

Piston Valves

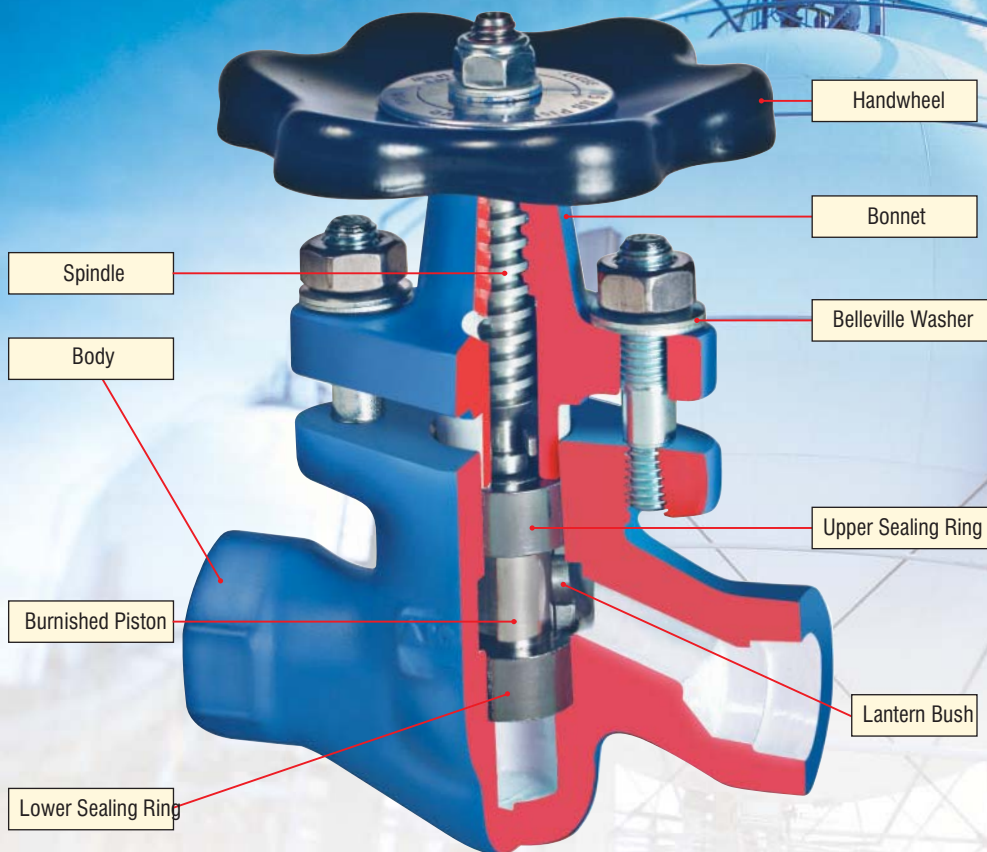
Zero leakage Valves



Superior features:

- ▶ Burnished Piston and metal reinforced graphite sealing rings
- ▶ Class VI shutoff i.e. bubble tight shut off
- ▶ Minimum inventory of spares
- ▶ Low co-efficient of friction and low operating torque
- ▶ TUV certified ISO 9001 company
- ▶ C R N Approved CRN No. 0C112885,0C1128852
- ▶ P E D Approved Certificate No. 07 202 1423 Z 0175/7/Din
- ▶ Applications - Steam, Heat Transfer Fluid, Superheated Steam, L.P.G., Ammonia, Compressed Air

Specialists in Process Efficiency and Energy Conservation



15NB, 20NB, 25NB, 32NB, 40NB (1/2", 3/4", 1", 1 1/4", 1 1/2")

Description

Forged steel Piston Valves provide perfect tightness and durability on different media such as steam, superheated steam, heat transfer fluid, ammonia, L.P.G., compressed air etc.

Size and Pipe Connections

15NB, 20NB, 25NB, 32NB, 40NB
1/2", 3/4", 1", 1 1/4", 1 1/2"
Screwed BSPT/NPT ends.
Socket weld ends.

