

# Piston Valve (DN15-40)

## Description

Forbes Marshall Piston Valves, PSVAL, provide perfect tightness and durable stability on different media such as steam, superheated steam, heat transfer fluid, water and compressed air.

## Sizes and Pipe Connection

DN 15 / 20 / 25 / 32 / 40  
Screwed BSPT / NPT / BSP, socket weld ends, flanged to class 150 / 300 / 600 available on special request  
Body design as per Class 800 - Available on request

## Limiting Conditions

### For DN 15 / 20 / 25 / 32 / 40 Socket weld ends

Maximum operating pressure	78 bar g
Maximum operating temperature	425 deg c for DN15-25 232 deg c for DN32-40
Maximum hydraulic test pressure	117 bar g (IBR requirement)

### For DN 15 / 20 / 25 Screwed ends

Maximum operating pressure	78 bar g
Maximum operating temperature	425 deg c
Maximum hydraulic test pressure	117bar g (IBR requirement)

### For DN 32 / 40 Screwed ends

Maximum operating pressure	41.5 bar g
Maximum operating temperature	232 deg c
Maximum hydraulic test pressure	62.5 bar g (IBR requirement)

### Body design conditions : DN 15-40 Class 150 Flanged ends

Maximum allowable pressure	19.6 bar g at 38 deg C
Maximum operating pressure	14 bar g at 195 deg C
Maximum operating temperature	425 deg C at 5.5 bar g for DN15-25 232 deg C at 12.7 bar g for DN32-40
Cold hydraulic test pressure	21 bar g (IBR requirement)

### Body design conditions : DN 15-40 Class 300 Flanged ends

Maximum allowable pressure	51.1 bar g at 38 deg C
Maximum operating pressure	41.7 bar g at 253 deg C for DN15-25 42.58 bar g at 232 deg C for DN32-40
Maximum operating temperature	425 deg C at 28.8 bar g for DN15-25 232 deg C at 42.58 bar g for DN32-40
Cold hydraulic test pressure	64 bar g (IBR requirement)

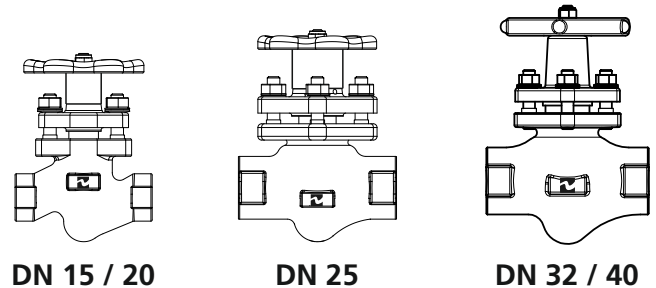
### Body design conditions : DN 15-40 Class 600 Flanged ends

Maximum allowable pressure	102 bar g @ 38 deg C
Maximum operating pressure	78 bar g at 318 deg C for DN15-25 78 bar g at 232 deg C for DN32-40
Maximum operating temperature	425degC at 57.5 bar g for DN15-25 232degC at 78 bar g for DN32-40
Maximum hydraulic test pressure	117 bar g

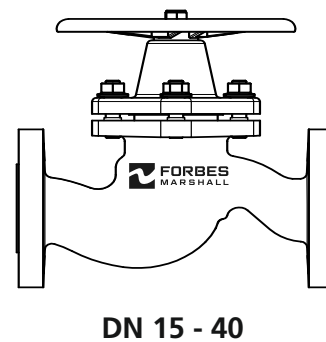
### Body design conditions : FOR SWE CONNECTIONS AS PER #800 (API 602) :

Maximum allowable pressure	136.2 bar g @ 38 deg C
Maximum operating pressure	104.5 bar g @ 315 deg C
Maximum operating temperature	425 deg C @ 76.7 bar g
Maximum hydraulic test pressure	204.3 bar g

