PETRO SAZEH MIHAN CO.

Catalogue
Knowledge - Exprience-Technology

PSM

Products :

Control Globe Valve (unbalanced/balanced)
Control Ball Valve (metal/soft seat)
General Ball Valve
Control Butterfly Valve
General Butterfly Valve
Piston Valve
Shut Off Valve
On/Off Valve

Services :

HVOLF Coating
Ball Grinding
Reverse Engineering
Valve Repair
Valve Pattern Making
Control Valve Loop Test
General Valve Standard Tests
Special Valve Design and Manufacture

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Brief History

Petro Sazeh Mihan founded by M.Rezae in 1997, which quickiy established itself as an control valve designer and manufacturer in Iran.

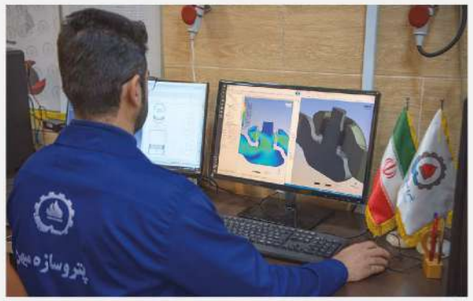
At the preliminary phase, the company started with repairing of industrial valves, and then continued with manufacture of rather simple components. The efforts finally culminated in manufacturing control valves with actuator, through utilization of native knowledge and reverse engineering method.

Introduction

Petro Saze Mihan Co. (2011) LTD manufacture a wide range of valve products for the Oil, Gas, Petrochemical and power plant industries including Trunnion Mounted & Floating Ball Valves, Globe Control Valves, Y type Piston and Butterfly Valves. You will see our brand name PSM on all the valves we produce.
The company's core business is manufacturing these types of valves on short delivery times, with a sophisticated manufacturing program. Our Engineering Department can design high quality valves within the tight deadlines that today's global projects require. Through bespoke engineering, we can manufacture small & large quantities in exotic materials.
The management team of PSM Co. place huge emphasis on employing high quality staff who are motivated through the company's quality policy to ensure the clients' requirements are met on every project. Only through using the skills of the design team and state of the art production facilities are we able to meet our clients' exacting demands and ensure compliance with the company's ISO 9001:2015 quality management system.
The quality of the products is guaranteed by certification based on both customer requirements and quality certification.
High quality 3D CAD, 3D CNC Manufacturing System and 3D measurement tools are used for production of the valves. PSM uses an advanced testing lab to ensure durability of its products. Fire safe, high temperature and cryogenic testing can be performed inhouse to prove the valves operation in extreme conditions.

Engineering Department

PSM design combine proven engineering expertise with state of the advanced technology, including computer aided design (CAD), computational fluid dynamics (CFD/CFX) and finite element method (FEM) to creating design and develop new products. Every task done by our team, from the easiest to the most complex, has had from the beginning and ever since an emphasized sense of seeking a job done properly at the highest level of quality.



Research and Development (R&D) Department

Every day, our efforts are poured into responding in the best possible ways to the needs of all our clients. Today's needs, and those of tomorrow. Every year, PSM earmarks part of its turnover for research and development aimed at developing techniques, processes and the use of materials that can meet the current requirements of the market, or those likely to arise, always with a watchful eye on the economic efficiency of production.
PSM as a knowledge-based company, following its vision and policy, to improve the level of technical knowledge and invent creative methods, seeking to promote its position among international companies in the area of research and development unit.

The aims of this unit are stated below :

- Improve the quality of products and services
- Develop and provide technical knowledge for industrial designs
- Practical research in the fields required by related industries
- Adding new products to company product portfolio

Quality Control (QC) Department

Spotlight on Quality

By stirring up healthy competition in the local manufacturing market, PSM has always implemented efficient and stringent quality in products, practices, and procedures, and so has met or even exceeded ISO requirements.
To maintain our certification, as well as meet our own high standards, every PSM staff undergoes training to understand how they can help to ensure PSM upholds its quality-oriented principles.
We reference many important applicable standards, so our PSM valves can be designed, manufactured and tested in accordance with other international standards on the request.

