

### PETRO AHOURA Knowledge Based Company





#### **Our Products**

- 1. Core Plugging Machine
- 2. Plugging Bits
- 3. Core Cutting Machine
- 4. Thin Sectioning Machine
- 5. Dean Stark Apparatus
- 6. Gas Permeameter (Educational)
- 7. Liquid Permeameter (Educational)
- 8. Helium Porosimeter (Educational)
- 9. Gas Permeameter (S.S)
- 10. Poroperm (U.S.S)
- 11. Poroperm (U.S.S & S.S)
- 12. Prob Permeameter
- 13. Core Aging System
- 14. Core Flooding SyStem
- 15. Core Flooding SyStem (Educational)
- 16. Slim Tube Apparatus
- 17. Polarizing Microsscope
- 18. IFT (Inter Facial Tension Meter)

PPA-PM

# CORE PLUGGING MACHINE

Our plugging machine category includes a variety of plugging machines with different specifications used to cut smaller core plugs from whole cores. for different RCAL and SCAL studies. PPA provides a variety of



Diamond-tipped coring bits, which allows the user to prepare different plug samples with various diameters from 1.5 " to 5" Water cooling system provides rapid and efficient cutting without any damage to the bit and the system. and the plugging machine includes water pump, water tank, flexible hose, water swivel, and drainage tray.



# PLUGGING (CORING)



PPA-CB



We designed several types of coring bits for plugging machines (insert name of your plugging machine) based on various purposes. Diamond and tungsten carbide segments or spines can lead to regular and fast cutting and coring procedure. The main types and specification of produced bits are as follows:

### **Specifications**

Duter diameter (optional)	
L inch coring version:	1.3 in (33 mm)
1.5 inch coring version:	1.85 in (47 mm)

Inner diameter (optional)1 inch coring version:1 in (25.4 mm)1.5 inch coring version:1.5 in (38.1 mm)Bit length (optional):170 mmMaximum coring length:150 to 160 mm

#### Number of segments or spines (optional)

1 inch coring version:	8 spines and 4 segments
1.5 inch coring version:	14 spines and 6 segments

# CORE CUTTING MACHINE

PPA-CST



Our core cutting system category includes a variety of cutting machines with different specifications, used to cut and slab whole core samples. In some models, additional facilities for trimming core plugs are also provided. A variety of blades with segmented and continuous diamond rims are utilized for cutting and slabbing whole cores for RCAL and Geological studies. The machine includes a water cooling system for rapid and efficient cutting without any damage to the blade and the machine.

Blade diameter:	Up to 11.8"
Maximum cutting depth:	5″
Compatible coolant:	Water
Rotations peed:	3000 RPM
Motor power:	2500 Watts



#### Petro Ahoura Company

PPA-TSC

# THIN SECTIONING MACHINE

PPA-PetroThin machine is designed to preparation of thin sections which can be used to geological, metallurgical, electronical and other purposes. There are several steps in thin section preparation which need to various tools, machines and materials. Two main and critical steps in thin section preparation are cutting and grinding of mounted chip (a piece selected sample for thin sectioning) on glass slide. During thin section preparation procedure, the thickness of the selected sample must be reached to 35 micron (geological thin sections) so, during the cutting and grinding steps, lowest thickness of remained sample on the glass slide is crucial. This machine can remove highest thickness of mounted sample on glass slide. The vacuum force is used to holding glass slides during cutting and grinding steps. A water circulation system is added to the machine for cooling, lubricating and washing during cutting and grinding steps. Electrical force is needed to machine, vaccum pump and circulation system.





motor:	3000 RPM, 220 V, 50 Htz, Made in GermanyMaximum
Vacuum Pump:	Value
Cutting Disk:	Diamond 400
Grinding Disk:	CBN 400
Vacuum Filter:	250 cc
Body Material:	Stainless steel

# PPA-DES

# DEAN STARK APARATUS

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The dean stark extractor is used to determine fluid saturation of core samples. The soxhlet distillation extraction method is used to dissolve and extract oil and brine from rock core sample by solvents. Core samples are placed in the extraction soxhlet and the heating mantle is energized to boil the solvent in the flask. The clean distilled solvent vapors (and water) rise to the top of the unit where they are condensed and fall back into the Soxhlet chamber. The condensed water is collected volumetrically calibrated а in receiving tube. The clean solvent 3 returns to the boiling flask along with any petroleum product that

is removed from the core sample.

### **Specifications**

Core sample diameter:Up to 4"Core sample length:Up on requestExtractor capacity:Up to 5000 ccBoiling flask:Up to 5000 ccReceiving tube:Up on requestHeating temperature:Up to 450°CWater cooling system is included.Up to 450°C

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Gas Permeameter is a basic system for training students which measures sample gas permeability (air, nitrogen, or helium) by the steady-state method. The instrument is designed to inject the gas to the test sample at various pressure and flow rate conditions. The injection pressure at the core face is measured by a pressure transducer and the gas flow rate is measured by a precision mass flow meter. A spreadsheet is designed to calculate the gas permeability by the measured data.

