pressure psi | Temp. °C | Weight Kg | Length mm | Diameter mm | Material | Thread connection |
|-------------|--------------|-----------------|-------------|--------------|--------------|----------------|-----------------|----------------------|
| SPS 700-10 | 700 | 10,000 | 150 | 27 | 805 | 88 | Stainless Steel | ¼" FNPT |
| SPS 1000-10 | 1,000 | 10,000 | 150 | 29 | 900 | 88 | Stainless Steel | ¼" FNPT |
| SPS 700-15 | 700 | 15,000 | 150 | 33 | 925 | 88 | Stainless Steel | 1/8" FLP |
| SPS 1000-15 | 1,000 | 15,000 | 150 | 37 | 1070 | 88 | Stainless Steel | 1/8" FLP |
| SPS 700-20 | 700 | 20,000 | 150 | 39 | 1045 | 88 | Stainless Steel | ¼" FMP |
| SPS 1000-20 | 1,000 | 20,000 | 150 | 46 | 1250 | 88 | Stainless Steel | ¼" FMP |

BENEFITS

- H₂S resistant
- Single phase sample transportation
- Sample agitation ring mixer
- Minimum dead volume
- Safe operation



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LOW PRESSURE PISTON SAMPLE CYLINDER (LPP SERIES)

The LPP series sample cylinder is a double end piston type cylinder for storage and transportation of low pressure oil and gas sample. The sample fluid is isolated from the secondary driving fluid with a floating piston especially designed to minimize friction and reduce pressure load. The bottle is equipped with an external magnetic volume tracker. The inlet and pre charge valves are provided with safety burst discs and pressure indication gauges. The piston accommodates a mixing ball with a minimum of dead volume. A carrying case is also available for transportation purposes.



FEATURES

| Model | Volume ml | Pressur psi | Temp. °C | Weight Kg | Length mm | Diameter mm | Material | Thread connection |
|----------|--------------|----------------|-------------|--------------|--------------|----------------|-----------------|----------------------|
| LPP 100 | 100 | 3,000 | 120 | 2 | 300 | 50 | Stainless Steel | ¼" FNPT |
| LPP 300 | 300 | 3,000 | 120 | 3 | 400 | 50 | Stainless Steel | ¼" FNPT |
| LPP 500 | 500 | 3,000 | 120 | 4 | 500 | 50 | Stainless Steel | ¼" FNPT |
| LPP 1000 | 1000 | 3,000 | 120 | 5 | 700 | 50 | Stainless Steel | ¼" FNPT |

BENEFITS

- H₂S resistant
- Sample agitation ball mixer
- Volume indicator
- Safe operation
- Minimum dead volume
- Mercury free



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LOW PRESSURE SAMPLE CYLINDER (LPS SERIES)

The LPS series sample cylinder is a cylinder for storage and transportation of low pressure gas sample. The internal cylinder surfaces can be optionally coated with Teflon to provide a non-stick surface, which aids in cleaning. The inlet and pre charge valves are provided with safety burst discs. Valve guards, Carrying handle carrying case are optional.



FEATURES

| Model | Volume ml | Pressur psi | Temp. °C | Weight Kg | Length mm | Diameter mm | Material | Thread connection |
|-----------|--------------|----------------|-------------|--------------|--------------|----------------|-----------------|----------------------|
| LPS 50 | 50 | 5,000 | 120 | 2 | 200 | 50 | Stainless steel | ¼ " FNPT |
| LPS 100 | 100 | 5,000 | 120 | 3 | 300 | 50 | Stainless steel | ¼ " FNPT |
| LPS 250 | 250 | 5,000 | 120 | 4 | 350 | 50 | Stainless steel | ¼ " FNPT |
| LPS 1,000 | 1,000 | 5,000 | 120 | 10 | 500 | 80 | Stainless steel | ¼ " FNPT |
| LPS 2,000 | 2,000 | 5,000 | 120 | 20 | 700 | 90 | Stainless steel | ¼ " FNPT |
| LPS 5,000 | 5,000 | 5,000 | 120 | 35 | 900 | 120 | Stainless steel | ¼ " FNPT |

BENEFITS

- H₂S resistant
- Sample agitation ball mixer
- Safe operation
- Minimum dead volume
- Mercury free



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GAS SAMPLE CYLINDER (GS SERIES)

The gas shipping bottle is designed to transport and store pressurized gas samples such as those in the petroleum industry. The standard bottle has a capacity of 20 liters at pressure up to 3,000 psi. Construction material is aluminium. All standard bottles are furnished with one angle needle valve at each end. Valves are protected by valve guards from damage during handling. A carrying case is also available for transportation purposes.