## DN15-40 PSVAL (SCRD & SWE ENDS)

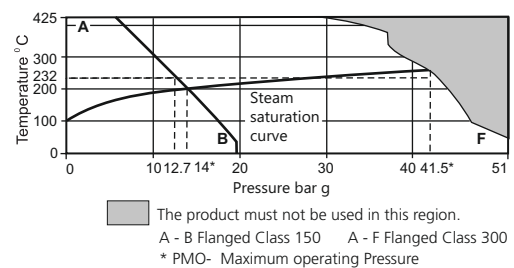


## DN15-40 PSVAL (FLGD ENDS)

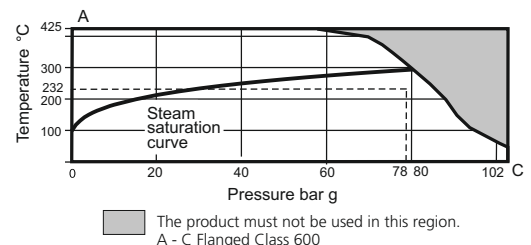


## Operating Range

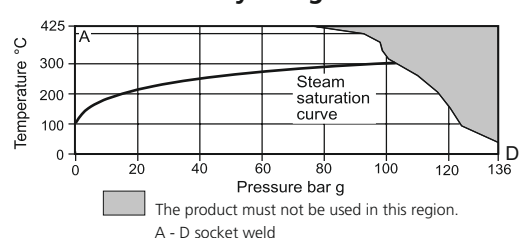
### ASME Class 150-300



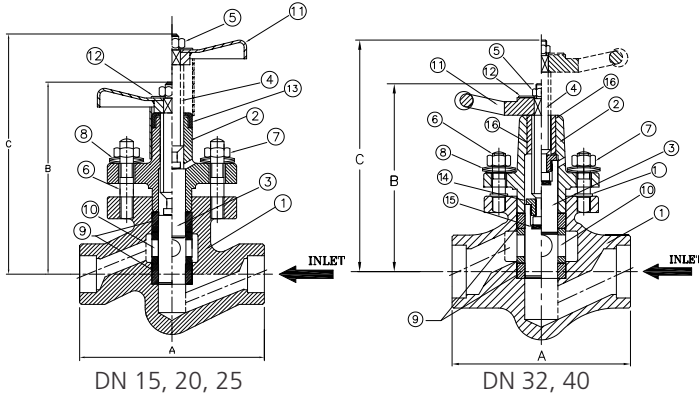
### ASME Class 600



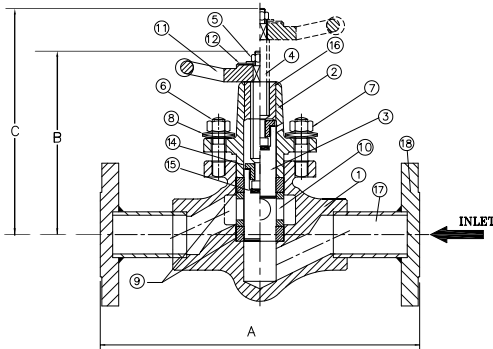
### ASME Class 800 - Body design condition



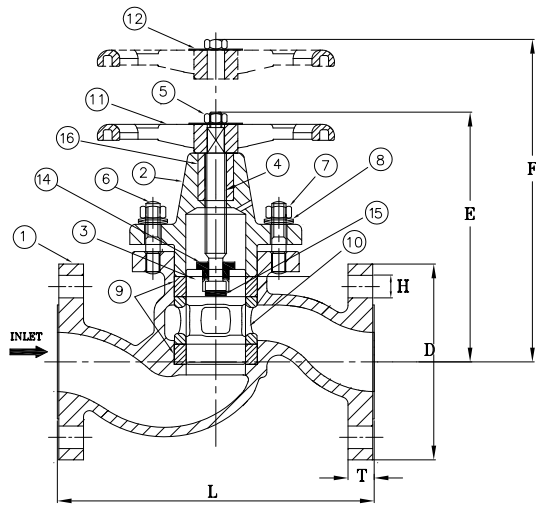
### DN15-40 SCR D & SWE ENDS



### DN15-40 WELD ON FLANGES



### DN15-40 AS CAST FLANGES



### As Cast Flanges Dimensions(mm) and Weights(Kg)-approx.

Size & Class	L	D	PCD	H	No. of Holes	T	E	F	Weight
DN15#150	108	90	60.3	16	4	9.6	118	146	4
DN15#300	152	95	66.7	16	4	12.7	118	146	4.8
DN20#150	117	100	69.9	16	4	11.2	118	146	4.6
DN20#300	178	115	82.6	19	4	14.3	118	146	6.3
DN25#150	127	110	79.4	16	4	12.7	133	165	5
DN25#300	203	125	88.9	19	4	15.9	133	165	6.5
DN32#300	216	135	98.4	19	4	17.5	180	220	10.8
DN40#150	165	125	98.4	16	4	15.9	180	220	9.25
DN40#300	229	155	114.3	22	4	19.1	180	220	12.2

For DN 32 only class 300 is available in integral Flange ends.