Permeability Range:	1md to 1 Darcy
Core diameter:	1.5"
Core length:	1" to 3"
Flow Pressure:	Up to 100 psi
Gas flow:	0-500 cc/min
Temperature:	Ambient
Pressure transducer accuracy:	0.1 % F.S.
Flow meter accuracy:	1 % F.S



# **LIQUID** PERMEAMETER

Educational Type



Liquid Permeameter is a manual system designed for teaching concept to measure absolute liquid permeability of plug sized core samples at room conditions. The liquid permeability calculation is based on the Darcy's law. The system is equipped with a precision pressure transmeter, a fluid transfer vessel and a stainless steel core holder. This low cost apparatus is a useful tool for educational purposes.

Permeability Range:	0.1 md to 4 Darcy
Core diameter:	1.5"
Core length:	1" to 3"
Flow Pressure:	up to 100 psi
Confining pressure:	up to 600 psi
Temperature:	Ambient
Pressure sensor accuracy:	0.1% F.S.





# HELIUM POROSIMETER

#### Educational Type

The automated helium gas expansion porosimeter is used for direct measuremet of grain and pore volumes in an auxiliary cell at isothermal conditions based on the Boyles law. Subsequently, porosity and grain density can be derived from the measured data. Data acquisition system is designed for for data logging, calculations, and calibration.





# Specifications

Core diameter:	1" and 1.5"
Core length:	up to 3"
Porosity Range:	up to 60%
Pressure sensor accuracy:	0.1% F.S
Temperature accuracy:	+/- 0.1 °C
Temperature:	Ambient
Cell pressure:	up to 150 psi

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#### **Petro Ahoura Company**



Our Gasperm system measures sample gas permeability (air, nitrogen or helium) by the steady-state method. The unit is connected to a computer for automated data acquisition and control. The instrument is utilized for the gas injection through test samples at various pressure and flow rate conditions





# Specifications

Permeability Range:	0.01md to 10 Darcies
Core diameter:	1.5"
Core length:	up to 3"
Flow pressure:	0 - 100 psi
Gas flow:	0 - 500 ,0-50 cc/min
Temperature:	Ambient
Pressure transducer accuracy:	0.1% F.S

# POROPERM (U.S.S)

PPA-USS



Our Poroperm apparatus is an automated permeameter and porosimeter system used to determine petrophysical properties of plug sized core samples at reservoir confining pressure. The gas permeability measurement is based on the unsteady state pressure fall-off method whereas the pore volume is determined by the Boyles law. The instrument is controlled by data acquisition system for data collection and computation.

# **Specifications**

POROPERM

Permeability Range:	0.001md to 100 md (USS)
Core diameter:	1.5"
Core length:	up to 3"
Porosity Range:	up to 60%
Pore Pressure:	Up to 250 psi
Confining pressure:	400 to 6000 psi
Temperature:	Ambient
Pressure Sensor accuracy:	0.1% F.S

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# POROPERM (U.S.S & S.S)

PPA

USS-SS



Our Poroperm apparatus is an automated permeameter and porosimeter system used to determine petrophysical properties of plug sized core samples at reservoir confining pressure. The gas permeability is measured by two method USS(fall-off method) and SS method. the pore volume is determined by the Boyles law. The instrument is controlled by data acquisition system for data collection and computation.

# **Specifications**

Permeability Range:	0.001md to 50 md (USS)
	50md to 5 Darcy (SS)
Core diameter:	1.5″
Core length:	up to 3"
Porosity Range:	up to 60%
Pore Pressure:	Up to 250 psi
Confining pressure:	400 to 6000 psi
Temperature:	Ambient
Pressure Sensor accuracy:	0.1% F.S
Flow meter:	10-500 cc per min (Accuracy: 0.1 % F.S)
differential Pressure:	0 - 3 bar (Accuracy: 0.1 % F.S)

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# PROBE-PERMEAMETER



PPA-PBP

Prob Permeameter, with Motorized Translation Table, provides a precise method for rapidly determining core permeability and heterogeneity. Data are usually measured from slabbed cores that have been cleaned and dried, although whole core can also be tested. The measurement locations can be adjusted to coincide with your specified sampling intervals (e.g. per centimeter, per bed) by changing the grid pattern. The ability of the Prob Permeameter system to rapidly measure accurately a large number of data points improves the statistical validity of these data, thus providing a more reliable permeability characterization of your reservoir. The results can be presented in tabular or digital form as well as in log or contour map format.