Multiple Inspection Support

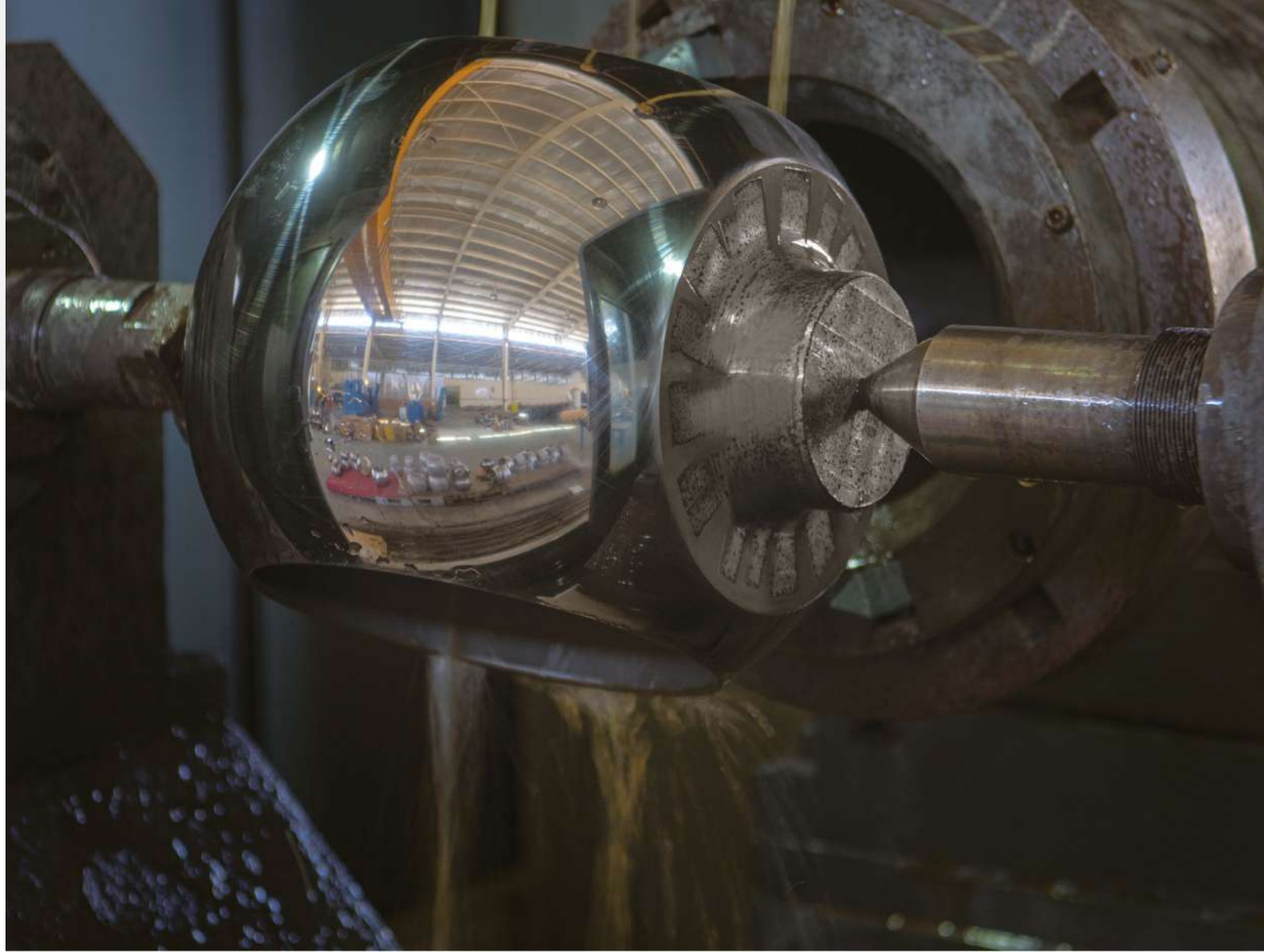
Our castings and forgings materials are purchased from reliable suppliers and we can provide you, inspection report.
During the fashioning process, our qualified technicians will do rigorous additional testing carried out through non-destructive tests (NDT), which includes :

- Hardness Testing
- Pipe Wall Thickness Testing
- Fugitive Emissions Testing
- Dimension Testing
- Paint Thickness Testing
- Torsion Testing

Services

Grinding

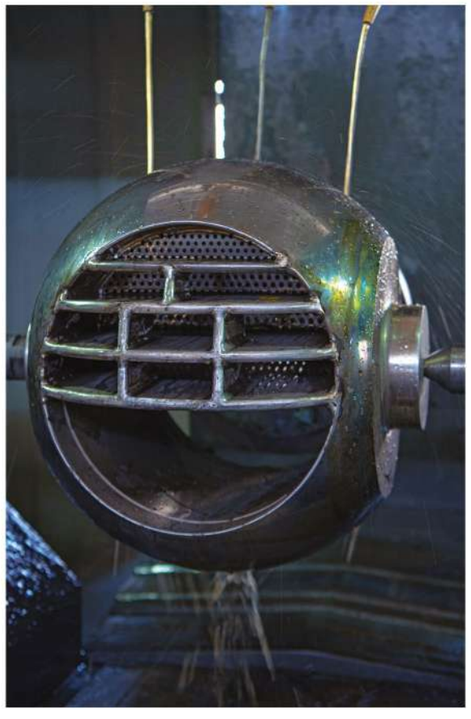
relying on the advanced machines and equipment and professional manpower, PSM is ready to provide grinding and lapping services for all types of industrial valves with a smoothness of 0.2 microns and a spherical accuracy of 2 microns in the dimensions domain of ½ to 30 inches.



Specialized Repair, reconstruction and testing of valves for oil, gas and petrochemical industries

Industrial valves may encounter defects and problems during operation due to abrasion, corrosion, erosion, weather conditions and unsuitable operating conditions. Therefore, some of tests and visual checks should be performed routinely at regular intervals. Repair operation, standard tests of industrial valves are performed by standard testing devices to ensure the correct operation and no leakage at PSM maintenance workshop. These test devices are available in different types and for different valves to evaluate the valve. Usually, water, air or a combination of both is used to test the performance of repaired industrial valves.
PSM can do the overhaul of any valve and turn the used valve into a new one. Original testing procedures are performed to ensure valve functionality. Any other additional testing required by customer is possible. Quality inspection is performed as for a new valve.
PSM company with specialized facilities, ready to repair, reconstruct, test and operate the valves used in various industries such as oil, gas and petrochemical and, in this regard offers the following services :

- Testing all types of valves up to 30 inches and 2500 Class in accordance with the appropriate standards
- Testing all types of control valves according to the appropriate standard
- Performing hydrostatic and leakage tests
- Reconstruction and repairs of all types of valves in accordance with the appropriate standard
- Manufacturing spare parts for all kinds of valves



Reverse Engineering

Using reverse engineering means starting from studying an existing product (of which is not possible to get the original design documents), analyzing each part of it, in order to re-create the original design. Hence, our expertised engineers, use the obtained result to develop and design various product, in full compliance with the latest standard revisions which have been issued since the original valve has been manufactured.

- The aim of the whole process is to re-use the external parts of the valve (body and closure), and replace all the trim with new components, in order to ensure a new life of the valve.
- Three -dimensional scanning and measuring with no restrictions on size, weight and temperature.
- Digital File Preparation Equipment and Components Dimensional inspection.
- File created on CATIA three-dimensional scatter pieces.
- Very high accuracy also for large objects independent of environmental conditions.

