TechVal
Control Systems

"COMMITTED TO
QUALITY"

Manufacturers of :
Forged Steel Valve | Gate Valve | Globe Valve | Check Valve | Ball Valve | Piston Valve | Bellow Seal Valve

Index

Our Product Range

CLASS	SIZES										
	Dn15	Dn20	Dn25	Dn32	Dn40	Dn50	Dn65	Dn80	Dn100	Dn150	Dn200
Forge Steel #800 (Screwed/Socket Weld)	✓	✓	✓	✓	✓						
Cast Steel #150 (Flanged)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Cast Steel #300 (Flanged)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

Forged Steel Piston Valve

Technical Specification

Design Standard	B16.34/EN12516.2
Testing Standard	API 598
Face to Face Standard	Manufacture's Standard
Socket Weld Standard	ASME B16.11
Screwed End Standard	ASME B1.20.1
Butt Weld Standard	ASME B16.25
Flange End Standard	ASME B16.5

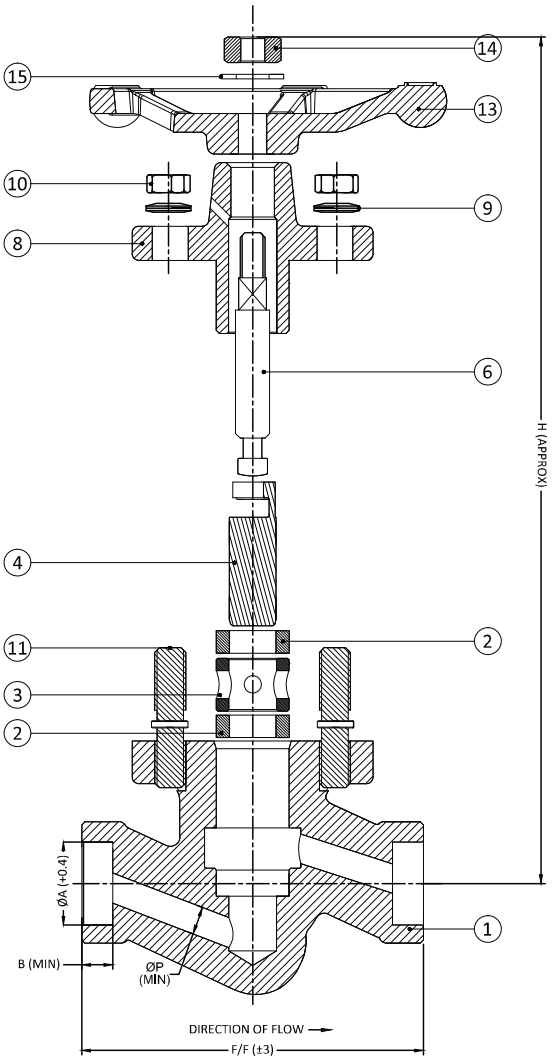
Dimension Table

800#	15mm (1/2")	20mm (3/4")	25mm (1")	40mm (1-1/2")
F/F (mm)	110	110	126	165
Øp (mm)	9	12	17	28
H OPEN (mm)	130	130	171	235
H CLOSE (mm)	105	105	137	191
ØWh (mm)	86	86	116	150
B (mm)	9.5	12.5	12.5	12.5
ØA (mm)	21.8	27.2	33.9	48.8
Approx Weight (Kg)	1.9	1.9	4	5.3

Design Feature

> GM Piston Valve is basically Seatless and Glandless Valve and by virtue of its design can replace both, the conventional type of Gate & Globe valves, with distinct advantages over them.

> Piston Valve works on the principle of Resilient rings in conjunction with a Metallic Stainless Steel Piston, that moves vertically between the rings, giving a Seal that is both effective as well as Durable. This sealing system gives a bubble tight shut off.



