

# FLOWKS

How Quality Lasts!

Oil&Gas&Power&Cryogenics

## FLOWKS

**FLOWKS VALVE INC.**

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**FORGED STEEL  
GATE VALVE  
CHECK VALVE  
GLOBE VALVE  
Y-STRAINER**





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Flowks Valve is a manufacturer specializing in all kinds of industrial valves. After years of experience in supplying valves for distributors and projects, Flowks Valve has been recognized as a skilled and responsible supplier. The reputation relies on our strict inspection procedure from CAD design, material purchasing, machining, assembling, hydraulic & air testing to packing & delivery. Each step is carried out by our experienced and dedicated craftsmen.

We offer various types of valves with different materials, including special materials like Monel, Inconel, duplex, copper, bronze, etc. We follow different standards such as API, ANSI, DIN, BS and JIS.

We are capable of supplying valves with special testings and treatments like radiographic examination (RT), ultrasonic examination (UT), liquid penetrant test (LPT), magnetic particle test (MPT), low temperature impact test and PMI. Special coating like FCC and TCC is also available. Our valves are widely used in different industries. We provide OEM service.

If you find anything interesting, please do not hesitate to contact us. What you will get is quality products with competitive prices. Look forward to having a chance to serve your esteemed company.





Flowks serves numerous domestic and foreign projects. We have good ability and experience in providing valves for severe services, designing valves for special applications, quick delivery of spare parts for replacement, etc.

Our valves are widely used in different industries.

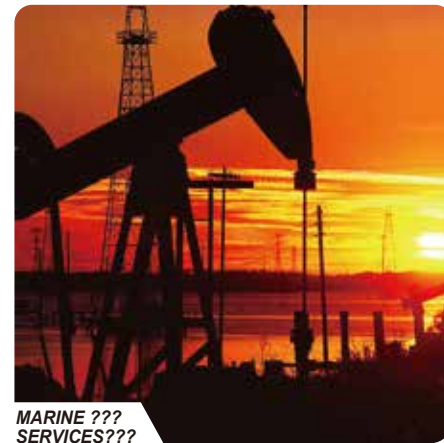
- **Onshore Oil & Gas**
- **Fine Chemicals**
- **LNG-Liquefied Natural Gas**
- **Water & Waste Water Treatment**
- **Metallurgy Industry**
- **Power Plant**
- **Marine Weapon**
- **Pulp & Paper**
- **Offshore Oil & Gas**



MARINE SERVICES



Power Plant



MARINE ??? SERVICES???



LNG



Offshore Oil & Gas

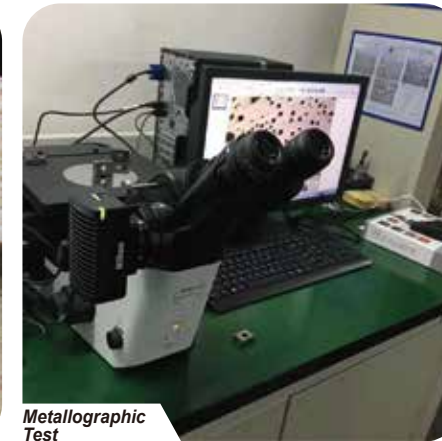


Petro-chemical

Modern and advanced testing tools with strict and scientific management, assures that each valve can be in full compliance with customer requirements.



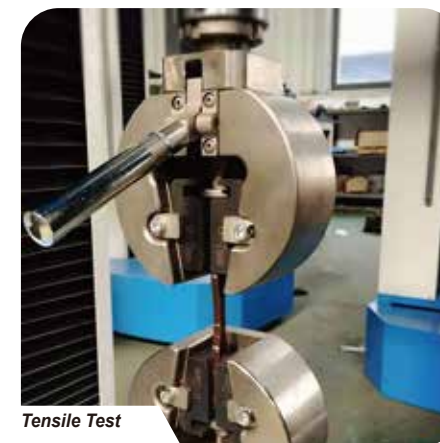
PMI



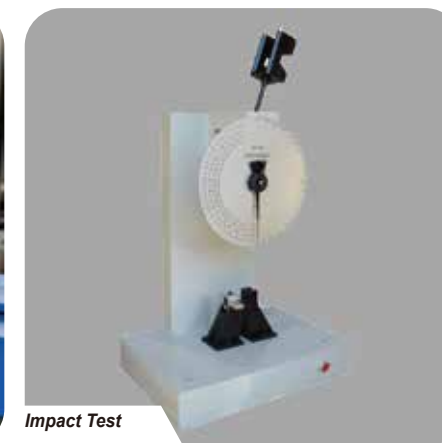
Metallographic Test



Salt Spray Test



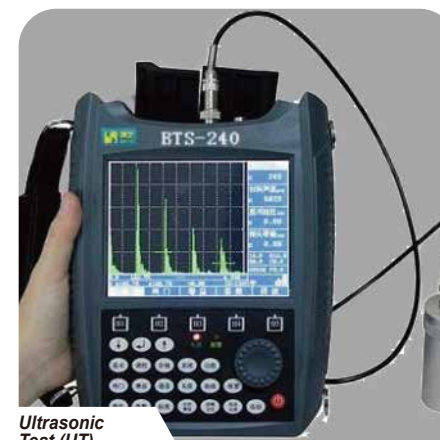
Tensile Test



Impact Test



Hardness Test



Ultrasonic Test (UT)