Pattern Making

Our newly expanded and automated molding and core making department produces castings models with of outstanding dimensional stability and superior appearance. Our foundry pattern making personnel maintain high standards in their daily operations.
Due to the importance of pattern in casting process, PSM relying on the experience, advanced software and technical knowledge of its experts, makes pattern professionally.
Designed patterns in this company are made according to standards such as DIN 1511. These patterns professionally are made for Control Globe valve (1 ½ "– 24") and Control Ball valve (2"-30").

Superior privilege of pattern making department of Petro Sazeh Mihan :

» Using up-to-date CNC machines
» Install running system according to casting requirements
» Simulating with cast simulation software such as Procast and Sutcast in order to increasing of casting efficiency.
» Making different types of pattern with various Separation Surfaces, Integrated, multi pieces, pattern with free part, pattern with plane and running system (planner pattern), special patterns, etc.

Patterns in the company are designed based on following categories :

» Process speed in making pattern.
» Desired accuracy and surface roughness.
» Number of cast parts
» Foam patterns
» Wooden patterns
» Aluminum patterns
» Plastics patterns

Steps of pattern making are as follows :

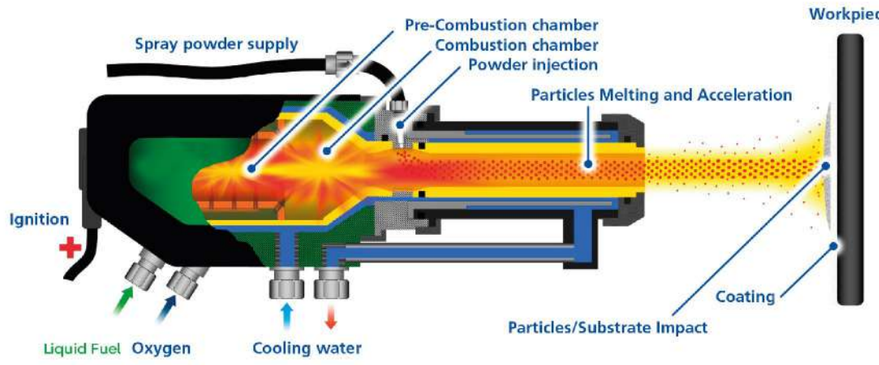
» Converting mechanical drawing to cast drawing
» If there is not 2D drawing of part, 3D file will be prepared with Digits, CMM and appropriate technical software.
» Preparing the cast pattern file by using software such as Solidworks, Catia for making pattern and core box by using CNC.
» Considering shrinkage within solidification on the pattern.
» Making cavity of pattern based on priorities mentioned above.
» Installing pattern on the plane.

HVOLF

HVOF process is one of the most popular thermal spray technologies and has been used in many industries due to its flexibility and the superior quality of coating produced compared to other thermal spray techniques.
It produces a coating of higher bond strength and higher hardness together with lower porosity than other thermal spray processes such as the plasma spray.

High Velocity Flame Spraying With Liquid Fuel

In high velocity flame spraying with liquid fuel like kerosene, N-paraffin a. o.higher combustion pressure are applied compared to spraying with gaseous fuel. The spray powder is radially injected at a position, where the combustion gases are expanded completely and already somewhat cooled down. This creates coatings of higher density and higher adhesive strength values. Eventually, residual stresses on pressure may be generated in the coating.



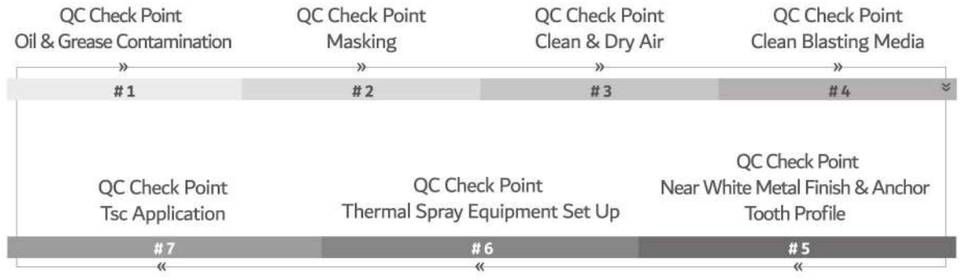
Comparison of Processes

Process	Typical Thermal Energy Temperature°c	Typical Kinetic Energy Particle Velocity M/Sec
Wire Flamespray	3000	50-100
Arc Wire	4000	50-100
Powder Flamespray	3000	20-50
Plasma	15000	50-150
H.V.O.F	2500	300-700

Coating Comparison

Process	Bond (Mpa)	Porosity (%)	Oxides (%)
Wire Flamespray	5.4 - 27*	10-15	5-15
Arc Wire	13.6 - 50*	10-15	5-15
Powder Flamespray	13.6 - 34*	5-10	5-15
Powder Flamespray(Fused Coatings)	68+	0	1-5
Plasma	34 - 68+	<1-5	<1-5
H.V.O.F	41- 95	<1	<1-2

QC Check Point for Thermal Spray Coating



Benefits of the HVOF Coating

- Reduced costs
- Improved performance
- Improved electrical properties
- Enabling components to operate in higher /lower temperatures
- Enabling components to operate in within harsh chemical environments
- Improved efficiency
- Improved life of mating component

HVOLF Coating Service in PSM valve company :

- Ball coating with grinding to 30" diameters
- Cylindrical component coating to 6000 mm length
- Plate or smooth pieces to 6000 mm length & 2000mm width
- Sprayed many types of powders same as WC-Co, Chrome carbide, MCrAlY, Colmonoy (Nickel alloy), stellite 6 ,....
- Best engineering & QC System
- Written procedure for qualification of HVOLF process