Maximum Hydrostatic Testing Pressure

Pressure Rating for 800#	
Hydro Test Pressure (Body) kg/cm²	209
Pneumatic Test Pressure kg/cm²	7

Material of Construction

15	NAME PLATE	STAINLESS STEEL	STAINLESS STEEL	STAINLESS STEEL
14	HANDWHEEL NUT	ASTM A 194 GR. 2H	ASTM A 194 GR. B8	ASTM A 194 GR. B8M
13	HAND WHEEL	MI / SGIRON	MI / SGIRON	MI / SGIRON
12	HANDWHEEL WASHER	MS	MS	MS
11	STUD	ASTM A 193 GR. B7	ASTM A 193 GR. B8	ASTM A 193 GR. B8M
10	NUT	ASTM A 194 GR. 2H	ASTM A 194 GR. B8	ASTM A 194 GR. B8M
9	BELLEVILLE WASHER	50CR V4/ASTM240 Gr.302	50CR V4/ASTM240 Gr.302	50CR V4/ASTM240 Gr.302
8	BONNET	ASTM A 105	ASTM A 182 GR. F-304	ASTM A 182 GR. F-316
7	SPLIT NUT	BRASS IS319 GR.1	BRASS IS319 GR.1	BRASS IS319 GR.1
6	SPINDLE	ASTM A 276 TYPE SS 410	ASTM A 276 TYPE SS 304	ASTM A 276 TYPE SS 316
5	SPLIT NUT WASHER	BRASS	BRASS	BRASS
4	PISTON	ASTM A 276 TYPE SS 410	ASTM A 276 TYPE SS 304	ASTM A 276 TYPE SS 316
3	LANTERN BUSH	ASTM A 276 TYPE SS 410	ASTM A 276 TYPE SS 304	ASTM A 276 TYPE SS 316
2	SEALING RING	GRAPHITE WITH SS304 REINFORCED	GRAPHITE WITH SS304 REINFORCED	GRAPHITE WITH SS304 REINFORCED
1	BODY	ASTM A 105	ASTM A 182 GR. F-304	ASTM A 182 GR. F-316
	DESCRIPTION	**MATERIAL**	**MATERIAL**	**MATERIAL**
		MOC A105	MOC F-304	MOC F-316

*Note : Alloy Steel, Stainless Steel, Duplex, Super Duplex is also available on request.

Cast Steel Piston Valve

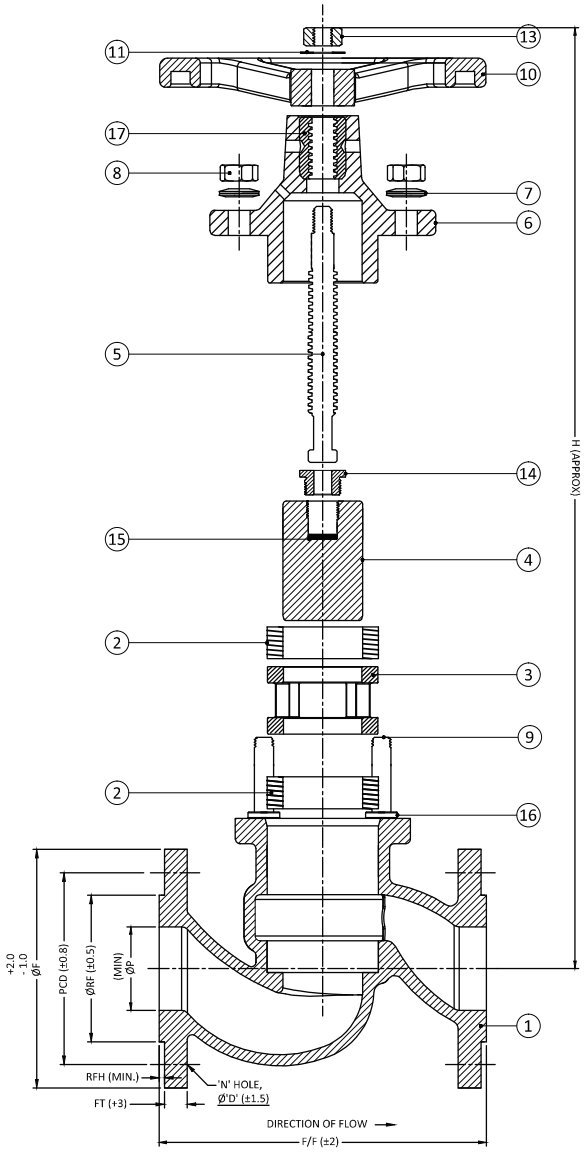
Technical Specification

Design Standard	B16.34/EN12516.2
Testing Standard	API 598
Face to Face Standard	ASME B 16.10
Flange End Standard	ASME B 16.5