Liquid Penetrant Test (LPT)



Radiographic Test (RT)







BODY AND BONNET MATERIALS

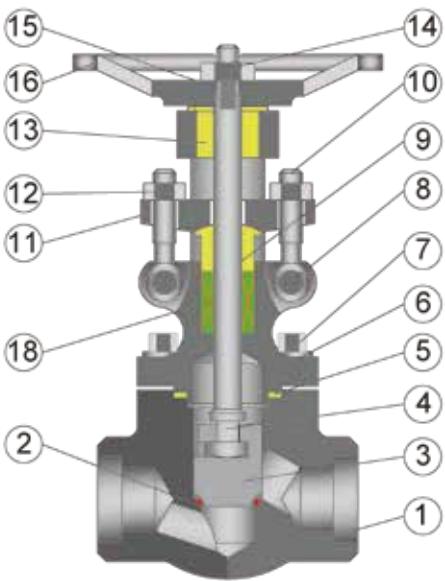
Material Group	Common Name	Nominal Type	UNS	Forging Spec.	Casting Spec. Equivalent	DIN	DIN W. No	Application Notes
Carbon Steel	CS	C-Mn-Fe	K03504	A105N	A216-WCB	C22.8 DIN 17243	1.0460	General non-corrosive service from -20F(-29C) to 800F(427C)
Low Temperature Carbon Steel	LTCS	C-Mn-Fe	K03011	A350-LF2	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	10CRM0910	1.7380	Up to 1100F(593C), HP steam
		5Cr-1/2Mo	K41545	A182-F5	A217-C5	12CRM0195	1.7362	High temp refinery service
		9Cr-1Mo	K90941	A182-F9	A217-C12	X12CrMo91	1.7386	High temp erosive refinery service
Stainless Steel	Austenitic 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	X2CrNi1911	1.4306	Up to 800F(427C)
		304H :	S30409	A182-F304H		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	X5CrNiMo17122	1.4404	Up to 800F(427C)
		316H :	S31609	A182-F316H		n/a	n/a	
		316Ti:	S31635	A182-F316Ti	X6CrNiMoTi17122		1.4571	
		321: 18Cr-10Ni-Ti	S32100	A182-F321	X6CrNiTi1810		1.4541	0.04% min. carbon (grade F321H) and heat treat at 2000F(1100C) for service temps.>1000F(538C)
		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		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 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	
	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	NiMo16Cr15W	2.4819	*Difficult to forge in close dye
Titanium	Titanium	98Ti	R50400	B381-Gr2	B367-C2	Ti2	3.7035	

STANDARD TRIM DEFINITIONS

API Trim No.	Nonimal Trim	CALOBRI descr.	Stem	Disc/Wedge	Seat
1	F6	F6	410	F6	410
2	304	304	304	304	304
5	Hardfaced	F6HF	410	F6+StGr6	410+StGr6
8	F6 and Hardfaced	F6HFS	410	F6	410+StGr6
9	Monel	Monel	Monel	Monel	Monel
10	316	316	316	316	316
11	Monel and Hardfaced	MonelHFS	Monel	Monel	Monel
12	316 and Hardfaced	316HFS	316	316	316 + St. Gr6
13	Alloy 20	Alloy 20	Alloy 20	Alloy 20	Alloy 20
14	Alloy 20 and Hardfaced	Alloy 20HFS	Alloy 20	Alloy 20	Alloy 20
15	Hardfaced (304)	304-HF	304	304+StGr6	304+StGr6
16	Hardfaced (316)	316-HF	316 HF	316+StGr6	316+StGr6
17	Hardfaced (347)	347-HF	347 HF	347+StGr6	347+StGr6
18	Hardfaced (Alloy 20)	Alloy 20-HF	Alloy 20 HF	Alloy 20 + St Gr6	Alloy 20 + St Gr6
n/a	Alloy 625	Alloy 625	Alloy 625	Alloy 625	Alloy 625

TRIM MATERIAL

CALOBRI	UNS	CALOBRI	Grade (forged)	ASTM wrought	DIN	DIN W NO.
F6	UNS S41000	13Cr	ASTM A182 F6a	A276-410	DIN X12Cr13	1,4006
304	UNS S30400	18-8 Cr-Ni	ASTM A182 F304	A276-304	DIN X5CrNi 18 10	1,4301
316	UNS S31600	18-8 Cr-Ni (18-10-2)	ASTM A182 F316	A276-316	DIN X5CrNiMo 18 10	1,4401
321	UNS S32100	18 Cr-10 Ni-Ti	ASTM A182 F321	A276-321	DIN X6CrNiTi 18 10	1.4541
347	UNS S34700	18 Cr-10 Ni-Cb	ASTM A182 F347	A276-347	DIN X6CrNiNb18 10	1.4550
MONEL(R)	UNS N04400	67Ni-30Cu	ASTM B564-N04400	B164-N04400	DIN 17743	2.4360
ALLOY 20	UNS N08020	28Ni-19Cr-Cu-Mo	ASTM A182-F20	ASTM B473	DIN 14500	2.4660
ALLOY 625	UNS N06625	60Ni-22Cr-9Mo-3.5Cb	ASTM B564-N06625	ASTM B564-N06625	DIN 17361	2.4865
C276	UNS N10276	54Ni-15Cr-16Mo	ASTM B564-N10276	ASTM B574-N10276	DINNiMo16Cr15W	2,4819
St. Gr6	UNS R30006	Co Cr-A	AMS 5894	Stellite(R) Gr6		