List of Equipment

- 3 units of ball lathe machine in different sizes form 1 to 30 inches.
- 3 units of CNC grinding Ball From 1 to 30 inches.
- 2 units of four axis CNC Milling Machines
- 2 units of CNC lathe machines.
- Thermal Spray Coating HP-HVOLF Eight axis Robotic Thermal Spray facility for coating
- 2 units of Abrasive Blast Machine

Laboratory and Quality Control Equipment

- Electroless Nickel Plating
- Positive Material Identification
- Surface Roughness Tester
- Spherical Roughness Measurement
- Coating Thickness Measurement
- Painting Thickness Measurement
- Humidity Meter & Thermometer
- Hand Held Hardness Tester
- Digital Hardness measurement with processing
- Software
- Cutter
- Polisher
- Mounting
- Trinocular Inverted Metallurgical Microscope
- With Image Analysis Software

Test Benches

- 5 Hydrostatic and leakage test benches (Size: 1/2 - 30 in/Class: 150 - 2500)
- Control Valve Special Loop Test (Size 1-24 in/Class:150 -2500)

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Piston Valve

A piston valve is a device used to control the motion of a fluid along a tube or pipe by means of the linear motion of a piston within a chamber or cylinder.

Features :
Easy Maintenance and Customer Oriented
Short and Reliable Delivery Time
Special Design and Fabrication Capability According to Client's Special Offers
All the main fabrication steps such as Designing – Grinding - Coating -Machining - Lapping, Routine Tests, ... are doing by the PSM's exclusive equipment.
Full Bore-Low Pressure Drop

Options :
Welded Fabrication in different Material (Such as Stainless Steel (S.S.316, CF8M,304L,), Carbon Steel (A105, ...), Duplex, Hastelloy, Monel, Inconel, ...
Polished Piston
Coated Piston
Radial piston sealing against packing rings
Rising non turning stem up to DN 32 included, turning non rising stem above
Position indicator
Outlet angle: 60°/45°
Heating Jacket
Hard faced seat and/or piston seating surface (Stellite)
Bolted stuffing - box, self -adjusted with spring washers, repackable in service
Integral connection flanges class 150 - 300
Conical metal - to - metal piston seating
Fixed or removable seat
Piston or Seat extension on request
Pneumatic, electric or hydraulic actuator/Manual override

General Data :
Size : 1/ 2 - 8 in
Class : 150 - 300
Connection : Weld (Socket/Butt), Flanged (RF/RTJ)

Some of clients :
Lorestan Petrochemical Company/Bakhtar Petrochemical Company

31000 Control Reciprocating Globe Valve

A globe valve, is a type of valve used for regulating flow in a pipeline, consisting of a movable plug or disc element and a stationary ring seat in a body

Features :
Unbalanced
Top Guided
Noise Control/Anti Cavitation
Easy Maintenance and Customer Oriented
Special Design and Fabrication Capability According to Client's Special Offers
All the main fabrication steps such as Designing – Cage Drilling /Milling-Seat and Plug Coating-Machining- Seat and Plug Lapping Test, Routine Tests, ... are doing by the PSM's exclusive equipment.

Options :
Linear / Equal/Quick Change / Modified Linear / Modified Equal Characteristics
Multi Hole Cages
Multi Stage Cage
Standard / High Capacity
Standard / Extension Bonnet
Oxygen Service / Cryogenic / Standard
Loop Test
Dead Band Test
Hysteresis Test
Metal / PTFE / Graphite Seal Ring
Through / Angle Body
Multi Hole / Countered Plug
Fieldbus Positioner / Special Instrument
Spring Diaphragm / Piston Spring Actuators

General Data :
Size : 3/4 - 8 in
Class : 150 - 2500
Connection : Weld (Socket / Butt), Flanged (RF / RTJ)
Body Material : Carbon Steel (A105), Stainless Steel (S.S316), Ductile Iron (WCB, WCC, CF8M, CF3M), Bronze, Monel, ...
Some of clients :
Pars Phenol Petrochemical Company / Arak Petrochemical Company / FanAvaran Petrochemical Company / Laleh Petrochemical Company

35000 Series General Ball Valve

A ball valve is a form of quarter-turn valve which uses a hollow, perforated and pivoting ball to control flow through it. It is open when the ball's hole is in line with the flow and closed when it is pivoted -90degrees by the valve handle.

Features :
Special Design and Fabrication Capability According to Client's Special Offers
All the main fabrication steps such as Designing – Ball Grinding-Ball Coating-Machining- Seat and Ball Lapping, Routine Tests, ... are doing by the PSM's exclusive equipment.

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Options :
Side Entry/Top Entry
One/Two/Three Piece
Multi Way
Double Block & Bleed
Floating/Trunnion
Metal/Soft Seat
Full/Reduced Bore
Oxygen Service/Cryogenic/Standard
Jacketed/Standard
Fire Safe
Special/Standard Coating
Lever Operated/Gearbox
Antistatic Device
Blowout Proof Stem

General Data :
Size: 1/2-30 in
Class: 150-2500
Connection: Weld (Socket/Butt), Threaded, Flanged (RF/RTJ)
Body Material: Carbon Steel (A105), Stainless Steel (S.S316), Ductile Iron (WCB, WCC, CF8M, CF3M), Bronze, Monel, Brass

Some of clients :
Pars Phenol Petrochemical Company/Arak Petrochemical Company/Khangiran Petrochemical Company/Arya Sasol Polymer Company/Amirkabir Petrochemical Company

38000 Control Reciprocating Globe Valve

A globe valve, is a type of valve used for regulating flow in a pipeline, consisting of a movable plug or disc element and a stationary ring seat in a body

Features :
Precise Microflow Valves with Compact Design and Flexible Capabilities
Heavy Top-Guiding (valve plug support is provided along the entire stroke length)
Application Flexibility (Ten standard contoured trim designs using the same body platform)
Adjustable CV
Compact Assembly
Unbalanced
Anti-Cavitation Trim
Easy Maintenance and Customer Oriented
Special Design and Fabrication Capability According to Client's Special Offers
All the main fabrication steps such as Designing -Seat and Plug Coating-Machining- Seat and Plug Lapping Test, Routine Tests... are doing by the PSM's exclusive equipment.