FEATURES

| | |
|----------------------|---|
| Capacity: | 20 litres |
| Working temperature: | -10 to 100 °C |
| Filling pressure: | 200 bar (2,900 psi) @ 60°C 170 bar (2,465 psi) @ 100°C |
| Construction: | Cylinder: Aluminium Valves: Stainless steel |
| Thread Connection: | ¼" FNPT |
| Dimensions OD x L: | 23 x 105 cm |
| Weight: | 26 Kg |

BENEFITS

- Transportation casing easy to stack
- Light weight
- Compliant with international regulation
- H₂S resistant

PISTON GAS SAMPLE CYLINDER (PGS SERIES)

The PGS series sample cylinder is a double end piston type cylinder designed to transport and store pressurized small volume of gas samples such as those in the petroleum industry. The gas sample fluid is isolated from the secondary driving fluid with a floating piston especially designed to minimize friction and reduce pressure load. The bottle is equipped with an external magnetic volume tracker and a carrying handle. The inlet and pre charge valves are provided with safety burst discs and pressure indication gauges. A carrying case is also available for transportation purposes.



FEATURES

| Model | Volume ml | Pressur psi | Temp. °C | Weight Kg | Length mm | Diameter mm | Material | Thread connection |
|-----------|--------------|----------------|-------------|--------------|--------------|----------------|----------|----------------------|
| PGS 4000 | 4,000 | 3,000 | 120 | 5 | 950 | 120 | Aluminum | ¼" FNPT |
| PGS 10000 | 10,000 | 3,000 | 120 | 10 | 1,000 | 180 | Aluminum | ¼" FNPT |

BENEFITS

- H₂S resistant
- External level tracker
- Light
- Safe operation
- Minimum dead volume
- Mercury free



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FLOATING PISTON ACCUMULATOR (FPA SERIES)

The floating piston accumulators are available in a range of different volume and pressure rating. These can be constructed in different material such as 316 stainless steel, titanium or hastelloy. The fluid seals may either be the standard Viton / Nitrile 'O' rings and PTFE back up ring.



FEATURES

Pressure:.....5,000 psi, 10,000 psi or 15,000 psi
Temperature:.....Ambient to 150°C (300 °F)
Cell volume:.....100 cc, 300 cc, 500 cc, 700 cc, 1,000 cc, 2,000 cc, 5000 cc
Material:.....316 stainless steel, aluminium, titanium or hastelloy

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MIXER CYLINDER (MC SERIES)

The MC series are double end piston type cylinders designed to store and mix any kind of fluids at pressure and temperature. The sample fluid is isolated from the secondary driving fluid with a floating piston and a magnetic mixer is located in the mixing sample chamber for proper agitation. The mixer is magnetically coupled to a drive system through the accumulator end cap which incorporates a permanent magnet driven by a direct current motor with variable speed. A mixer controller permits to stop, start and control the speed of the mixer. The cylinder can be operated in either upright or inverted orientation. Both end caps are provided with an inlet/outlet port for fluid introduction or fluid sampling.



FEATURES

| Model | Volume ml | Pressure psi | Temp. °C | Weight Kg | Length mm | Diameter mm | Material (1) | Thread connection |
|------------|--------------|-----------------|-------------|--------------|--------------|----------------|-----------------|----------------------|
| MC 500-10 | 500 | 10,000 | 150 | 21 | 700 | 120 | Stainless steel | ¼" FNPT |
| MC 1000-10 | 1,000 | 10,000 | 150 | 25 | 750 | 120 | Stainless steel | ¼" FNPT |
| MC 2000-10 | 2,000 | 10,000 | 150 | 35 | 900 | 150 | Stainless steel | ¼" FNPT |
| MC 500-15 | 500 | 15,000 | 200 | 21 | 700 | 120 | Stainless steel | 1/8" FLP |
| MC 1000-15 | 1,000 | 15,000 | 200 | 25 | 750 | 120 | Stainless steel | 1/8" FLP |
| MC 2000-15 | 2,000 | 15,000 | 200 | 35 | 900 | 150 | Stainless steel | 1/8" FLP |

(1) Titanium material available.