Material of Construction

17	THREADED BUSH	BRASS IS319 GR.1	NA	NA	NA	1
16	GAP RING	ASTM A 276 TYPE SS 410	NA	NA	NA	4
15	SPLIT NUT WASHER	BRASS	NA	NA	1	1
14	SPLIT NUT	BRASS IS319 GR.1	NA	NA	1	1
13	HANDWHEEL NUT	ASTM A 194 GR. 2H	1	1	1	1
12	HANDWHEEL WASHER	MS	1	1	1	1
11	NAME PLATE	STAINLESS STEEL	1	1	1	1
10	HAND WHEEL	MI / SGIRON	1	1	1	1
9	STUD	ASTM A 193 GR. B7	2	4	4	4
8	NUT	ASTM A 194 GR. 2H	2	4	4	4
7	BELLEVILLE WASHER	50CR V4/ASTM240 Gr.302	4	8	8	8
6	BONNET	ASTM A 105	1	1	1	1
5	SPINDLE	ASTM A 276 TYPE SS 410	1	1	1	1
4	PISTON	ASTM A 276 TYPE SS 410	1	1	1	1
3	LANTERN BUSH	ASTM A 276 TYPE SS 410	1	1	1	1
2	SEALING RING	GRAPHITE WITH SS304 REINFORCED	2	2	2	2
1	BODY	ASTM A 216 GR. WCB	1	1	1	1
	DESCRIPTION	**MATERIAL**	**15-20 mm**	**25 mm**	**40 mm**	**50 mm**

*Note : Alloy Steel, Stainless Steel, Duplex, Super Duplex is also available on request.



Maximum Operating Testing Pressure

Pressure Rating	150#	300#
Hydro Test Pressure (Body) kg/cm²	32	78
Hydro Test Pressure (Seat) kg/cm²	22	56
Pneumatic Test Pressure kg/cm²	7	7

CLASS	150#					300#				
DIMENSION	15mm (1/2")	20mm (3/4")	25mm (1")	40mm (1-1/2")	50mm (2")	15mm (1/2")	20mm (3/4")	25mm (1")	40mm (1-1/2")	50mm (2")
F/F (mm)	108	117	127	165	203	152	178	203	229	267
ØP (mm)	15.7	20.9	25.0	40.0	50.0	15.7	20.9	25.0	40.0	50.0
H OPEN (mm)	127	127	176	240	270	127	127	176	240	270
H CLOSE (mm)	104	104	142	193	223	104	104	142	193	223
ØF (mm)	90	100	110	120	150	95	115	125	155	165
ØRF (mm)	34.9	42.9	50.8	73.0	92.1	34.9	42.9	50.8	73.0	92.1
FT (mm)	9.6	11.2	12.7	12.7	14.3	12.7	14.3	15.9	19.1	20.7
RFH (mm)	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7
PCD (mm)	60.3	69.9	79.4	98.4	120.7	66.7	82.6	88.9	114.3	127.0
N	4	4	4	4	4	4	4	4	4	8
ØWH (mm)	86	86	116	150	200	86	86	116	150	200
ØD (mm)	15.9	15.9	15.9	15.9	19.0	15.9	19.0	19.0	22.2	19.0
WEIGHT APPROX (Kg)	1.6	1.9	3.1	6.7	10.5	1.9	2.6	4.7	8.7	12.2