Options :
Linear/Equal/Quick Change/Modified Linear/Modified Equal Characteristics
Loop Test/Dead Band Test/Hysteresis Test
High pressure
Bellows seal
Cryogenic
Angle valve
NACE version
Fieldbus Positioner/Special Instruments
Spring Diaphragm Actuator

General Data :
Size: 1 / 2 -1 1 /2 in
Class: 150 - 2500
Connection: Weld (Socket/Butt), Flanged (RF/RTJ)
Body Material: Carbon Steel (A105), Stainless Steel (S.S316), Ductile Iron (WCB, WCC, CF8M, CF3M), Bronze, Monel, ...

Some of clients :
Pars Phenol Petrochemical Company / Arak Petrochemical Company

43000 Series Control Butterfly Valve

A butterfly valve is a valve that isolates or regulates the flow of a fluid. The closing mechanism is a disk that rotates.

Features :
Triple Offset Butterfly Valve
High Technology in Designing and Fabrication
bi-directional
Self-Centering Disc
Higher Cv than Other Types
Removal of Keyways or Pins
Low/Zero Leakage
High flow rates
Extremely high cycle life
Special Design and Fabrication Capability According to Client's Special Offers
All the main fabrication steps such as Designing - Seat and Disk Coating-Machining- Seat and Disk Lapping, Routine Tests... are doing by the PSM's exclusive equipment.

Options :
Cryogenic
Fire Safe
Body Material : Carbon steel (A105/WCC, ...) / Stainless steel (S.S.316/CF8M, ...) / Low Temperature Carbon Steel LCC
Spring-diaphragm, floating stem pneumatic actuator (3 - 8 in valve)
Spring return, rolling diaphragm pneumatic actuator (3 - 8 in valve)
Scotch-yoke piston actuator (8 - 48 in valve)
Different Actuator Mounting Position

General Data :
Size: 3 - 48 in
Class: 150 - 300
Connection : Wafer/Double Flanged (RF/RTJ) / Weld (Socket / Butt) / Lug

45000 Series Control Ball Valve

A ball valve is a form of quarter-turn valve which uses a hollow, perforated and pivoting ball to control flow through it. It is open when the ball's hole is in line with the flow and closed when it is pivoted 90-degrees by the valve handle.

Features :
Separable Bonnet design available
Straight through flow pattern provides greater flow capacities
The unique self-aligning eccentric rotating plug provides tight shut off and low dynamic forces.
A large variety of reduced trim options are available in all sizes
General Data:
Size: 1 - 12 in
Class: 150 - 600
Connection: Weld (Socket/Butt), Threaded, Flanged (RF/RTJ)

46000 Series Control Ball Valve
Features :
High Capacity
Heavy Duty
Enhanced flow capacities
Excellent leakage control
Soft/Metal Seat
Reliable operation
simplified maintenance
Body Type: Cast with integral bonnet

Body Material: Carbon steel/ Stainless steel
Plug Type: high capacity "V" contoured segmented ball
Flow Characteristic: Equal percentage
Spring-Opposed Diaphragm/Spring-Opposed Rolling Diaphragm Actuators

General Data:
Size: 1 - 12 in
Class: 150 - 300
Connection: Flanged (RF/RTJ)

51000 Control Reciprocating Globe Valve

A globe valve, is a type of valve used for regulating flow in a pipeline, consisting of a movable plug or disc element and a stationary ring seat in a body

Features :
Balanced
Cage Guided
Noise Control/Anti Cavitation
Easy Maintenance and Customer Oriented
Special Design and Fabrication Capability According to Client's Special Offers
All the main fabrication steps such as Designing – Cage Drilling /Milling -Seat and Plug Coating-Machining- Seat and Plug Lapping Test, Routine Tests, ... are doing by the PSM's exclusive equipment.

Options :
Linear /Equal / Quick Change / Modified Linear / Modified Equal Characteristics
Multi Hole / Countered Cages
Multi Stage Cage
Standard / High Capacity
Standard / Extension Bonnet
Oxygen Service / Cryogenic / Standard
Loop Test / CV Test
Dead Band Test
Hysteresis Test
Metal / PTFE / Graphite Seal Ring
Through/Angle Body
Full / Reduced Trim
Fieldbus Positioner / Special Instrument
Spring Diaphragm / Piston Spring Actuators

General Data :
Size: 2 - 24 in
Class: 150 - 2500
Connection: Weld (Socket/Butt), Threaded, Flanged (RF/RTJ)
Body Material: Carbon Steel (A105), Stainless Steel (S.S316), Ductile Iron (WCB, WCC, CF8M, CF3M), Bronze, Monel, ...