STANDARD

Design & Manufacture: BS 5352/API 602  
Test & Inspection: API 598  
Marking: MSS SP25  
Flange End: ANSI B16.5  
Socket Weld (SW) End: ANSI B16.11  
Screw (NPT) End: ANSI B1.20.1  
Butt Weld (BW) End: ANSI B16.25  
Outside Screw and Yoke (OS&Y), Self-aligning Packing Gland in Two Parts, Spiral-wound Gasket, Retained Type Integral Backseat  
Ratings:  
-Carbon Steel Class 800: 1975 psig @ 100°F, 138 bar @ +38°C  
-Carbon Steel Class 1500: 3705 psig @ 100°F, 255 bar @ +38°C

**1. BODY.** The body is forged steel and designed to the basic dimensional requirements of the applicable specifications such as API 602 and ASME B16.34. The body is available in both the full or standard port design. It is also available in either T-pattern or Y-pattern configuration.

**2. SEAT.** The body seat is an integral weld overlay and is part of the valve trim.

**3. DISC.** The disc is forged steel and is part of the valve trim. The disc seating surface is of the tapered or plug type design. The disc is attached to the stem using a loose or swivel disc arrangement.

**4. STEM.** The stem is forged steel and part of the valve trim. It contains an integral back seat shoulder, which mates with the integral backseat of the bonnet. The stem is designed to the basic dimensional requirements of the applicable specifications such as API 602.

**5. GASKET.** The bolted bonnet joint design valve uses a contained, controlled compression, spiral wound type gasket.

**6. BONNET.** The bonnet is forged steel, has an integral backseat and incorporates the stuffing box, which has dimensions per the applicable specifications such as API 602.

**7. BONNET BOLTING.** The bonnet bolting is manufactured of alloy steel in accordance with the requirements of the applicable specifications such as API 602 and ASME B16.34.

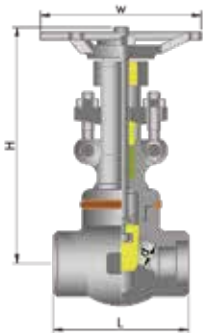
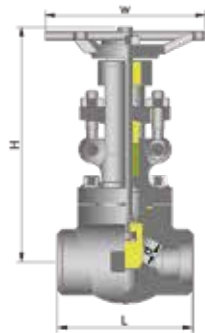
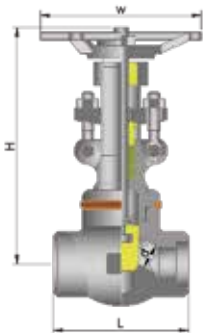
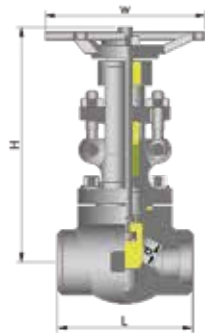
**11. GLAND AND FLANGE.** The gland, gland flange assembly utilizes a separate, two piece design. This self aligning design allows the flange to be unevenly tightened while the gland maintains its parallel alignment with the stem and stuffing box.

**10.12. GLAND BOLTS AND NUTS.** The steel/stainless steel gland bolt and nut assembly is a stud, double nut arrangement. This design allows complete removal from the valve when service is required. The use of industry standard thread full length studs and nuts also allows easy replacement should these items be lost or in need of replacement.

**13. YOKE SLEEVE.** The yoke sleeve is of forged stainless steel material having a high melting point and is resistant to wear and corrosion.

**16. HANDWHEEL.** The handwheel is forged carbon steel of an openspoke design. This robust construction along with appropriate sizing allows for ease of operation.

**17.BODY-BONNET JOINT.** Two different bonnet joint designs are available. These are either the bolted bonnet or the threaded and seal welded type.



CLASS 800

BOLTED BONNET STANDART POTR API602 / ISO15761-FULL PORT TO BS5352  
Outside Screw &Yoke - Threaded and Socket Weld Ends

Reduced Bore	NPS	1/2"		3/4"		1"		1-1/4"		1-1/2"		2"		2-1/2"	
		1/4"		3/8"		1/2"		3/4"		1"		1-1/4"		1-1/2"	
		mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in
End to End	L	79	3.11	79	3.11	92	3.62	111	4.37	120	4.72	152	5.98	172	6.77
Hand wheel	W	100	3.94	100	3.94	100	3.94	125	4.92	160	6.30	160	6.30	180	7.09
Center to Open	H	164	6.46	164	6.46	164	6.46	203	7.99	224	8.82	260	10.24	300	11.81
Dia. of port	d	7	0.28	9	0.35	13	0.51	17.5	0.69	23	0.91	30	1.18	35	1.38
Weight	Kg/Lb	1.9	4.19	2.28	5.03	2.37	5.22	4.3	9.48	5.75	12.68	7.8	17.20	12.5	27.56

