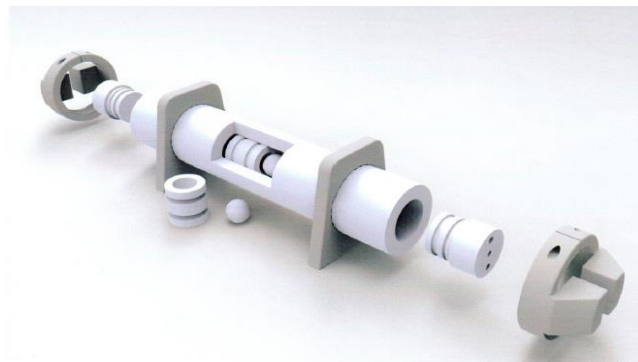


## PVT Equipment Catalogue

### PVT Cylinder

The SPM-series sample cylinder was designed specifically transportable for the task of housing samples and analysis in the laboratory or subsequent long term storage. Due to its design to keep sample single phase plus the noncorrosive and light weight material, this piston type cylinder used widely in sampling task and transporting single phase sample from any kind of bottom hole sampler. Keep sample single phase and above bubble point during sampling from reservoir formation to laboratory is a most important job to achieve reliable laboratory results.



SPM700	Material	Dimension (mm)	Weight (Kg)	Description
Cylinder	Titanium	500*100(OD)	10.5	Up to 40000 psi
Piston	Titanium	60*56(OD)	0.5	HP-HT Packing
End Cap	Titanium	70*56(OD)	2* 0.5	HP-HT Packing
Mixing ball	316L st. stl.		/	Or vortex ring
Valve	316L st. stl.	/	/	HP-HT Packing Anti-vibration
Protection Cap	Teflon/Carbon	40*140(OD)	/	High Temperature
Transportation Box	Aluminum	80*20*20	1	Light Weight

#### Features & Benefits

- Single Piston sample receiver, with internal mixing device
- Sample mixing options of a single mixing ball or vortex ring
- Autoclave Engineer design, two end caps and a piston sealed with O-Ring and back-Up rings
- Two way out port valve on the sample side and hydraulic side for Evacuation and Purging.
- Anti vibration valve port (1/4" male) with protection guard fitted.
- Supplied with Aluminum Transportation box

### Specifications

volume	Material	Height	Outer-Diameter	Inner-Diameter	Weight
700	Titanium	500mm	100 mm	56 mm	12 kg
1100	Titanium	500 mm	100 mm	48 mm	11 kg

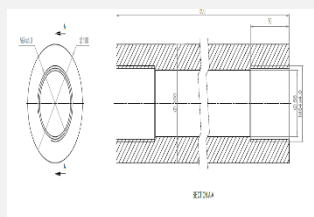
Base on the different type of sampling, bottom hole or Surface, the SPM sample cylinder designed in two different volumes in benefit. 700cc SPM cylinders are used in Bottom hole sampling, with regard to all kind of sampler. 1100cc SPM cylinders are used in Surface sampling base on routine PVT analysis.

All SPM Cylinders have

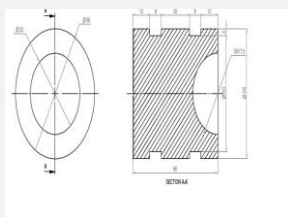
- Hydrostatic Certificate
- Metallurgical Certificate
- corrosion Certificate
- User instructions and user spare parts list

SPM-Series	Working	Test	Ultimate
Pressure psi	12000	15000	40000
Temperature °C	150	200	1600

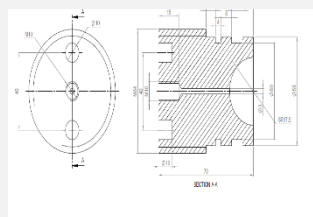
Cylinder Body



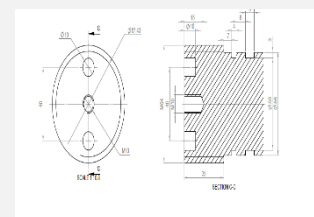
Piston



Upper Lid



Bottom Lid



## PVT Equipment Catalogue

### Material

Titanium is considered a superior combination of high strength and low weight ratios when compared to steel. Titanium based alloys are lightweight and stronger than steel alloys. Titanium grade 2 were electrochemically explored to determine their corrosion susceptibility behavior when exposed to corrosive environments (specifically H<sub>2</sub>S) typically found on hydrocarbon reservoirs.

	Titanium	Stainless Steel
Weight	Light	Heavy
Specific Gravity	4.5	7.9
fatigue life	More	Limit
withstand high and low temperatures	✓	×
longevity	Less	More
corrosive	×	✓
Unalloyed Strength	45% lighter	5% stronger
Elongation	20 to 30 %	10 to 15 %

Mechanical Properties	Metric	English
Hardness, Rockwell B	98	98
Tensile Strength, Ultimate	430 MPa	62400 psi
Tensile Strength, Yield	340	49300 psi
Elongation a Break	28%	28%
Modulus of Elasticity	102 GPa (in tension)	14800 ksi (in tension)
Compressive Yield Strength	340 MPa	49300 psi
Notched Tensile Strength	720 MPa ( $k_t=3.0$ )	104000 psi ( $k_t=3.0$ )
Ultimate Bearing Strength	930 MPa ( $e/D=2$ )	135000 psi ( $e/D=2$ )
Bearing Yield Strength	660 MPa ( $e/D=2$ )	95700 psi ( $e/D=2$ )
Poisson's Ratio	0.34	0.34
Charpy Impact	65 J (V-notch)	47.9 ft-lb (V-notch)
Fatigue Strength	280 MPa ( $1E+7$ cycles)	40600 psi ( $1E+7$ cycles)
Shear Modulus	38 GPa	5510 ksi
Shear Strength	380 MPa (Ultimate)	55100 psi (Ultimate)



**MAXIMATOR** medium pressure valves with metal to metal seats have a high level of safety and reliability under adverse operating conditions. These valves may be used both with gases and liquids.

Traceability is ensured through extensively documented data (batch number, maximum pressure, material number, type designation). All medium pressure valves include glands and collars.

O.D. Size in. (mm)	Connection Type	Orifice Size in. (mm)	Rated Cv*	Pressure/Temp. Rating psi @ R.T. (bar)**
1/4 (6.35)	4MF	0.125 (3.2)	0.31	22,500 (1,550)
3/8 (9.53)	6MF	0.219 (5.6)	0.75	22,500 (1,550)
9/16 (14.29)	9MF	0.312 (7.9)	1.30	22,500 (1,550)
3/4 (19.05)	12MF	0.438 (11.1)	2.50	22,500 (1,550)
1 (25.4)	16MF	0.562 (14.3)	4.40	22,500 (1,550)

### Valve and Sealing

Autoclave and thermodynamically Engineering used to all design and parts.

MAXIMATOR Standard valves are supplied with Teflon/Carbon packing and operated to 230°C

O-rings and Back-Up rings are Viton grade for gas and oil industry and produced by PARKER Co.

### Hydrostatic Certificate



### Metallurgical Certificate



### Corrosion Certificate