Material: DN 15-40:

No.	Description	Material	Standard
1	Body	Forged Carbon Steel/Cast Steel	ASTM A105N/ASTM A216 WCB
2	Bonnet	Forged Carbon Steel	ASTM A105N
3	Piston	Stainless Steel	ASTM A 276 TYPE 304
4	Spindle	Stainless Steel	ASTM A 276 TYPE 410
5	Nyloc Nut	Carbon Steel	
6	Stud	Carbon Steel	ASTM A193 Gr. B7
7	Nut	Carbon Steel	ASTM A 194 Gr.2H
8	Belleville Washer	Spring Steel	51CrV4
9	Sealing stack	S.S. Reinforced Graphite	
10	Spacer	Stainless Steel	ASTM A 276 TYPE 410
11	*Handwheel	Sheet Metal / SG Iron	
12	Name Plate	Stainless Steel	ASTM A 240 TYPE 304
13	Grease Cap	Stainless Steel	SS 304

\*Note : For DN 15-25 Handwheel - Sheet Metal  
For DN32-40 Hand wheel-S.G. Iron

Additional material: DN32-40

Sr.No.	Description	Material	Standard
14	Split Nut	Bronze	
15	Thrust Plate	Stainless Steel	ASTM A 276 TYPE 420
16	Bush	Bronze	

Additional material: DN15-40 Weld on Flanges

Sr.No.	Description	Material	Standard
17	Pipe	Carbon Steel	ASTM A106 GR B
18	Flange	Forged Carbon Steel	ASTM A 105

### Dimensions (approx. in mm)

Screwed & Socket weld ends

Size (DN)	A	B	C	Weight (kg)
15	110	118	146	2
20	110	118	146	2
25	126	133	165	4
32	165	175	215	7.5
40	165	175	215	8

### Dimensions (approx. in mm)

Weld on Flanges

\*Tol ±1mm

Size (DN)	A*			B	C
	Class 150	Class 300	Class 600		
15	252	265	265	118	146
20	252	265	265	118	146
25	260	278	278	133	165
32	305	317	320	175	215
40	305	317	320	175	215

### Weights (approx. in Kg)

Weld on Flanges

Size (DN)	Class		
	Class 150	Class 300	Class 600
15	3	3.5	4
20	4	5	5.5
25	6	7.5	8
32	10.7	12	13
40	11	13.5	14.5

## How to Order

Example: DN 15 Piston Valve with socket weld ends.

## Installation

The valve is designed for installation in a vertical 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.

**Ensure that water hammer is not present in the lines under any circumstances. This can be done by gradually charging the line and draining all the residual condensate through drain valves every time the line is charged with steam. Heavy water hammer may permanently damage the piston valve.**

## Safety Information

**Pressure :** Before attempting any maintenance of the valve, ensure that pressure is isolated and safely vented to atmosphere. Do not assume that the system is depressurized even when a pressure gauge indicates zero.

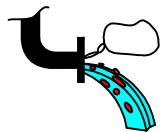
## Maintenance

Use Molykote M30 oil for lubrication. For DN 15-40 sizes lubricate spindle regularly through bonnet hole and spindle threads.

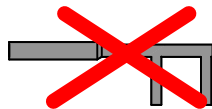
**Operate the valve once or twice after lubrication.**

## Piston Valve Operating Guidelines

1. Flush the line properly before taking the Piston Valve in operation



2. Do not use valve "F" key for opening & closing the valve



3. Please do oiling of valve as shown in below figure with Molykote M30 oil or high temperature lubricating oil to ensure smooth operation of valve

## Available Spares

Refer Piston Valve user manual for available spares.

## How to Order Spares

Order spares as per the code no. specified in the user manual.

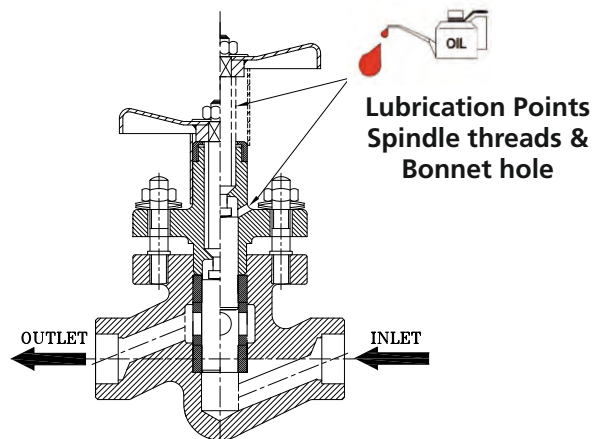
## Kv Values

Size (DN)	15	20	25	32	40
Kv	2.5	2.5	5.8	13	13

## Recommended Tightening Torques

### For Bonnet Nut

Sr. No.	Size (DN)	Torque (Nm)
1	15	3 - 5
2	20	
3	25	5 - 7
4	32	8 - 12
5	40	



Lubrication Details  
DN 15-40



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