CLASS 800

WELDED BONNET STANDART POTR API602 / ISO15761-FULL PORT TO BS5352  
Outside Screw &Yoke - Threaded and Socket Weld Ends

Reduced Bore	NPS	1/2"		3/4"		1"		1-1/4"		1-1/2"		2"		2-1/2"	
		1/4"		3/8"		1/2"		3/4"		1"		1-1/4"		1-1/2"	
		mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in
End to End	L	79	3.11	79	3.11	92	3.62	111	4.37	120	4.72	152	5.98	172	6.77
Hand wheel	W	100	3.94	100	3.94	100	3.94	125	4.92	160	6.30	160	6.30	180	7.09
Center to Open	H	164	6.46	164	6.46	164	6.46	203	7.99	224	8.82	260	10.24	300	11.81
Dia. of port	d	7	0.28	9	0.35	13	0.51	17.5	0.69	23	0.91	30	1.18	35	1.38
Weight	Kg/Lb	1.7	3.75	1.7	3.75	1.9	4.19	3.3	7.28	5.2	11.46	6.8	14.99	10.6	23.37

CLASS 900

CLASS 1500

BOLTED BONNET STANDART POTR API602 / ISO15761-FULL PORT TO BS5352  
Outside Screw &Yoke - Threaded and Socket Weld Ends

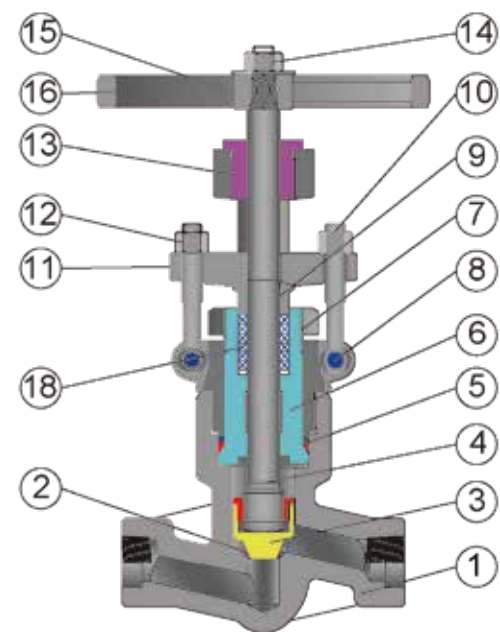
Reduced Bore	NPS	1/2"		3/4"		1"		1-1/4"		1-1/2"		2"		2-1/2"	
		1/4"		3/8"		1/2"		3/4"		1"		1-1/4"		1-1/2"	
		mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in
End to End	L	92	3.62	111	4.37	111	4.37	120	4.72	152	5.98	172	6.77	200	7.87
Hand wheel	W	100	3.94	125	4.92	125	4.92	160	6.30	160	6.30	180	7.09	200	7.87
Center to Open	H	171	6.73	207	8.15	207	8.15	240	9.45	258	10.16	330	12.99	355	13.98
Dia. of port	d	7	0.28	12	0.47	15	0.59	20	0.79	28	1.10	32	1.26	40	1.57
Weight	Kg/Lb	2.3	5.07	3.7	8.16	3.6	7.94	3.6	7.94	7.6	16.76	11.6	25.57	15	33.07

CLASS 900

CLASS 1500

WELDED BONNET STANDART POTR API602 / ISO15761-FULL PORT TO BS5352  
Outside Screw &Yoke - Threaded and Socket Weld Ends

Reduced Bore	NPS	1/2"		3/4"		1"		1-1/4"		1-1/2"		2"		2-1/2"	
		1/4"		3/8"		1/2"		3/4"		1"		1-1/4"		1-1/2"	
		mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in
End to End	L	92	3.62	111	4.37	111	4.37	120	4.72	152	5.98	172	6.77	200	7.87
Hand wheel	W	100	3.94	125	4.92	125	4.92	160	6.30	160	6.30	180	7.09	200	7.87
Center to Open	H	171	6.73	207	8.15	207	8.15	240	9.45	258	10.16	330	12.99	355	13.98
Dia. of port	d	7	0.28	12	0.47	15	0.59	20	0.79	28	1.10	32	1.26	40	1.57
Weight	Kg/Lb	2	4.41	3.4	7.50	3.3	7.28	6	13.23	5.6	12.35	10.3	22.71	14.2	31.31



■ STANDARD

Design & Manufacture: BS 5352/API 602  
Test & Inspection: API 598  
Marking: MSS SP25  
Flange End: ANSI B16.5  
Socket Weld (SW) End: ANSI B16.11  
Screw (NPT) End: ANSI B1.20.1  
Butt Weld (BW) End: ANSI B16.25  
Outside Screw and Yoke (OS&Y), Self-aligning Packing Gland in Two Parts, Spiral-wound Gasket, Retained Type Integral Backseat  
Ratings:  
-Carbon Steel Class 800: 1975 psig @ 100°F, 138 bar @ +38°C  
-Carbon Steel Class 1500: 3705 psig @ 100°F, 255 bar @ +38°C

**1. BODY.** The body is forged steel and designed to the basic dimensional requirements of the applicable specifications such as API 602 and ASME B16.34. The body is available in both the full or standard port design. It is also available in either T-pattern or Y-pattern configuration.