Mixer controller

Power requirement..... 230 VAC, 50 Hz, 100 W

BENEFITS

- H₂S resistant
- The impeller provides a minimum dead volume
- Provide rigorous agitation of entire fluid sample
- Capable of mixing high viscosity samples up to 1,000 cp
- High speed, allows equilibrium to be reached in minimum time
- Reduces operating time for establishing phase equilibrium on sample.



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RECOMBINATION CELL APPARATUS (RCA 1000)

The RCA 1000 instrument is based on a high pressure, high temperature recombination cell in which oil and gas solutions are injected at pre-defined volume, stirred together, heated at a desired temperature and pressurized at pressure above the saturation pressure for few hours to give a homogeneous mixture of the reservoir fluid. The instrument comes with a recombination cell jacketed with an heating mantel for temperature control, a magnetic driven stirrer, a motorized rocking system with a mixing ring in the sample chamber of the cell for proper agitation of heavy oil samples and a temperature and pressure display panel. The top of the cell is equipped with a bull's eye window to visualize the saturation pressure.



FEATURES

Cell Volume: 2,000 cc
 Pressure: 15,000 psi (1,000 bar)
 Max working temperature: Ambient to 175°C (350 °F)
 Wetted material: Stainless steel, viton
 Pressure accuracy: 0.1 % FS
 Temperature accuracy: ± 0.5 °C
 Power supply: 220 VAC 50 Hz

BENEFITS

- Very fast recombination operation due to the magnetic driven stirrer
- The motorized rocking system used in conjunction with the mixing ring enables an efficient agitation of the heavy oil sample.
- Bull's eye window for dew point and bubble point detection
- Versatile as it can be used for oil and gas condensates thanks to its rocking system



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MOBILE RECOMBINATION AND RESTORATION APPARATUS (MRR 1000)

This apparatus is especially designed to physically recombine gas and liquid samples in reservoir conditions of pressure and temperature. The apparatus comes with an recombination cell jacketed in an insulated heating mantel for temperature control , a motorized rocking system, a magnetic driven stirrer for proper agitation, a temperature and pressure display panel and a moveable chassis. The apparatus is ideal for field application as it is provided with a transportable box to be easy to move around from one site to another. The apparatus can be also used as a restoration unit by replacing the recombination cell with a shipping cylinder. The sample cylinder shall be wrapped with the heating mantle and then mounted on the motorized rocking system to provide the mean to agitate the fluid under pressure and temperature for several days, if required.



FEATURES

Cell Volume:.....1,000 cc
 Pressure:.....15,000 psi (1,000 bar)
 Max working temperature:.....Ambient to 200°C (400 °F)
 Wetted material:.....Stainless steel, viton
 Pressure accuracy:.....0.1 % FS
 Temperature accuracy:.....± 0.5 °C
 Power supply:.....220 VAC 50 Hz

BENEFITS

- Very fast recombination operation due to the magnetic driven stirrer
- Versatile, can be used as recombination and restoration unit
- Motorized rocking system to set the cell in upright and inverted position



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SAMPLE RESTORATION APPARATUS

Very useful for the restoration of the fluid sample, the apparatus enables to heat and agitate the sample to the reservoir temperature while pressurizing the same sample at the reservoir pressure using an external high pressure pump. The unit can be proposed into one, two or six cylinder versions. The sample cylinder is wrapped with an heating mantle and then mounted on the motorized rocking system to provide the mean to agitate the fluid under pressure and temperature for several days, if required. The chassis is equipped with four heavy duty casters which enable to move the apparatus very easily anywhere in the laboratory room. A control panel is used to enter and display the temperature and to start / stop the rocking mechanism.