Some of clients:
Pars Phenol Petrochemical Company / JAM Petrochemical Company / Arak Petrochemical Company / Laleh Petrochemical Company

Table.1 ANSI - FCI 70.2 - Control Valve Seat Leakage

Leakage Class	Maximum Seat Leakage	Test Procedure
Class I	agreement between user and supplier	None
Class II	0.5% of rated valve capacity	Test Medium: air or water at 10 - 51ºC Test Press: 34 - bar or ±5% of the max operating ΔP whichever is less
Class III	0.1% of rated valve capacity	Test Medium: air or water at 10 - 51ºC Test Press: 34 - bar or ±5% of the max operating ΔP whichever is less
Class IV	0.01% of rated valve capacity	Test Medium: air or water at 10 - 51ºC Test Press: 34 - bar or ±5% of the max operating ΔP whichever is less
Class V	5×10^{-4} (ml) per minute of water per inch of seat diameter per psi differential	Test Medium: water at 10 - 52ºC Test Press: ±5% of the max operating ΔP,not exceeding Press/temp Rating
	5×10^{-12} (m^3) per second of water per mm of seat diameter per bar differential	Test Medium: water at 10 - 52ºC Test Press: ±5% of the max operating ΔP,not exceeding Press/temp Rating
	4.7 standard ml per minute of air per inch of orifice diameter	Test Medium: air or nitrogen gas at 10 - 52ºC Test Press: Inlet Press = 3.5 barg
	11.1×10^{-6} standard (m^3) per hour of air per mm of orifice diameter	Test Medium: air or nitrogen gas at 10 - 52ºC Test Press: Inlet Press = 3.5 barg
Class VI	According to Table.2	Test Medium: nitrogen gas at 10 - 52ºC Test Press: max rated ΔP across valve or 3.5 bar whichever is the least

Table.2

Nominal Seat Diameter Millimeters (Inches)	ml per Minute	Bubbles per Minute*
< 25 (< 1)**	0.15	1**
38 (1.5)	0.30	2
51 (2)	0.45	3
64 (2.5)	0.60	4
76 (3)	0.90	6
102 (4)	1.70	11
152 (6)	4.00	27
203 (8)	6.75	45
250 (10)	11.1	
300 (12)	16.0	
350 (14)	21.6	
400 (16)	28.4	

Bubbles per minute as tabulated are a suggested alternative based on a suitable calibrated measuring device, in this case, a 6 mm (0.25 inch) O.D. x 1 mm (0.032 inch) wall tube submerged in water to a depth of from 3 to 6 mm (0.125 to 0.25 inch). The tube end shall be cut square and smooth with no chamfers or burrs and the tube axis shall be perpendicular to the surface of the water. Other apparatus may be constructed and the number of bubbles per minute may differ from those shown as long as they correctly indicate the flow in ml per minute.

**If the valve seat diameter differs by more than 2 mm (0.08 inch) from one of the values listed, the leakage rate may be obtained by interpolation assuming that the leakage rate varies as the square of the seat diameter

ASME B 16.34/B16.5 (-29 to +38°C) Max. working & test pressure

Material		Pressure (Barg) by classes							
Group	Item	150	300	400	600	900	1500	2500	4500
1.1 A105 A350 LF2/LF3/LF6 A216 WCB	Working Pressure	19.65	51.02	68.26	102.04	153.06	255.45	425.41	766.01
	Shell Test	31.03	77.57	103.42	153.41	230.97	384.38	639.49	1149.70
	Seat Test	21.72	56.19	75.15	112.38	168.58	280.96	468.15	842.88
1.2, 1.7, 1.9, 1.10, 1.11, 1.13, 1.14 A352 LC2/LC3/LCC A217 WC5/WC6/WC9	Working Pressure	19.99	51.71	68.95	103.42	155.13	258.55	430.92	775.66
	Shell Test	31.03	77.57	103.42	155.13	232.70	387.83	646.38	1163.49
	Seat Test	22.06	56.88	75.84	113.76	170.65	284.41	680.86	853.23
1.3, 1.5 A182 F1 A352 LCB/LC1 A217 WC1	Working Pressure	18.27	47.92	63.78	95.84	144.10	240.08	400.10	720.30
	Shell Test	27.58	72.39	96.53	144.79	217.18	360.25	599.84	1077.31
	Seat Test	20.34	52.74	70.33	105.49	158.23	263.38	438.85	790.14
1.4, 1.8, 1.12 A350 LF1	Working Pressure	16.20	42.75	56.88	85.15	127.55	212.70	354.74	638.45
	Shell Test	25.86	65.50	86.18	129.28	191.33	527.45	532.62	958.37
	Seat Test	17.93	47.23	62.74	93.77	140.31	234.08	390.24	702.58
1.6	Working Pressure	15.51	40.68	54.12	81.01	121.90	203.12	338.60	609.43
	Shell Test	24.13	62.05	82.74	122.38	182.71	305.09	506.76	911.83
	Seat Test	17.24	44.82	59.64	89.29	133.76	222.70	371.28	668.45
2.1, 2.2, 2.4, 2.5 A182 F304/F304H A351 CF8/CF8M/CF8C A182 F316316/H	Working Pressure	18.96	49.64	66.19	99.28	148.93	248.21	413.69	744.63
	Shell Test	29.30	75.84	99.97	149.96	224.08	372.32	620.53	1116.95
	Seat Test	21.03	54.81	73.08	109.28	164.10	273.03	455.05	819.10
2.3 A182 F304L/F317L A182 F316L A351 CF3M/CF3	Working Pressure	15.86	41.37	55.16	82.74	124.11	206.84	344.74	620.53
	Shell Test	24.13	62.05	82.74	124.11	186.16	310.26	517.11	930.79
	Seat Test	17.58	45.51	60.67	91.01	136.52	227.53	379.21	682.58
2.6, 2.7 A182 F310H	Working Pressure	18.96	49.64	61.71	99.28	148.93	248.21	413.69	694.99
	Shell Test	29.30	75.84	93.08	149.96	224.08	372.32	620.53	1116.95
	Seat Test	21.03	54.81	67.91	109.28	164.10	273.38	455.05	819.10

Note : For working pressure ratings at other temperature and material group refer to ASME / ANSI B16.34 - 2009 or B16.5.
Sell hydrostatic test pressure is 1.5 times the 38°C rating rounded off to the next higher 1.7 bar.
High pressure seat hydrostatic test pressure is 1.1 times the 38°C rating rounded off to the next higher 0.35 bar.
All ratings are for " Standard Class " valves.