**2. SEAT.** The body seat is an integral weld overlay and is part of the valve trim.

**3. DISC.** The disc is forged steel and is part of the valve trim. The disc seating surface is of the tapered or plug type design. The disc is attached to the stem using a loose or swivel disc arrangement.

**4. STEM.** The stem is forged steel and part of the valve trim. It contains an integral back seat shoulder, which mates with the integral backseat of the bonnet. The stem is designed to the basic dimensional requirements of the applicable specifications such as API 602.

**5. GASKET.** The bolted bonnet joint design valve uses a contained, controlled compression, spiral wound type gasket.

**6. BONNET.** The bonnet is forged steel, has an integral backseat and incorporates the stuffing box, which has dimensions per the applicable specifications such as API 602.

**B.** When a stainless steel pressure seal gasket is used, the body contact surface is provided with a stainless steel overlay to ensure a tight seal over the life of the valve.

**C.** The pressure seal bonnet is offered in two different designs:  
1. For small sizes the thrust ring, made of stainless steel, is screwed on the body.  
2. For larger sizes the thrust ring is a segmented ring inserted in the body cavity.

**11. GLAND AND FLANGE.** The gland, gland flange assembly utilizes a separate, two piece design. This self aligning design allows the flange to be unevenly tightened while the gland maintains its parallel alignment with the stem and stuffing box.

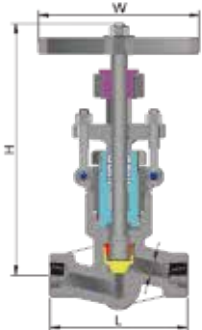
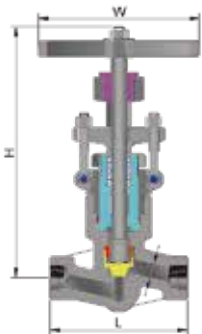
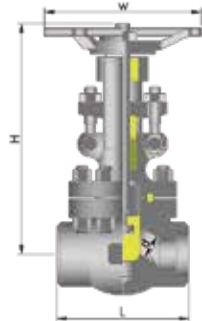
**10.12. GLAND BOLTS AND NUTS.** The steel/stainless steel gland bolt and nut assembly is a stud, double nut arrangement. This design allows complete removal from the valve when service is required. The use of industry standard thread full length studs and nuts also allows easy replacement should these items be lost or in need of replacement.

**13. YOKE SLEEVE.** The yoke sleeve is of forged stainless steel material having a high melting point and is resistant to wear and corrosion.

**16. HANDWHEEL.** The handwheel is forged carbon steel of an openspoke design. This robust construction along with appropriate sizing allows for ease of operation.

**17. BODY-BONNET JOINT.** Two different bonnet joint designs are available. These are either the bolted bonnet or the threaded and seal welded type.

**D.** Flowks pressure seal valves are designed in accordance with ASME B16.34 and where applicable with API Std 600 or ISO 10434. Ratings: 900 - 1500 and 2500 lbs standard and special class according to ANSI B16.34.



**CLASS 900** BOLTED BONNET STANDART POTR API602 / ISO15761-FULL PORT TO BS5352  
**CLASS 1500** Outside Screw & Yoke - Threaded and Socket Weld Ends

Full Bore	NPS	1/2"		3/4"		1"		1-1/4"		1-1/2"		2"		2-1/2"	
		mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in
End to End	L	110	4.33	110	4.33	150	5.91	150	5.91			210	8.27	235	9.25
Hand wheel	W	110	4.33	110	4.33	130	5.12	210	8.27			180	7.09	250	9.84
Center to Open	H	227	8.94	227	8.94	300	11.81	307	12.09			40	1.57	448	17.64
Dia. of port	d	9	0.35	12	0.47	15	0.59	20	0.79			32	1.26	40	1.57
Weight	Kg/Lb	5	11.02	5	11.02	10	22.05	11.5	25.35			22	48.50	37	81.57

**CLASS 900** PRESSURE SEALED BONNET STANDART POTR API602 / ISO15761-FULL PORT TO BS5352  
**CLASS 1500** Outside Screw & Yoke - Threaded and Socket Weld Ends

Full Bore	NPS	1/2"		3/4"		1"		1-1/4"		1-1/2"		2"		2-1/2"	
		mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in
End to End	L	140	5.51	140	5.51	140	5.51	178	7.01	178	7.01	216	8.50		
Hand wheel	W	220	8.66	200	7.87	220	8.66	280	11.02	280	11.02	300	11.81		
Center to Open	H	320	12.60	320	12.60	320	12.60	440	17.32	440	17.32	490	19.29		
Dia. of port	d	12	0.47	15	0.59	20	0.79	28	1.10	32	1.26	40	1.57		
Weight	Kg/Lb	11.5	25.35	10.8	23.81	10.5	23.15	19.6	43.21	21.1	46.52	55.4	122.14		

**CLASS 2500** BOLTED BONNET STANDART POTR API602 / ISO15761-FULL PORT TO BS5352  
Outside Screw & Yoke - Threaded and Socket Weld Ends