Cast Steel Piston Valve

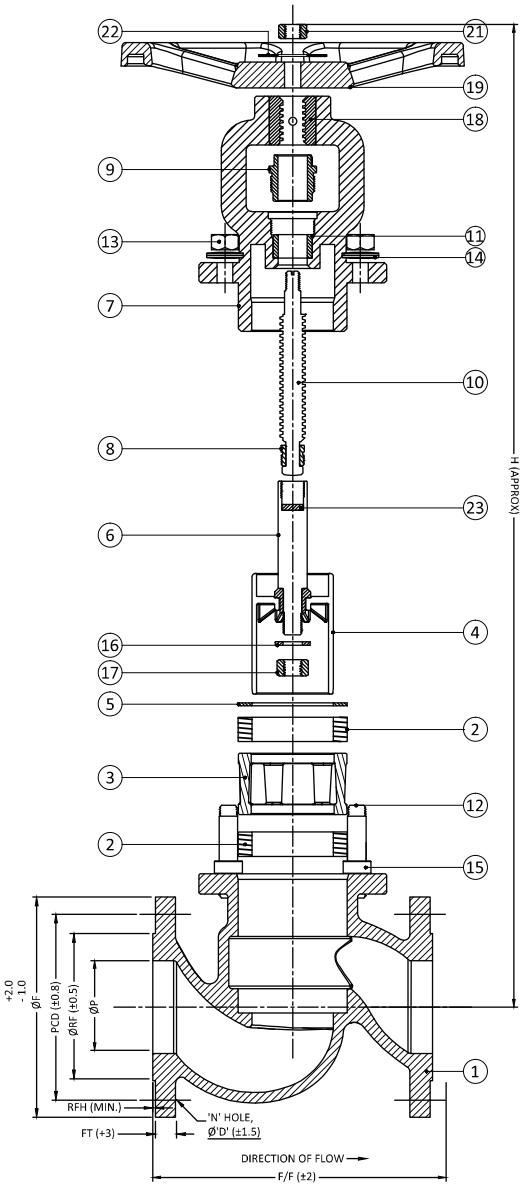
Technical Specification

Design Standard	B16.34/EN12516.2
Testing Standard	API 598
Face to Face Standard	ASME B 16.10
Flange End Standard	ASME B 16.5

Material of Construction

23	THRUST PLATE	ASTM A 276 TYPE SS 410	1	1	1	1
22	NAME PLATE	STAINLESS STEEL	1	1	1	1
21	HANDWHEEL NUT	ASTM A 194 GR. 2H	1	1	1	1
20	HANDWHEEL WASHER	MS	1	1	1	1
19	HANDWHEEL	MI / SGIRON	1	1	1	1
18	YOKE	BRONZE	1	1	1	1
17	SPINDLE NUT	ASTM A 194 GR. 2H	1	1	1	1
16	FLAT WASHER	ASTM A 276 TYPE SS 410	1	1	1	1
15	GAP RING	ASTM A 276 TYPE SS 410	3	4	4	4
14	BELLEVILLE WASHER	50CR V4/ASTM240 Gr.302	12	16	16	16
13	NUT	ASTM A 194 GR. 2H	6	8	8	8
12	STUD	ASTM A 193 GR. B7	6	8	8	8
11	STEM SEAL RING	GRAPHITE WITH SS304 REINFORCED	1	1	1	1
10	STEM	ASTM A 276 TYPE SS 410	1	1	1	1
9	GLAND NUT	ASTM A 276 TYPE SS 410	1	1	1	1
8	SPLIT NUT	BRASS IS319 GR.1	1	1	1	1
7	BONNET	ASTM A 105/ASTM A 216 GR. WCB	1	1	1	1
6	SPINDLE	ASTM A 276 TYPE SS 410	1	1	1	1
5	BONNET SEALING RING	GRAPHITE	1	1	1	1
4	PISTON	ASTM A 216 GR. WCB	1	1	1	1
3	LANTERN BUSH	ASTM A 276 TYPE SS 410	1	1	1	1
2	SEALING RING	GRAPHITE WITH SS304 REINFORCED	2	2	2	2
1	BODY	ASTM A 216 GR. WCB	1	1	1	1
	DESCRIPTION	**MATERIAL**	**80mm**	**100mm**	**150mm**	**200mm**

*Note : Alloy Steel, Stainless Steel, Duplex, Super Duplex is also available on request.