FEATURES

Temperature:..... Ambient to 200°C
Temperature accuracy:..... ± 5°C
Diameter of accumulator:..... 60 mm to 100 mm
Length of the accumulator:..... 500 mm to 750 mm
Power supply:..... 220 VAC,50 Hz

BENEFITS

- Efficient stirring mechanism for fluid restoration
- Fast heating temperature ramp
- Very accurate temperature regulation
- Easy to move the apparatus
- Easy to mount the fluid sample cylinder

PVT



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GAS SAMPLE RESTORATION APPARATUS

Very useful during the restoration of gas sample, the apparatus enables to heat and agitate the sample to the reservoir temperature. One gas sample cylinder can be processed by the rocker. The sample cylinder is wrapped with an heating mantle and then mounted on the motorized rocking system to provide the mean to rock the fluid under pressure and temperature for several days, if required. The chassis is equipped with four heavy duty casters which enable to move the apparatus very easily anywhere in the laboratory room. A control panel is used to enter and display the temperature and to start / stop the rocking mechanism.



FEATURES

Temperature:..... Ambient to 100°C
Temperature accuracy:..... ± 5°C
Diameter of accumulator:..... 200 mm to 250 mm
Length of the accumulator:..... up to 800 mm
Power supply:..... 220 VAC,50 Hz

BENEFITS

- Fast heating temperature ramp
- Very accurate temperature regulation
- Easy to move the apparatus
- Easy to mount the gas sample cylinder

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CYLINDER HEATING MANTLE

The heating mantle offers a convenient, cost-effective way to heat and maintain temperatures of sample cylinder. They provide clean heat, eliminate hot or cold spots and are easy to install and remove. They require low maintenance and labor cost, are energy efficient, clean room compatible, consist of durable material, provide multiple heating zones, remain chemical and moisture resistant and are easily adaptable to multiple diameters of cylinders. The mantle is provided with a temperature regulator and it is a plug and play tool. Two sizes are available, one for liquid cylinder and another one for gas cylinder.



FEATURES

Type 1: Mantle for liquid cylinders

Working temperature:.....up to 200 °C

Temperature accuracy:.....± 5°C

Diameter range.....60 mm to 100 mm

Length range.....up to 500 mm

Construction:.....Kevlar, Silicon aramid

Power:.....220 VAC, 50 Hz, 400 watts

Type 2: Mantle for gas cylinders

Temperature:.....Ambient to 100°C

Temperature accuracy:.....± 5°C

Diameter of accumulator:.....200 mm to 250 mm

Length of the accumulator:.....up to 800 mm

Power supply:.....220 VAC,50 Hz

BENEFITS

- Convenient
- Efficient
- Robust and reliable
- Attractive
- Low maintenance



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HEATING TROLLEY FOR LIQUID CYLINDER

The heating trolley is especially designed to heat and maintain at constant temperature pressurized fluid contained in floating piston accumulator. The trolley is equipped with two heavy duty casters which enable to transport the fluid sample very easily anywhere in the laboratory room. A drum also permits to wind the 10 meters extension cord. The accumulator is mounted into two heating shelves maintained by two clamps. A control panel is used to enter and display the temperature and set point value. A thermocouple probe is used to measure the temperature.



FEATURES

Temperature:..... Ambient to 200°C
 Temperature accuracy:..... ± 5°C
 Diameter of accumulator:..... 60 to 100 mm
 Length of the accumulator:..... 500 mm to 750 mm
 Power supply:..... 220 VAC,50 Hz, 400 watts

BENEFITS

- Easy to mount the fluid sample accumulator
- Easy to move the trolley in the laboratory room
- Fast heating temperature ramp
- Very accurate temperature regulation
- Homogeneous temperature in the fluid sample



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HEATING TROLLEY FOR GAS CYLINDER

The heating trolley is especially designed to heat and maintain at constant temperature pressurized fluid contained in gas cylinder. The trolley is equipped with two heavy duty casters which enable to transport the gas sample very easily anywhere in the laboratory room. A drum also permits to wind the 10 meters extension cord. The cylinder is mounted into two heating shelves maintained by two clamps. A control panel is used to enter and display the temperature and set point value. A thermocouple probe is used to measure the temperature.