Limiting Conditions

For (15,20,25,32&40NB) / (1/2", 3/4", 1", 1 1/4" & 1 1/2") socket weld ends.
Maximum operating pressure : 78 bar g (1131 psig)
Maximum operating temperature : 425°C (797°F)
Maximum hydraulic test pressure : 156 bar g (2262 psig)

For (15,20,25 NB) / (1/2", 3/4", & 1") screwed ends.

Maximum operating pressure : 78 bar g (1131 psig)
Maximum operating temperature : 425°C (797°F)
Maximum hydraulic test pressure : 83 bar g (913 psig)

For (32,40 NB) / (1 1/4" & 1 1/2") screwed ends

Maximum operating pressure : 41.5 bar g (602psig)
Maximum operating temperature : 425°C (797°F)
Maximum hydraulic test pressure : 83.0 bar g (1203 psig)

50NB, 65NB, 80NB, 100NB, 125 NB, 150NB, 200NB (2", 2 1/2", 3", 4", 5", 6", 8")

Description

Cast steel Piston Valves provide perfect tightness and durability on different media such as steam, superheated steam, heat transfer fluid, ammonia, L.P.G., compressed air etc.

Size and Pipe Connections

50NB, 65NB, 80NB, 100NB, 125NB, 150NB, 200NB
2", 2 1/2", 3", 4", 5", 6", 8"
Flange type : ANSI 150 / ANSI 300

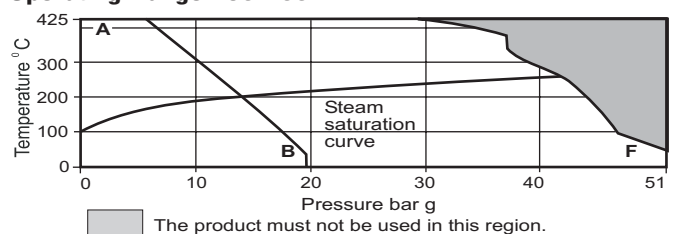
For ANSI 150

Maximum allowable pressure : 19.6 bar g (284 psig) @ 38°C (100°F)
Maximum operating pressure : 14 bar g (203 psig) @ 197°C (387°F)
Maximum operating temperature : 425°C (797°F) @ 5.5 bar g (80 psig)
Maximum hydraulic test pressure : 28 bar g (406 psig)

For ANSI 300

Maximum allowable pressure : 51 bar g (740 psig) @ 38°C (100°F)
Maximum operating pressure : 41.5 bar g (602 psig) @ 253°C (487°F)
Maximum operating temperature : 425°C (797°F) @ 28.8 bar g (418 psig)
Maximum hydraulic test pressure : 83 bar g (1203.5 psig)

Operating Range : 50-200 NB



A — B Flanged ANSI 150

A — F Flanged ANSI 300

Leakage is out, The Piston Valve is in

What is a Piston Valve?

The Piston Valve is a seatless and glandless valve. At the heart of the Piston Valve are the Piston and Sealing Rings. A burnished piston seals against metal reinforced graphite rings to achieve leak proof shutoff. This unique design ensures, long life even at high temperatures - upto 425° C.

Features:

- ▶ Larger effective sealing area - 600% more than Globe Valve;
- ▶ Zero leakage assured across the gland and the seat

- ▶ Durability - piston unexposed to media
- ▶ Absence of gland and valve key
- ▶ The only scrap free valve
- ▶ Fire proof
- ▶ Maintenance friendly
- ▶ Self cleaning
- ▶ Self lubricating

Valve Leakage — Two Kinds

Leakage to Atmosphere

Leakage happens in all Gate / Globe and Ball Valves. This leakage to atmosphere is also called leakage through gland.

Leakage is visible. The loss of product / energy and steam through these leaks are visible to the human eye and is easy to quantify.

The good part is that solutions are available to counter gland leakage.

Solution

Conventional solution — Bellow Sealed Valve

Smart solution — Piston Valve

Comparison with Bellow Sealed Valve

Bellow sealed valves have formed/welded bellows instead of a gland. Bellows puncture over a period of usage — very much like the bellows in mechanical seals.