Maximum Operating Testing Pressure

Pressure Rating	150#	300#
Hydro Test Pressure (Body) kg/cm²	32	78
Hydro Test Pressure (Seat) kg/cm²	22	56
Pneumatic Test Pressure kg/cm²	7	7

CLASS	150#				300#		
DIMENSION	80mm (3")	100mm (4")	150mm (6")	200mm (8")	80mm (3")	100mm (4")	150mm (6")
F/F (mm)	241	292	406	495	318	356	444
ØP (mm)	80	100	152	200	80	100	152
H OPEN (mm)	400	510	615	720	400	510	615
H CLOSE (mm)	330	420	495	575	330	420	495
ØF (mm)	190	230	280	245	210	255	320
ØRF (mm)	127.0	157.2	215.9	269.9	127.0	157.2	215.9
FT (mm)	17.5	22.3	23.9	27.0	27.0	30.2	35.0
RFH (mm)	1.7	1.7	1.7	1.7	1.7	1.7	1.7
PCD (mm)	152.4	190.5	241.3	298.5	168.3	200.0	269.9
N	4	8	8	8	8	8	12
ØWH (mm)	300	300	350	400	300	300	350
ØD (mm)	19.0	19.0	22.2	22.3	19.0	19.0	22.2
WEIGHT APPROX (Kg)	21.0	35.5	56.7	110.4	25.2	40.7	68.7