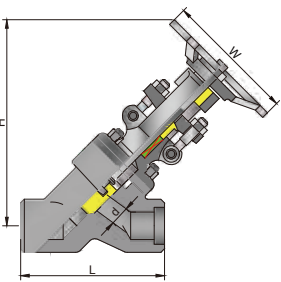
Full Bore	NPS	1/2"		3/4"		1"		1-1/4"		1-1/2"		2"		2-1/2"	
		mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in
End to End	L	150	5.91	150	5.91	210	8.27			235	9.25	235	9.25		
Hand wheel	W	130	5.12	130	5.12	250	9.84			300	11.81	300	11.81		
Center to Open	H	293	11.54	300	11.81	390	15.35			435	17.13	435	17.13		
Dia. of port	d	11	0.43	14	0.55	19	0.75			28	1.10	35	1.38		
Weight	Kg/Lb	10	22.05	10.3	22.71	22.4	49.38			38	83.78	38	83.78		

**CLASS 2500** PRESSURE SEALED BONNET STANDART POTR API602 / ISO15761-FULL PORT TO BS5352  
Outside Screw & Yoke - Threaded and Socket Weld Ends

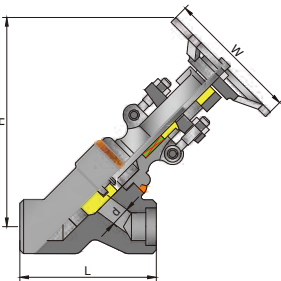
Full Bore	NPS	1/2"		3/4"		1"		1-1/4"		1-1/2"		2"		2-1/2"	
		mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in
End to End	L	186	7.32	186	7.32	186	7.32	232	9.13	232	9.13	279	10.98		
Hand wheel	W	200	7.87	200	7.87	200	7.87	280	11.02	280	11.02	300	11.81		
Center to Open	H	375	14.76	378	14.88	380	14.96	490	19.29	490	19.29	540	21.26		
Dia. of port	d	11	0.43	14	0.55	19	0.75	25	0.98	28	1.10	35	1.38		
Weight	Kg/Lb	12.3	27.12	11.6	25.57	10.8	23.81	26	57.32	28.4	62.61	60	132.28		



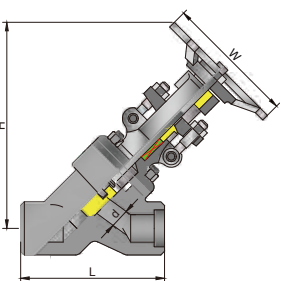
Y TYPE GLOBE VALVE



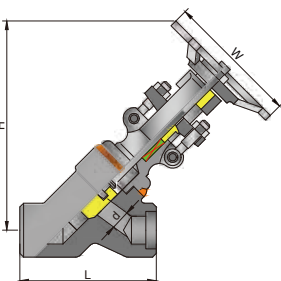
CLASS 800		BOLTED BONNET STANDART POTR API602 / ISO15761-FULL PORT TO BS5352 Outside Screw & Yoke - Threaded and Socket Weld Ends															
Reduced Bore	NPS	1/2"		3/4"		1"		1-1/4"		1-1/2"		2"		2-1/2"			
Full Bore	NPS	1/4"		3/8"		1/2"		3/4"		1"		1-1/4"		1-1/2"		2"	
		mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in
End to End	L	98	3.86	98	3.86	98	3.86	111	4.37	140	5.51	140	5.51	155	6.10	170	6.69
Hand wheel	W	100	3.94	100	3.94	100	3.94	125	4.92	160	6.30	160	6.30	180	7.09	200	7.87
Center to Open	H	180	7.09	180	7.09	180	7.09	188	7.40	280	11.02	280	11.02	295	11.61	350	13.78
Dia. of port	d	7	0.28	7	0.28	7	0.28	17.5	0.69	23	0.91	30	1.18	35	1.38	46	1.81
Weight	Kg/Lb	2.6	5.73	2.6	5.73	3.8	8.38	4.6	10.14	9.3	20.50	9.3	20.50	14	30.86	19.6	43.21



CLASS 800		WELDED BONNET STANDART POTR API602 / ISO15761-FULL PORT TO BS5352 Outside Screw & Yoke - Threaded and Socket Weld Ends															
Reduced Bore	NPS	1/2"		3/4"		1"		1-1/4"		1-1/2"		2"		2-1/2"			
Full Bore	NPS	1/4"		3/8"		1/2"		3/4"		1"		1-1/4"		1-1/2"		2"	
		mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in
End to End	L	98	3.86	98	3.86	98	3.86	111	4.37	140	5.51	140	5.51	155	6.10	170	6.69
Hand wheel	W	100	3.94	100	3.94	100	3.94	125	4.92	160	6.30	160	6.30	180	7.09	200	7.87
Center to Open	H	180	7.09	180	7.09	180	7.09	188	7.40	280	11.02	280	11.02	295	11.61	350	13.78
Dia. of port	d	7	0.28	7	0.28	7	0.28	17.5	0.69	23	0.91	30	1.18	35	1.38	46	1.81
Weight	Kg/Lb	1.8	3.97	1.8	3.97	2	4.41	3.5	7.72	8	17.64	8	17.64	12	26.46	16	35.27