Piston Valve is a Glandless Valve. A burnished piston seals against metal reinforced graphite rings. Ensures zero leakage and long life.

In Line Leakage

In line also known as seat leakage — It happens in all metal seated valves by design (metal seated valves confirm to Class 2 / Class 4 leakage)

Soft seated valves also suffer from this over a period of time.

This loss however is not visible and is hard to quantify. You actually DO NOT SEE how much is leaking!!

But Yes ! There is a solution — the Piston Valve.

It is seatless as well. Leakage Class 6 — Bubble tight shut off.

Performance Parameters of Different Types of Isolation Valves

Type of Valve Parameter	Gate	Ball	Globe	FM Piston Valve
Size of effective sealing area	High	Very High	Low	Very High
Replace gland seal	Y	Y	Y	Y**
Replace internals	Y	Y	N/Y	Y**
Replace seat	N	Y	N/Y*	Y**
Leakage	High	Low	Medium	NIL
Purchase cost	Low	Medium/High	Medium/High	High
Cost of ownership over 5 to 10 years	High	Medium	High	Low

* Valve to be removed from line. ** Can be done inline (Valve need not be removed)

Energy audits of steam systems done at various sites have revealed that valve leakage is a serious concern in the industry. In a typical 5 year old plant, over 30% of the isolation valves leak.

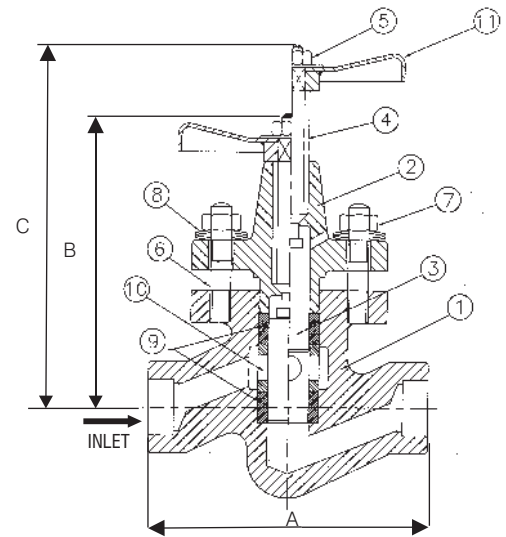
Cost of Ownership covers not only the purchase cost, but the cost of maintaining inventory of spare valves, spare packings / sealings & seats, replacement, leakage and manpower costs..

PISTON VALVES HAVE THE LEAST COST OF OWNERSHIP

Material: 15 - 25 NB (1/2" - 1") Piston Valves

No.	Part	Material	
1	Body	Forged Carbon Steel	ASTM A 105
2	Bonnet	Forged Carbon Steel	ASTM A 105
3	Piston	Stainless Steel	ASTM A 276 Type 304
4	Spindle	Stainless Steel	ASTM A 276 Type 410
5	Nyloc Nut	Carbon Steel	Carbon Steel
6	Stud	Carbon Steel	ASTM A 193 Gr. B7
7	Nut	Carbon Steel	ASTM A 194 Gr. 2H
8	B. Washer	Spring Steel	50Cr V4
9	Sealing Rings	S/S Reinforced Graphite	S/S Reinforced Graphite
10	Spacer	Stainless Steel	ASTM A 276 Type 410
11	Handwheel	Sheet Metal	Sheet Metal