Material Information

Material Group	Common Name	Nominal Type	UNS	Forging Spec.	Casting Spec. Equivalent	DIN	DIN W. No	Application Notes
Carbon Steel	CS	C-Mn-Fe	K03504	A105N	A216-WCB	C22.8 DIN 17243	1.0460	General non-corrosive service from -20F(-29C) to 800F(427C)
Low Temperature Carbon Steel	LTCS	C-Mn-Fe	K03011	A350-LF2	A352-LCA A352-LCB A352-LCC	TSTE 355 DIN 18103	1.0566	General non-corrosive service from -50F (-46C) to 650F(340C), LF2 to 800F(427C).
Low Temperature Alloy Steel	Nickel Steel	3.1/2Ni	K32025	A350-LF3	A352-LC3	10Ni14	1.5637	-150F(-101C) to 650F(340C)
Low Alloy Steel	Moly Steel	C-1/2Mo	K12822	A182-F1	A217-WC1	15MO3	1.5415	Up to 875F (468C)
	Alloy Steel Chrome Moly	1.1/4Cr-1/2Mo	K11572	A182-F11 cl2	A217-WC6	13CRMO44	1.7335	Up to 1100F (593C)
		2.1/4Cr-1Mo	K21590	A182-F22 cl3	A217-WC9	10CRMO910	1.7380	Up to 1100F(593C), HP steam
		5Cr-1/2Mo	K41545	A182-F5	A217-C5	12CRMO195	1.7362	High temp refinery service
		9Cr-1Mo	K90941	A182-F9	A217-C12	X 12 CrMo 9 1	1.7386	High temp erosive refinery service
		9Cr-1Mo-V		A182-F91	A217-C12A	X 10 CrMoVNb 9 1	1.4903	High pressure steam
Stainless Steel	Austenitic S.Steel 300 series S.Steel	304 : 18Cr-8Ni	S30400	A182-F304	A351-CF8	DIN X5CrNi 18 9	1.4301	0.04% min. carbon for temp.>1000F(538C)
		304L : 18Cr-8Ni	S30403	A182-F304L	A351-CF3	X 2 CrNi 19 11	1.4306	Up to 800F(427C)
		304H :	S30409	A182-F304H	A351-CF10	n/a	n/a	
		316 : 16Cr-12Ni-2Mo	S31600	A182-F316	A351-CF8M	DIN X5CrNiMo 18 10	1.4401	0.04% min. carbon for temp.>1000F(538C)
		316L : 16Cr-12Ni-2Mo	S31603	A182-F316L	A351-CF3M	X 5 CrNiMo 17 12 2	1.4404	Up to 800F(427C)
		316H :	S31609	A182-F316H	A351-CF10M	n/a	n/a	
		316Ti:	S31635	A182-F316Ti		X 6 CrNiMoTi 17 12 2	1.4571	0.04% min. carbon (grade F321H) and heat treat at 2000F(1100C) for service temps.>1000F(538C)
		321: 18Cr-10Ni-Ti	S32100	A182-F321		X 6 CrNiTi 18 10	1.4541	
		321H	S32109	A182-F321H		n/a	n/a	
		347: 18Cr-10Ni-Cb(Nb)	S34700	A182-F347	A351-CF8C	DIN 8556	1.4550	0.04% min. carbon (grade F347H) and heat treat at 2000F(1100C) for service temps.>1000F(538C)
		347H	S34709	A182-F347H	A351-CF8A	n/a	n/a	
		317L	S31703	A182-F317L	A351-CG3M	X2CrNiMo18-16-4	1.4438	
	Alloy 20	28Ni-19Cr-Cu-Mo	N08020	A182-F20	A351-CN7M	DIN 1.4500	2.4660	service to 600F(316C)
	Duplex 2205	22Cr-5Ni-3Mo-N	S31803 S32205	A182-F51	A890-J92205	X2CrNiMON22-5-3 DIN 10088-1 (95)	1.4462	service to 600F(316C) -The original S31803 UNS designation has been supplemented by S32205 which has higher minimum N, Cr, and Mo.
	Super Duplex 2507	25Cr-7Ni-4Mo-N	S32750	A182-F53	A351-CD4MCu A890 5A	X2CrNiMoN25-7-4 DIN 10088-1 (95)	1.4501	service to 600F(316C)
	Super Duplex F55	25Cr-7Ni-3.5Mo-N-Cu-W	S32760	A182 F55	CD3MWCuN			Service to 600F
	Super Austenitic 6Mo	20Cr-18Ni-6Mo	S31254	A182-F44	A351-CK3MCuN	X1CrNiMoCuN20-18-7 DIN 10088-1 (95)	1.4547	service to 600F(316C)
Nickel-Iron Alloy	Incoloy 800	33Ni-42Fe-21Cr	N08800	B564-N08800		X10NiCrAlTi32-20	1.4876	service to 1000F(538C)
	Incoloy 825	42Ni-21.5Cr-3Mo-2.3Cu	N08825	B564-N08825	A494-CU5MCuC	DIN 17744	2.4858	service to 600F(316C) for N02200, 1200F(648C) for N02201
Nickel	Nickel	99/95Ni	N02200	B160-N02200 (bar)	A494-CZ-100	NW2200	1.7740	
Nickel-Copper	Monel 400	67Ni-30Cu	N04400	B564-N04400	A494-M35-1	DIN 17730	2.4360	
	Monel 500		N05500	B564-N05500			2.4375	
Nickel-Alloy	904L		N08904	904L	n/a	Z2 NCDU 25-20	1.4539	
Nickel Superalloys	Inconel 600	72Ni-15Cr-8Fe	N06600	B564-N06600	A494-CY40	DIN 17742	2.4816	
	Inconel 625	60Ni-22Cr-9Mo-3.5Cb	N06625	B564-N06625*	A494-CW-6MC		2.4856	*Difficult to forge in close dye
	Hastelloy C-276	54Ni-15Cr-16Mo	N10276	B564-N10276*	A494-CW-2M	NiMo 16 Cr 15 W	2.4819	*Difficult to forge in close dye
Titanium	Titanium	98Ti	R50400	B381-Gr2	B367-C2	Ti 2	3.7035	

Maximum & Minimum Operating Pressure & Temperature

Forged Steel #800 (Screwed/ Socket weld)	Maximum Operating Pressure	136.2 bar
	Maximum Operating Temperature	425° C
	Maximum Hydraulic Test Pressure	209 bar
Cast Steel #150 (Flanged)	Maximum Operating Pressure	19.6 bar
	Maximum Operating Temperature	425° C
	Maximum Hydraulic Test Pressure	32 bar
Cast Steel #300 (Flanged)	Maximum Operating Pressure	51.1 bar
	Maximum Operating Temperature	425° C
	Maximum Hydraulic Test Pressure	78 bar