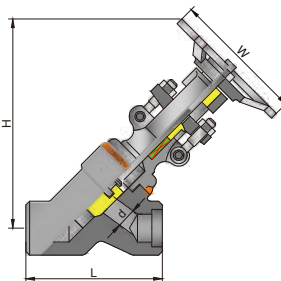


CLASS 900 CLASS 1500		BOLTED BONNET STANDART POTR API602 / ISO15761-FULL PORT TO BS5352 Outside Screw & Yoke - Threaded and Socket Weld Ends															
Full Bore	NPS	3/8"		1/2"		3/4"		1"		1-1/4"		1-1/2"		2"		2-1/2"	
		mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in
End to End	L	98	3.86	111	4.37	111	4.37	140	5.51	140	5.51	155	6.10	170	6.69		
Hand wheel	W	100	3.94	125	4.92	125	4.92	160	6.30	160	6.30	180	7.09	200	7.87		
Center to Open	H	175	6.89	175	6.89	175	6.89	215	8.46	254	10.00	305	12.01	305	12.01		
Dia. of port	d	9	0.35	12	0.47	15	0.59	20	0.79	28	1.10	32	1.26	40	1.57		
Weight	Kg/Lb	2.6	5.73	4.6	10.14	4.6	10.14	9.3	20.50	9.3	20.50	14	30.86	19.6	43.21		

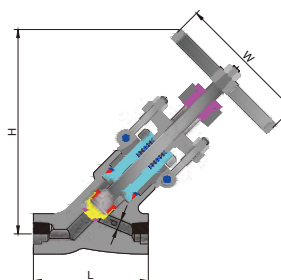


CLASS 900 CLASS 1500		WELDED BONNET STANDART POTR API602 / ISO15761-FULL PORT TO BS5352 Outside Screw & Yoke - Threaded and Socket Weld Ends															
Full Bore	NPS	3/8"		1/2"		3/4"		1"		1-1/4"		1-1/2"		2"		2-1/2"	
		mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in
End to End	L	98	3.86	111	4.37	111	4.37	140	5.51	140	5.51	155	6.10	170	6.69		
Hand wheel	W	100	3.94	125	4.92	125	4.92	160	6.30	160	6.30	180	7.09	200	7.87		
Center to Open	H	175	6.89	175	6.89	175	6.89	215	8.46	254	10.00	305	12.01	305	12.01		
Dia. of port	d	9	0.35	12	0.47	15	0.59	20	0.79	28	1.10	32	1.26	40	1.57		
Weight	Kg/Lb	1.8	3.97	3.5	7.72	3.5	7.72	8	17.64	8	17.64	12	26.46	16	35.27		

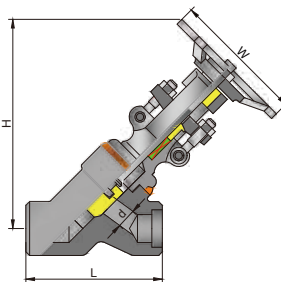
MAIN DIMENSION OF Y TYPE GLOBE VALVE



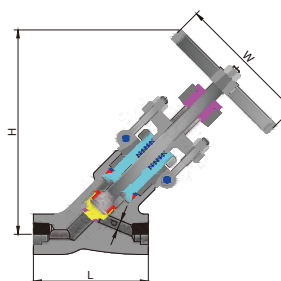
CLASS 2500		WELDED BONNET STANDART POTR API602 / ISO15761-FULL PORT TO BS5352 Outside Screw & Yoke - Threaded and Socket Weld Ends															
Full Bore	NPS	3/8"		1/2"		3/4"		1"		1-1/4"		1-1/2"		2"			
		mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in
End to End	L	186	7.32	186	7.32	186	7.32	186	7.32	232	9.13	232	9.13	310	12.20		
Hand wheel	W	200	7.87	200	7.87	200	7.87	200	7.87	280	11.02	280	11.02	300	11.81		
Center to Open	H	329	12.95	329	12.95	329	12.95	329	12.95	350	13.78	350	13.78	383	15.08		
Dia. of port	d	9	0.35	11	0.43	14	0.55	19	0.75	25	0.98	28	1.10	35	1.38		
Weight	Kg/Lb	12.3	27.12	12.3	27.12	11.6	25.57	10.8	23.81	28	61.73	26.4	58.20	43.8	96.56		



CLASS 2500		PRESSURE SEALED BONNET STANDART POTR API602 / ISO15761-FULL PORT TO BS5352 Outside Screw & Yoke - Threaded and Socket Weld Ends															
Full Bore	NPS	3/8"		1/2"		3/4"		1"		1-1/4"		1-1/2"		2"			
		mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in
End to End	L	186	7.32	186	7.32	186	7.32	186	7.32	232	9.13	232	9.13	310	12.20		
Hand wheel	W	200	7.87	200	7.87	200	7.87	200	7.87	280	11.02	280	11.02	300	11.81		
Center to Open	H	333	13.11	333	13.11	333	13.11	333	13.11	406	15.98	406	15.98	524	20.63		
Dia. of port	d	9	0.35	11	0.43	14	0.55	19	0.75	25	0.98	28	1.10	35	1.38		
Weight	Kg/Lb	12.3	27.12	12.3	27.12	11.6	25.57	10.8	23.81	28	61.73	26.4	58.20	43.8	96.56		