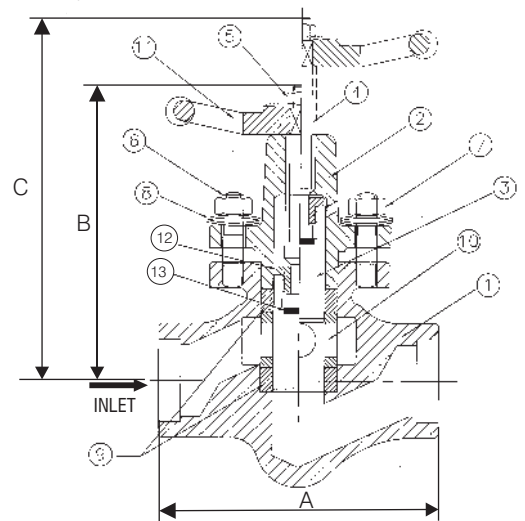
Sectional View



15-25 NB Piston Valve
Always open and close Valve fully
Do not use Valve Key

Material: 32 - 40 NB (1 1/4" - 1 1/2") Piston Valves

No.	Part	Material	
1	Body	Forged Carbon Steel	ASTM A 105
2	Bonnet	Forged Carbon Steel	ASTM A 105
3	Piston	Stainless Steel	ASTM A 276 Type 304
4	Spindle	Stainless Steel	ASTM A 276 Type 410
5	Nyloc Nut	Carbon Steel	Carbon Steel
6	Stud	Carbon Steel	ASTM A 193 Gr. B7
7	Nut	Carbon Steel	ASTM A 194 Gr. 2H
8	B. Washer	Spring Steel	50Cr V4
9	Sealing Rings	S/S Reinforced Graphite	S/S Reinforced Graphite
10	Spacer	Stainless Steel	ASTM A 276 Type 410
11	Handwheel	SG Iron	SG Iron
12	Split Nut	Brass	Brass
13	Thrust Plate	Stainless Steel	ASTM A 276 Type 420

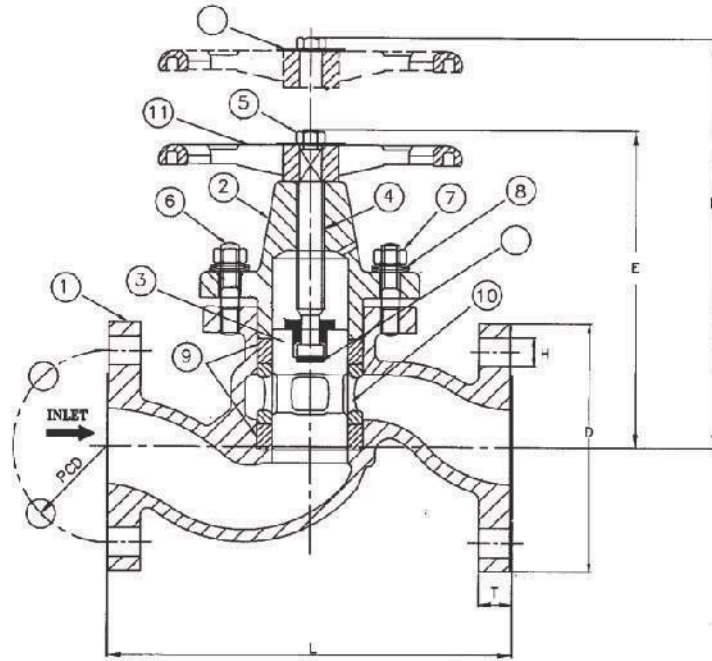


32-40 NB Piston Valve
Always open and close Valve fully
Do not use Valve Key

Dimensions: In mm/inches (approximate)

SIZES		END CONNECTION	A		B		C		Approx.Net Weight	
MM	IN		MM	IN	MM	IN	MM	IN	Kg	Lbs
15NB	1/2"	SC/SW	110	4.33	118	4.65	146	5.75	2	4.41
20NB	3/4"	SC/SW	110	4.33	118	4.65	146	5.75	2	4.41
25NB	1"	SC/SW	126	4.96	133	5.24	165	6.50	3.5	7.7
32NB	1 1/4"	SC/SW	165	6.50	175	6.89	215	8.46	8	17.64
40NB	1 1/2"	SC/SW	165	6.50	175	6.89	215	8.46	8	17.64

Due to continuous development of our products, we reserve the right to modify our product design or construction without prior notice.