CASTING / FORGING /BARSTOCK CROSS REFERENCE

DESCRIPTION	UNS GRADE	FORGING	CASTING	BARSTOCK
Carbon steel	K30504	A 105	A216 WCB	A105
Low - temp. carbon	K03011	A350 LF2	A352 LCB	A350 LF2
High - yield steel	K03014	A694 F60	-	A694 F60
3 - 1/2 nickel steel	K32025	A350 LF3	A352 LC3	A350 LF3
5 chrome, 1/2 moly	K41545	A182 F5	A217 C5	A182 F5
1 1/4 chrome, 1/2 moly	K11597	A182 F11	A217 WC6	A739 B11
2 1/4 chrome moly, 1moly	K21590	A182 F22	A217 WC9	A739 B22
9 chrome, 1moly	K90941	A182 F9	A217 WC6	A182 F9
13 chrome	S41000	A182 F6A	A351 CA15	A276 or A479 410
304	S30400	A182 F304	A351 CF8	A276 or A479 304
304 L	S30403	A182 F304L	A351 CF3	A276 or 479 304L
316	S31600	A182 F316	A351 CF8M	A276 or A479 316
316L	S31603	A182 F316L	A351 CF3M	A276 or A479 316L
317L	S31703	A182 F317L	A351 CG8M	A276 or 479 317L
321	S32100	A182 F321	-	A276 or A479 321
347	S34700	A182 F347	A351 CF8C	A276 or A479 347
17-4pH	S17400	A564 630	A564 630	-
Alloy 400	N04400	B564 N04400	A494 M35 - 1	B164 N04400
Alloy K500	N05500	-	-	B865 N05500
Alloy 800	N08800	B564 N08810	-	B408 N08800
Alloy 825	N08825	-	-	B425 N08825
Alloy 600	N06600	B564 N06600	A494 CY40	B166 N06600
Alloy 625	N06625	B564 N06625	A494 CW6MC	B446 N06625
Alloy B2	B10665	B564 N10665	A494 N 12 MV	B335 N10665
Alloy C	N10002	-	A494 CW6M	-
Alloy C22	N06022	B574 N06022	A494 CX2MW	B574 N06022
Alloy C276	N10276	B564 N10276	A494 CW12 MW	B574 N10276
22%duplex	S13803	A182 F51	A890 Gr. 4A	A276 or A479 S31803
25%duplex	S32750 or 32760	A182 F53	A890 Gr. 6A	A276 / 479 A32750 or 60
2545MO	S31254	A182 F44	A351 CK3MCuN	A182 F44
904L	N08904	B625 N08904	-	B649 N08904
Titanium	R50400	B381 F2	B367 C2	B348 Gr.2

BOLT SIZES FOR ANSI 150 TO 1500 CLASS FLANGES

Dimensions (inches) ANSI / ASME 150 - 600 lb

Flange Size	150 lb (1 /16 Raised Face)				300 lb (1 /16" Raised Face)				400 lb (1 /4" Raised Face)				600 lb (19/ 4" Raised Face)			
Nominal Pipe Size (in)	Number of Bolts	Diameter of Bolts (in)	Length of Headed Bolts(in)	Length of Stud Bolts(in)	Number of Bolts	Diameter of Bolts (in)	Length of Headed Bolts(in)	Length of Stud Bolts(in)	Number of Bolts	Diameter of Bolts (in)	Length of Headed Bolts(in)	Length of Stud Bolts(in)	Number of Bolts	Diameter of Bolts (in)	Length of Headed Bolts(in)	Length of Stud Bolts(in)
1/2	4	1/2	1-3/4	2-1/4	4	1/2	2	2-1/4					4	1/2	2-1/2	3
3/4	4	1/2	2	2-1/4	4	5/8	2-1/2	2-3/4					4	5/8	3	3-1/4
1	4	1/2	2	2-1/2	4	5/8	2-1/2	3					4	5/8	3-1/2	3-3/4
1-1/4	4	1/2	2-1/4	2-1/2	4	5/8	2-3/4	3					4	3/4	3-1/2	4
1-1/2	4	1/2	2-1/4	2-3/4	4	3/4	3	3-1/2					8	5/8	3-1/2	4
2	4	5/8	2-3/4	3	8	5/8	3	3-1/4					8	3/4	4	4-1/2
2-1/2	4	5/8	3	3-1/4	8	3/4	3-1/4	3-3/4					8	3/4	4-1/4	4-3/4
3	4	5/8	3	3-1/2	8	3/4	3-1/2	4					8	7/8	4-3/4	5-1/4
3-1/2	8	5/8	3	3-1/2	8	3/4	3-3/4	4-1/4								
4	8	5/8	3	3-1/2	8	3/4	3-3/4	4-1/4	8	7/8	4-3/4	5-1/4	8	7/8	5	5-1/2
5	8	3/4	3-1/4	3-3/4	8	3/4	4	4-1/2	8	7/8	5	5-1/2	8	1	5-3/4	6-1/4
6	8	3/4	3-1/4	3-3/4	12	3/4	4-1/4	4-3/4	12	1	6	6-1/2	12	1	6	6-1/2
8	8	3/4	3-1/2	4	12	7/8	4-3/4	5-1/4	12	1-1/8	6-3/4	7-1/4	12	1-1/8	7	7-1/2
10	12	7/8	3-3/4	4-1/2	16	1	5-1/4	6	16	1-1/4	7-1/4	7-3/4	16	1-1/4	7-3/4	8-1/4
12	12	7/8	4	4-1/2	16	1-1/8	5-3/4	6-1/2	20	1-1/4	7-3/4	8	20	1-1/4	8	8-1/2
14	12	1	4-1/4	5	20	1-1/8	6	6-3/4	20	1-1/2	8	8-1/2	20	1-3/8	8-1/2	9
16	16	1	4-1/2	5-1/4	20	1-1/4	6-1/2	7-1/4	20	1-3/8	8	8-1/4	20	1-1/2	9-1/4	9-3/4
18	16	1-1/8	4-3/4	5-3/4	24	1-1/4	6-3/4	7-1/2	24	1-1/2	9	9-1/2	20	1-5/8	10	10-1/2
20	20	1-1/8	5-1/4	6	24	1-1/4	7	8	24	1-3/4	10	10-1/2	24	1-5/8	10-3/4	11-1/4
24	20	1-1/8	5-3/4	6-3/4	24	1-1/2	7-3/4	9					24	1-7/8	12-1/4	12-3/4