FEATURES

Temperature:..... Ambient to 100°C
 Temperature accuracy:..... ± 5°C
 Diameter of gas cylinder:..... 200 to 250 mm
 Length of the gas cylinder:..... up to 800 mm
 Power supply:..... 220 VAC, 50 Hz, 700 watts

BENEFITS

- Easy to mount the fluid sample accumulator
- Easy to move the trolley in the laboratory room
- Fast heating temperature ramp
- Very accurate temperature regulation
- Homogeneous temperature in the fluid sample

GAS BOOSTER (GB – SERIES)

Designed for compression of low pressure field gas samples into cylinders. The gas booster is complete to operate. All that is required is an air supply for the air driven pump and a cylinder of storage gas. The device includes manual valves, air regulator, filter, gas booster and high pressure tubing and fitting.



FEATURES

Admission pressure:.....15 bar to 200 bar (about 225 to 2,900psi).
Max outlet pressure:.....700 bar (10,000 psi) or 1000 bar (15,000 psi).
Working temperature:.....Ambient 25° - 50 °C
Air drive:.....0.5 to 10 bar (7 to 145psi)
Process fluids:.....Dry HC gas

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PRESSURE GENERATOR SYSTEM (PGS)

Designed to provide hydraulic pressure for Hg free fluid transfer at pressure condition. Maximum output is 10,000 psi. The system comes complete with control valves, air driven liquid pump, pressure gauge, air regulator, relief valve and frame.



FEATURES

Max outlet pressure:..... 700 bar (10,000 psi)
Air inlet:..... 30 to 145 psi (10 bar)
Wetted parts:..... Stainless steel

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SINGLE CYLINDER VOLUMETRIC PUMP (SP – SERIES)

The SP- series meets requirements of any application where accurate pressure, flow rate and volume measurements are needed in ambient and high temperature conditions. Delivery or extraction of fluids are possible at constant rate or constant pressure. Predefined volume can be delivered or received at constant flow rate. The pump is delivered with an accurate pressure sensor, two hand operated valves for tank feeding and outlet delivery, a control panel and a reservoir. The whole is mounted on a chassis equipped with four heavy duty casters. A computer data acquisition and supervision system is also optional. A controlled temperature airbath can be provided to heat the fluid up to 200°C. The Vinci SP series provides several cylinder capacities over a wide range. Fluid wetted parts can be manufactured from stainless steel and titanium.



FEATURES

| Performance specifications | Model SP 250 | Model SP 500 | Model SP 1000 |
|------------------------------|--|--|--|
| Maximum pressure rating: psi | 10,000 psi 15,000 psi (/15) 20,000 psi (/20) 25,000 psi (/25) | 10,000 psi 15,000 psi (/15) 20,000 psi (/20) 25,000 psi (/25) | 10,000 psi 15,000 psi (/15) 20,000 psi (/20) 25,000 psi (/25) |
| Pressure accuracy: %FS | 0.1% | 0.1% | 0.1% |
| Maximum flow rate: ml/min | 25 ml/min | 25 ml/min | 25 ml/min |
| Minimum flow rate: ml/min | 0,001 ml/min | 0,001 ml/min | 0,001 ml/min |
| Single stroke volume: ml | 250 ml | 500 ml | 1000 ml |
| Temperature range: °C | Ambient or HT | Ambient or HT | Ambient or HT |
| Wetted parts | SS or Ti | SS or Ti | SS or Ti |
| Tubing connector | 1/8 inch | 1/8 inch | 1/8 inch |
| Power supply: | 230 VAC, 50 Hz | 230 VAC, 50 Hz | 230 VAC, 50 Hz |



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HAND OPERATED PUMP (MP SERIES)

Designed to provide hydraulic pressure and volume measurement for gas and liquid transfer into high pressure cells. The pump can be delivered with a manometer, two hand operated valves for tank feeding and outlet delivery, a tank, a volumetric vernier and a bench top frame. Fluid wetted parts are manufactured from stainless steel. Several pump cylinder capacities over a wide range of pressure are available.