50 NB Piston Valve
Always open and close Valve fully. Do not use Valve key

Material : 50 NB (2") Piston Valve

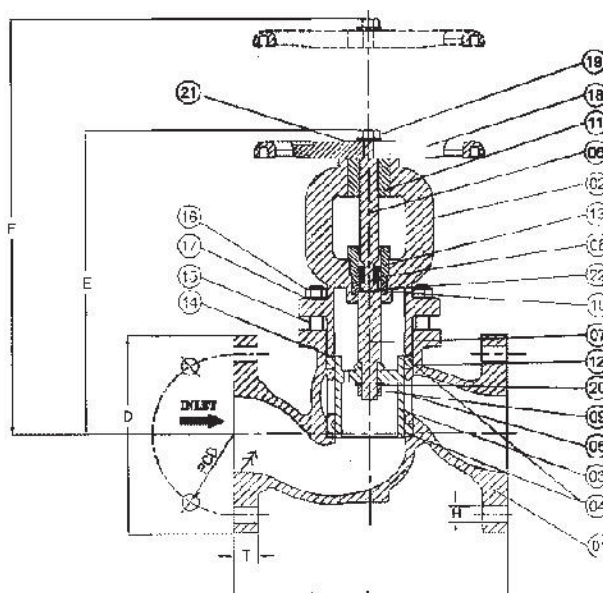
No	Part	Material	
1	Body	Cast Steel	ASTM A 216 Gr. WCB
2	Bonnet	Cast Steel	ASTM A 216 Gr. WCB
3	Piston	Stainless Steel	ASTM A 276 Type 304
4	Spindle	Stainless Steel	ASTM A 276 Type 410
5	Nyloc Nut	Carbon Steel	Carbon Steel
6	Stud	Carbon Steel	ASTM A 193 Gr. B7
7	Nut	Carbon Steel	ASTM A 194 Gr. 2H
8	B. Washer	Spring Steel	50 CrV4
9	Sealing Ring	S/S Reinforced Graphite	S/S Reinforced Graphite
10	Spacer	Stainless Steel	ASTM A 743 Gr. CA 15
11	Handwheel	S.G. Iron	S.G. Iron
12	Thrust Plate	Stainless Steel	ASTM A 276 Type 420
13	Name Plate	Stainless Steel	Stainless Steel
14	Split Nut	Brass	Brass

Dimensions: In mm/inches (approximate) - ANSI 150

SIZES		ANSI Class	L		D		PCD		H		No. of Holes	T		E(Close)		F(Open)		Approx.Net Weight	
MM	IN		MM	IN	MM	IN	MM	IN	MM	IN		MM	IN	MM	IN	MM	IN	Kg	Lbs
50NB	2"	150#	203	8.00	152	5.98	121	4.78	19	0.8	4	19	0.75	210	8.27	262	10.31	16	35

Dimensions: In mm/inches (approximate) - ANSI 300

SIZES		ANSI Class	L		D		PCD		H		No. of Holes	T		E(Close)		F(Open)		Approx.Net Weight	
MM	IN		MM	IN	MM	IN	MM	IN	MM	IN		MM	IN	MM	IN	MM	IN	Kg	Lbs
50NB	2"	300#	267	10.51	165	6.50	127	5.00	19	0.8	8	22	0.87	210	8.27	262	10.31	17.5	39



Always open and close Valve fully. Do not use Valve Key .