Measurement Method:	Pressure fall-off
Permeability Range:	0.01 md to 1 darcies
Maximum Pressure:	150 psi
Pressure transducer accuracy:	%0.1 F.S
Temperature:	ambient



# CORE AGING



PPA-AGCL

The core aging system is utilized to age core samples by crude oil to restore the reservoir wettability condition prior to SCAL study. The base model is designed to age one core sample in a cell and can be upgraded to a five-cell model. Core sample is aged by crude oil and connate water for several weeks at reservoir pressure and temperature. The wettability changes at oil-invaded pores. The wettability alteration depends on the stability of water films, trapped between the pore surface and oil phase. The wettability of rock moves to more oil-wet condition due to the ruptue of water films and oil/rock contacts.

Maximum confining & pore pressure:	400 bar
Working temperature:	up to 120 °C
Core length:	up to 3"
Core diameter:	1" and 1 ½"
Wetted material:	SS316
Power supply:	220VAC, 50Hz





A core flooding system is a system that flows a fluid (liquid or gas) through a core sample at controlled conditions and measure flow parameters these systems can be used for:

- EOR test and research
- Water flooding
- Steady state permeability measurements
- Relative permeability measurements (U.S.S)
- Flow distribution in multi-layered reservoirs
- Formation damage tests



Pump:	Up on Reques
Core-holder:	D: 1.5" - H: Up to 3.5'
Fransfer vessel:	3x (Max P: 400 or 700 bar, Vol: Up on Request
Oven:	Up to 150 °C
Back pressure:	1x (Max P: 400 or 700 bar
Pressure sensor:	1x (Max P: 400 or 700 bar, Accuracy: 0.1 % F.s
Differential Pressure Transi	mitter: 1x (Accuracy: 0.1 % F.s
Hand Pump:	2x ( Max P: 400 or 700 bar
ncluded Data Acquisition	





Educational Type

A core flooding system is a system that flows a fluid (liquid or gas) through a core sample at controlled conditions and measure flow parameters these systems can be used for:

- EOR test and research
- Water flooding
- Steady state permeability measurements
- Relative permeability measurements (U.S.S)
- Flow distribution in multi-layered reservoirs
- Formation damage tests

# **Specifications**

Pump:		
Core-holder:		
Transfer vessel:		
Oven:		
Back pressure:		
Pressure sensor:		
Hand Pump:		

HPLC Pump (400 bar) D: 1.5" - H: Up to 3.5" 2x ( Max P: 400 bar, Vol: 500 cc) Up to 150 °C 1x (Max P: 400 bar) 2x (Max P: 400 bar, Accuracy: 0.1 % F.s) 2x ( Max P: 400 bar)



PPA-STA

# **SLIM TUBE** APPARATUS

A slim tube miscibility test is performed to estimate the minimum miscibility pressure (MMP) or minimum miscibility concentration (MMC) of a given injection solvent and oil at reservoir pressure and temperature. The test is commonly performed within a 40 feet column of coiled tubing pre-packed with glass beads or sand. Different types of materials and the specific length of the tube can be used upon request. The gas is injected with a desired pressure through the slim tube saturated with oil. The effluent following from the slim tube can be observed via a sight glass tube. The volume of effluent is continuously monitored by digital volume measurement system while produced gas is measured by a gas flow meter. Finally MMP is achieved based on the recovery curve which is plotted using the raw data obtained during the different miscible displacement experiments.

### **Specifications**

Tube length: Material: Porous media: Working pressure: Working temperature: Fluids: 40 feet, other length available Stainless steel Calibrated 230 - 310 μm silica 400 bar (6000 psi) Up to 150°C Live oil, HC gas, CO2, solvent



# POLARIZING MICROSCOPE

This polarizing light microscope is designed for both geological and mineralographical studies and purposes. Its 3600 rotating universal stage is unique for mineralogy and detection of the extinction angle of minerals. The polarizing light system is designed and adjusted by PPA which gives us the exact birefringence of the studied minerals. There are several objective lenses with 4x to 100x magnifications which different scales of the study are possible. Also, its visual domain is wider than other commercial microscopes. At the time of production the stage and light system are adjusted together and the microscope is always centered. Its compacted size and low weight (about 3kg) are other characteristics of this microscope.

PPA-PLZ



### **Specifications**

Binocular head, °0 to °360 rotating

Wide field eyepieces WF10X / 18mm

Universal stage °360 rotating; Gentle and soft rotation; Sample holders by order

Semi Plan 4x, 10x, 40x (spring), 100x (spring,oil); 2.5x by order

Coaxial coarse and fine focusing adjustment

PPA polarizing system

**Retardation plate** 

Focusable 1.25 N.A Abbe condenser

Iris diaphragm Green, blue and yellow light filters



The physical phenomenon between gas and oil or between water and oil called surface or interface tensition (IFT) results from the attractions due to intremolecular forces.

the appratus allows for the determination at reservoir condition and ambiant condition:

1) surface tension (liquid -gas) and interfacial tension (liquid-liquid) using the pendant drop method (Laplace equation)

1) contact angle between lquid-gas or liquid-liquid and solid system using the sessile drop method

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





#### PETRO AHOURA COMPANY Catalog of Products 2016

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