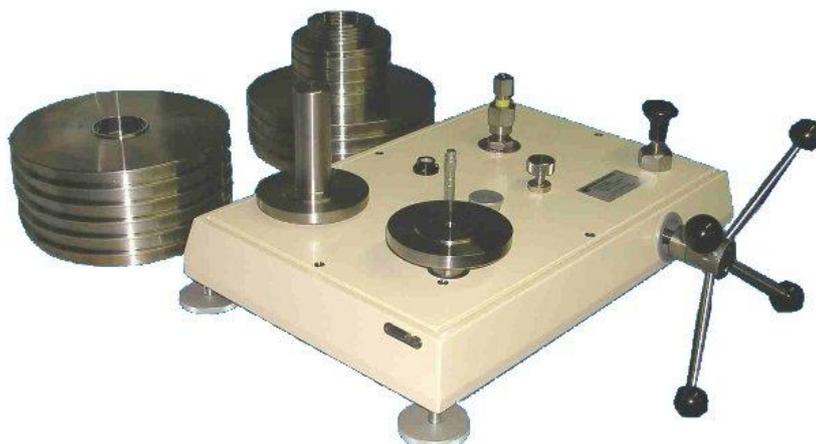
FEATURES

| Performance specifications | Model MP 10 | Model MP 25 | Model MP 50 |
|-----------------------------------|--------------------|--------------------|--------------------|
| Maximum pressure rating: psi | 10,000 psi | 10,000 psi | 10,000 psi |
| Pressure accuracy: %FS | 0.5% | 0.5% | 0.5% |
| Single stroke volume: ml | 10 ml | 25 ml | 50 ml |
| Temperature range: °C | Ambient | Ambient | Ambient |
| Wetted parts | SS | SS | SS |
| Tubing connector | 1/8 inch | 1/8 inch | 1/8 inch |

| Performance specifications | Model MP 100 | Model MP 250 | Model MP 500 |
|-----------------------------------|---------------------|---------------------|---------------------|
| Maximum pressure rating: psi | 10,000 psi | 10,000 psi | 10,000 psi |
| Pressure accuracy: %FS | 0.5% | 0.5% | 0.5% |
| Single stroke volume: ml | 100 ml | 250 ml | 500 ml |
| Temperature range: °C | Ambient | Ambient | Ambient |
| Wetted parts | SS | SS | SS |
| Tubing connector | 1/8 inch | 1/8 inch | 1/8 inch |

DEADWEIGHT GAUGE

Primary pressure standard designed for high pressure calibration applications. The device consists of a vertically mounted precision lapped piston and cylinder assembly. Accurately calibrated masses are loaded onto the piston, which rises freely within its cylinder. These weights balance the upward force created by the application of pressure within the system. Delivered with a carrying case.



FEATURES

Model: Dual piston
Operation: Oil operated
Pressure range: 1 bar (15 psi) to 1,100 bar (16,000 psi)
Accuracy: 0.015% RDG

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DIGITAL PRESSURE GAUGE (DPG SERIES)

The Digital Pressure Gauge series is designed for extremely accurate pressure measurement to meet your most demanding requirements for precision laboratory or field measurement instrumentation. The instrument includes a high precision analog pressure transducer, a rupture disc for over pressure protection, a five digit digital display and a data logging software for automatic data acquisition.



FEATURES

Model DPG series
Pressure range up to 10,000 psi (other range available)
Accuracy 0.1% FS
Port connection 1/8" autoclave type
Wetted part stainless steel
Power supply 220 VAC 1 Ph, 50 Hz

PVT



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UNINTERRUPTIBLE POWER SUPPLY (UPS 16)

Back-up power protection used in most laboratories against electrical noise, sags, surges and brownouts which affect the sensitivity of the electrical components of the laboratory equipment.



FEATURES

| | |
|-------------------------------|--|
| Output power capacity:..... | 12,800 Watts / 16,000 VA |
| Max configurable power:..... | 12,800 Watts / 16,000 VA |
| Input voltage:..... | 240 V +-1 %, single phase |
| Output voltage:..... | 240 V +-1 %, single phase |
| Efficiency at full load:..... | 90% |
| Back up time:..... | 6 minutes at full load (12,800 watts) 17 minutes at half load (6,400 Watts) |