Material : 65 - 200 NB (2½" - 8") PISTON VALVE

No.	Part	Material	
1	Body	Cast Steel	ASTM A 216 Gr. WCB
2	Bonnet	Cast Steel	ASTM A 216 Gr. WCB
3	Piston	Stainless Steel	ASTM A 351 Gr. CF8
4	Body Sealing Stack	S/S Reinforced Graphite	S/S Reinforced Graphite
5	Spacer	Stainless Steel	ASTM A 743 Gr. CA 15
6	Spindle	Stainless Steel	ASTM A 276 Type 410
7	Stem	Stainless Steel	ASTM A 276 Type 304
8	Split Nut	Brass	Brass
9	LH Nut	Stainless Steel	ASTM A 276 Type 304
10	Gland Sealing Stack	S/S Reinforced Graphite	S/S Reinforced Graphite
11	Threaded Bus	Ph. Bronze	Ph. Bronze
12	Back Seat	Stainless Steel	ASTM A 276 Type 410
13	Gland Nut	Stainless Steel	ASTM A 276 Type 410
14	Bonnet Sealing Ring	Graphite	Graphite
15	Stud	Carbon Steel	ASTM A 193 Gr. B7
16	Nut	Carbon Steel	ASTM A 194 Gr. 2H
17	Beleville Washer	Spring Steel	50 CrV4
18	Handwheel	S.G. Iron	S.G. Iron
19	Nyloc Nut	Carbon Steel	Carbon Steel
20	Washer	Stainless Steel	ASTM A 276 Type 304
21	Name Plate	Stainless Steel	Stainless Steel
22	Thrust Plate	Stainless Steel	ASTM A 276 Type 420

Dimensions: In mm/inches (approximate) - ANSI 150

SIZES		ANSI Class	L		D		PCD		H		No. of Holes	T		E(Close)		F(Open)		Approx. Net Weight	
MM	IN		MM	IN	MM	IN	MM	IN	MM	IN		MM	IN	MM	IN	MM	IN	Kg	Lbs
65NB	2 ½"	150#	216	8.50	178	7.00	140	5.50	19	0.75	4	22	0.87	335	13.19	400	15.75	27	59
80NB	3"	150#	241	9.50	191	7.50	152	5.99	19	0.75	4	24	0.94	320	12.6	384	15.12	31	68
100NB	4"	150#	292	11.50	229	9.02	191	7.50	19	0.75	8	24	0.94	395	15.55	479	18.86	49	108
125NB	5"	150#	356	14.02	254	10.00	216	8.50	22	0.87	8	24	0.94	446	17.56	540	21.26	70	154
150NB	6"	150#	406	15.98	279	10.98	241	9.49	22	0.87	8	26	1.02	486	19.13	598	23.54	90	198
200NB	8"	150#	495	19.49	343	13.50	298	11.73	22	0.87	8	28	1.10	591	23.27	728	28.66	164	362

Dimensions: In mm/inches (approximate) - ANSI 300

SIZES		ANSI Class	L		D		PCD		H		No. of Holes	T		E(Close)		F(Open)		Approx. Net Weight	
MM	IN		MM	IN	MM	IN	MM	IN	MM	IN		MM	IN	MM	IN	MM	IN	Kg	Lbs
65NB	2 ½"	300#	292	11.50	191	7.52	149	5.87	22	0.87	8	25	0.98	335	13.19	400	15.75	31	68
80NB	3"	300#	318	12.52	210	8.27	168	6.61	22	0.87	8	28	1.1	320	12.60	384	15.12	37	82
100NB	4"	300#	356	14.02	254	10.00	200	7.87	22	0.87	8	32	1.26	395	15.55	479	18.86	58	128
125NB	5"	300#	400	15.75	280	11.02	235	9.25	22	0.87	8	35	1.38	446	17.55	540	21.26	87	192
150NB	6"	300#	445	17.52	318	12.52	270	10.63	22	0.87	12	37	1.46	486	19.13	598	23.54	117	258
200NB	8"	300#	559	22.01	381	15.00	330	12.99	25	0.87	12	41	1.61	591	23.27	728	28.66	210	463

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Quality Certificates



P E D Certificate



ISO 9001:2000 Certificate

Piston Valve Selection Guide

1	Product Code	PSVAL											
2	Size	15NB	20NB	25NB	32NB	40NB	50NB	65NB	80NB	100NB	125NB	150NB	200NB
3	End Connection	1/2"	3/4"	1"	1 1/4"	1 1/2"	2"	2 1/2"	3"	4"	5"	6"	8"
	Screwed (SC)	BSPT	A	A	A	A							
		NPT	B	B	B	B							
	Socket Welded (SW)	I	I	I	I	I							
	ANSI 150						Q	Q	Q	Q	Q	Q	Q
	ANSI 300						M	M	M	M	M	M	M
4	Material	F	F	F	F	F	C	C	C	C	C	C	C

Not in standard product range, take confirmation while ordering.