For these sizes 600 lb Flanges are used

BOLT SIZES FOR ANSI 150 TO 1500 CLASS FLANGES

Dimensions (inches) ANSI / ASME 900 - 2500 lb

Flange Size	900 lb (1 /4 Raised Face)				1500 lb (1 /16" Raised Face)				2500 lb (1 /4" Raised Face)			
Nominal Pipe Size (in)	Number of Bolts	Diameter of Bolts (in)	Length of Headed Bolts(in)	Length of Stud Bolts(in)	Number of Bolts	Diameter of Bolts (in)	Length of Headed Bolts(in)	Length of Stud Bolts(in)	Number of Bolts	Diameter of Bolts (in)	Length of Headed Bolts(in)	Length of Stud Bolts(in)
1/2	For these sizes 600 lb Flanges are used				4	3/4	3-1/2	4	4	3/4	4-1/4	4-3/4
3/4					4	3/4	3-3/4	4-1/4	4	3/4	4-1/4	4-3/4
1					4	7/8	4-1/4	4-3/4	4	7/8	4-3/4	5-1/4
1-1/4					4	7/8	4-3/4	4-3/4	4	1	5-1/4	5-3/4
1-1/2					4	1	5	5-1/4	4	1-1/8	6	6-1/2
2					8	7/8	5-1/2	5-1/2	8	1	6-1/4	6-3/4
2-1/2					8	1	6-1/4	6	8	1-1/8	7	7-1/2
3	8	7/8	5	5-1/2	8	1-1/8	-	6-1/4	8	1-1/4	8	8-1/2
3-1/2	-	-	-	-	-	-	7	-	-	-	-	-
4	8	1-1/8	6	6-1/2	8	1-1/4	9	7-1/2	8	1-1/2	9-1/4	9-3/4
5	8	1-1/4	6-3/4	7-1/4	8	1-1/2	9-1/2	9-1/2	8	1-3/4	11	11-1/2
6	12	1-1/8	7	7-1/2	12	1-3/8	10-3/4	10	8	2	13	13-1/2
8	12	1-3/8	8	8-1/2	12	1-5/8	12-3/4	11-1/4	12	2	14-1/2	15
10	16	1-3/8	8-1/2	9	12	1-7/8	14-1/4	13-1/4	12	2-1/2	18-1/2	19
12	20	1-3/8	9-1/4	9-3/4	16	2	15-1/2	14-3/4	12	2-1/2	20-1/2	21
14	20	1-1/2	10	10-1/2	16	2-1/4	17	16				
16	20	1-5/8	10-1/2	11	16	2-1/2	18-3/4	17-1/2				
18	20	1-7/8	12-1/4	12-3/4	16	2-3/4	20-1/2	19-1/4				
20	20	2	13	13-1/2	16	3	23-1/2	21				
24	20	2-1/2	16-1/2	17	16	3-1/2	5-3/4	24				

Specifications to A193, B7, L7, B16 & B8M A194, 2H, G4 & G8M Stainless Steel SS316 and SS304 Grade 5 & Grade 8-8, A325 High Tensile & M.S.
Types: - Stud-Bolts, Hex Nut, HHMB.

Clients

Petro Sazeh Mihan (PSM.Co) as a designer and manufacturer of various types of control valves, has had many collaborating with great industries such as oil, gas, petrochemical, power plants and other related companies. These collaborations are including a wide range of reverse engineering, manufacturing, reconstruction, designing, coating, repairment and standard tests for different types of valves besides of consulting services in the field of selection and troubleshooting of control valves.
Hence, the company is registered on the list of certified suppliers by the Ministry of Petroleum (AVL) and the vendor list of the most petrochemicals, refineries, other great industries

Some of companies which PSM.Co have the cooperation with them :

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شرکت انتقال گاز ایران
جمهوری اسلامی ایران وزارت نفت
شرکت حفاری شمال
شرکت ملی صنایع پتروشیمی
شرکت پالایش نفت تهران
شرکت نفت فلات قاره ایران
شرکت پالایش نفت اصفهان
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شرکت نفت و گاز گچساران
شرکت پتروشیمی ارستان
ماشین سازی اراک
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شرکت پتروشیمی فن اوران
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شرکت پتروشیمی بوشهر
شرکت پارس فنل
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شرکت پتروشیمی مروارید
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شرکت پتروشیمی ایلام
شرکت پتروشیمی آبادان
شرکت گروه گسترش نفت و گاز پارسیان
شرکت پتروشیمی لاله
شرکت پتروشیمی مبین
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شرکت پالایش نفت لاوان
شرکت پالایشگاه گاز ایلام
شرکت نفت و گاز پارس
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شرکت پالایش نفت امام خمینی(ره) شازند
شرکت ملی پالایش و پخش فرآورده های نفتی ایران
شرکت مناطق نفت خیز جنوب
شرکت نفت مناطق مرکزی ایران
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شرکت خطوط لوله و مخابرات استان مرکزی
شرکت پالایش نفت شازند
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