Piston Valve Usage & Features :

DESCRIPTION :

The Mechseal piston valve (MSV) is a linear movement valve in which a stainless steel piston travels between the upper and lower seal ring. These rings are separated by a lantern bushing, which supports the piston and creates a bubble tight seal. Known for their extraordinary performance and long life, piston valves can handle a variety of media such as steam, thermic fluid, condensate and many other liquids and gasses. They can be used in on/off and throttling application.
Mechseal valve offers glandless piston valve for reliable long-term performance in steam, condensate as well as process lines. The versatile valve can be used for both isolation and throttling application.

INSTALLATION :

The valve should be installed in the direction of flow indicated on the body. The valve can be installed in any plane, except with the hand wheel on the lower side.
Sealing is affected by the linear motion of the piston, between upper and lower valve rings- when the piston engages with the lower ring, the valve closes, and when the piston aligns with the upper ring, the valve opens. Further, the piston is conjunction with the upper ring prevent leakage to atmosphere.

FEATURE :

- Bubble tight (ANSI leakage class VI)
- Reinforced sealing rings and Belleville washer-compensates for thermal expansion, reliability.
- Sealing not affected by the presence of dirt or any other impurities in the media
- Other serviceable – sealing rings can be replaced without removing the valve from line.
- Can be used for throttling applications
- Robust and maintenance free
- No erosion of sealing surface
- Long service life
- Effective sealing area is large, as compared to the conventional linear movement of valves
- Can be easily serviced inline
- Easy to repair: The only wearing parts are sealing rings which are easily replaceable
- Low cost of ownership
  (Cost of ownership included maintenance, inventory cost in addition to the purchase cost)

MAINTENACE :

In case any leakage is observed the bonnet nuts should be tightened with the valve in the fully closed position. Tightened the bonnet nuts may be repeated as and when required until the rings are worn out and no further adjustment or tightening is possible. At this stage the sealing rings need to be replaced.
No under force should be used when tightening the nuts, as they should rotate easily with a standard spanner. Care should be taken while tightening the nuts to avoid tilting of the bonnet. Undue force should not be used to shut the valve as this may damage the spindle or the wheel.

1) To stop stem leakage :

I) In piston valve, the bonnet must be tightened down to prevent stem gland seal & lower seat leakage. Applying the recommended torque to nut will ensure any steam leaks are avoided.
II) The piston valve is designed for either bonnet assembly replacement which includes all the necessary internal parts, or simple in-line replacement of the upper and lower sealing rings.
III) The valve spindle should be checked at regular interval to ensure adequate grease is present to ensure efficient valve operation.
IV) When piston valve fitted on high temperature application or where server weather condition prevails, the grease should be checked more rapidly.

2) To Replace Sealing Rings & Piston

I) Close the piston valve.
II) Remove the bonnet nuts and washer
III) Withdraw the bonnet complete with spindle and piston
IV) Remove the upper sealing rings, lantern bush and lower sealing ring
V) Ensure the inside surface & sealing ring's sitting surface of the valve are clean
VI) Fit the new lower sealing ring , lantern bush (if available) and upper sealing ring
VII) Refit the bonnet complete with spindle and piston and tighten nuts to the recommended torque.

Comparison Between Bellow Seal, Piston & Traditional Valves

	Bellow Seal Valve	Piston Valve	Conventional Valve
Stem Seal	Metallic Bellow Gland Packing	Sealing Ring	Gland Packing
Steam Leakage	Not Possible Since Metallic Bellow are designed to several thousands cycle	Not Possible till the ring wear out	Very Common Due to friction between stem & gland
Equipment Downtime	Nil	Low for replacing ring	Very High for replacing gland packing
Safety	Can be used safely for almost any media	Cab ne used for limited media steam, hot water	Highly unsafe when the media is poisonous/hazardous
Valve Life	Very High in Years	High compared to Conventinal Valve	Very low due to leakage through gland occur in some month

TechVal
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