END Connection Code	BSPT	NPT	Socket Welded	ANSI 150	ANSI 300
	A	B	I	Q	M

Material Description	
F	Forged Carbon Steel
C	Cast Carbon Steel

How to order

Forbes Marshall 150NB(6"), Cast Steel ANSI 150 Piston Valve
Product Description : 1 2 3 4 → PSVAL150QC

Available Spares :

Sealing Rings (15-40NB,50NB)

Body Sealing Stack Set, Bonnet Sealing Ring & Gland Sealing Stack. (65-200NB)

How to order spares :

Order spares as per the code no. specified in the 'User Manual'.

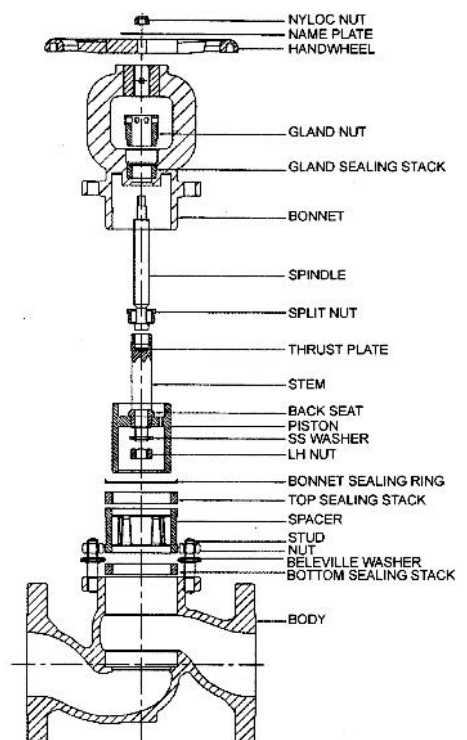
Installation :

The Valve is designed for installation in a vertical line or horizontal line with inlet as per the arrow direction. To open the valve turn hand wheel till it stops at the top and to close turn hand wheel till it touches the bonnet. Do not use 'F' Key. If any leakage is observed during operation at the outlet, close valve fully and tighten opposite nuts equally half or one turn until leakage stops.

Safety Information :

Pressure

Before attempting any maintenance of the Valve, ensure that pressure is isolated and safety vent to atmosphere. Do not assume that the system is depressurized even when the pressure gauge indicates zero.



Global Installations

Lontar Papyrus & Paper	Indonesia
Chel Jedang-Samsung	Indonesia
Jiwi Kimia Paper Plant	Indonesia
YTL Power Plant	Indonesia
Polysindo Petrochemical	Indonesia
Glaxo Smithkline	Singapore
Multistrada Tyre	Singapore
DSS Power Plant	Indonesia
Oman Refinery (CCC)	Oman
Bidco Refineries	Kenya
Apotex-Oncology	Canada
RBC Center	Canada
Telus Tower	Canada
AWC, Inc.	USA
Unilever	Various plants
Colgate Palmolive	Various plants
Cadbury	Various plants
Nestle	Various plants
Nicholas Piramal	Various plants
Coca Cola	Various plants
Pepsi	Various plants
Goodyear Tyre	Various plants
Perfetti Van Melle	Various plants
Le-Meridian Hotels	Various plants
Titan Organics	Dubai
TPC	Dubai
Islamic Paper Mills	Egypt
First Paper Mills	Egypt
Loadstar	Srilanka
Brandix	Srilanka
AMW	Srilanka
Hamza Textile	Bangladesh
M.S.Textile	Bangladesh
Tamishna Dyeing	Bangladesh
Bashundhra Group	Bangladesh
and many more...	

Forbes Marshall Piston Valve User Industries

- ▶ Oil & Gas
- ▶ Petrochemicals
- ▶ Textiles
- ▶ Pharma
- ▶ Fertilisers
- ▶ Edible Oil
- ▶ Chemical Industry
- ▶ Pulp & Paper
- ▶ Paint
- ▶ Food Processing
- ▶ Dairy

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