CLASS 4500		WELDED BONNET STANDART POTR API602 / ISO15761-FULL PORT TO BS5352 Outside Screw & Yoke - Threaded and Socket Weld Ends															
Full Bore	NPS	3/8"		1/2"		3/4"		1"		1-1/4"		1-1/2"		2"			
		mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in
End to End	L	155	6.10	155	6.10	155	6.10	155	6.10	225	8.86	225	8.86	225	8.86		
Hand wheel	W	180	7.09	180	7.09	180	7.09	180	7.09	400	15.75	400	15.75	400	15.75		
Center to Open	H	350	13.78	350	13.78	350	13.78	380	14.96	453	17.83	453	17.83	453	17.83		
Dia. of port	d	9	0.35	11	0.43	11	0.43	15	0.59	26	1.02	26	1.02	28	1.10		
Weight	Kg/Lb	9.6	21.16	9.6	21.16	9.4	20.72	10.5	23.15	34	74.96	34	74.96	36	79.37		



CLASS 4500		PRESSURE SEALED BONNET STANDART POTR API602 / ISO15761-FULL PORT TO BS5352 Outside Screw & Yoke - Threaded and Socket Weld Ends															
Full Bore	NPS	3/8"		1/2"		3/4"		1"		1-1/4"		1-1/2"		2"			
		mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in
End to End	L	200	7.87	200	7.87	200	7.87	200	7.87	250	9.84	250	9.84	330	12.99		
Hand wheel	W	280	11.02	280	11.02	280	11.02	280	11.02	300	11.81	300	11.81	320	12.60		
Center to Open	H	400	15.75	400	15.75	400	15.75	400	15.75	460	18.11	460	18.11	540	21.26		
Dia. of port	d	9	0.35	11	0.43	11	0.43	15	0.59	20	0.79	20	0.79	28	1.10		
Weight	Kg/Lb	30	66.14	30	66.14	30	66.14	30	66.14	30	66.14	36	79.37	58	127.87		



MAIN DIMENSION OF GLOBE VALVE

CLASS 150  
CLASS 300  
CLASS 600

BOLTED BONNET STANDART POTR API602 / ISO15761-FULL PORT TO BS5352  
Outside Screw & Yoke - Flange Ends

Full Bore	NPS	1/2"		3/4"		1"		1-1/4"		1-1/2"		2"	
		mm	in	mm	in	mm	in	mm	in	mm	in	mm	in
End to End (L) (RF) (BW)	150Lb	108	4.25	117	4.61	127	5.00	140	5.51	165	6.50	203	7.99
	300Lb	152	5.98	178	7.01	203	7.99	216	8.50	229	9.02	267	10.51
	600Lb	165	6.50	190	7.48	216	8.50	229	9.02	241	9.49	292	11.50
Hand wheel	W	100	3.94	100	3.94	125	4.92	160	6.30	160	6.30	180	7.09
Center to Open(H)	150 300 Lb	180	7.09	184	7.24	217	8.54	224	8.82	260	10.24	300	11.81
	600Lb	164	6.46	164	6.46	203	7.99	224	8.82	260	10.24	300	11.81
Dia. of port	d	9	0.35	13	0.51	17.5	0.69	23	0.91	30	1.18	35	1.38
Weight RF (Kg/Lb)	150Lb	3.45	7.61	4	8.82	6.19	13.65	9.6	21.16	10.5	23.15	17	37.48
	300Lb	3.8	8.38	5.1	11.24	7.2	15.87	12	26.46	13.5	29.76	19.7	43.43
	400Lb	5.6	12.35	7.8	17.20	12.5	27.56	17	37.48	23.5	51.81	38.8	85.54

CLASS 900  
CLASS 1500

BOLTED BONNET STANDART POTR API602 / ISO15761-FULL PORT TO BS5352  
Outside Screw & Yoke - Flange Ends

Full Bore	NPS	1/2"		3/4"		1"		1-1/4"		1-1/2"		2"	
		mm	in	mm	in	mm	in	mm	in	mm	in	mm	in
End to End (L)	(RF,BW)	216	8.50	229	9.02	254	10.00	279	10.98	305	12.01	368	14.49
	(RTJ)	216	8.50	229	9.02	254	10.00	279	10.98	305	12.01	371	14.61
Hand wheel	W	100	3.94	100	3.94	125	4.92	160	6.30	160	6.30	180	7.09
Center to Open	H	180	7.09	184	7.24	217	8.54	224	8.82	260	10.24	300	11.81
Dia. of port	d	9	0.35	13	0.51	17.5	0.69	23	0.91	30	1.18	35	1.38
Weight	Kg/Lb	5.6	12.35	7.8	17.20	12.5	27.56	17	37.48	23.5	51.81	38.8	85.54

CLASS 2500

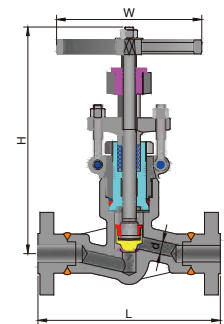
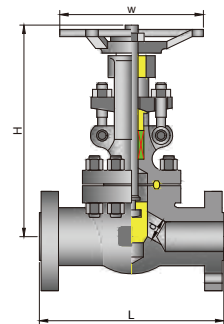
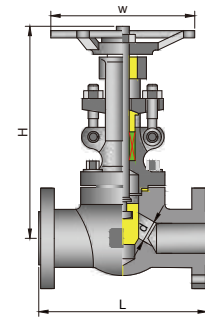
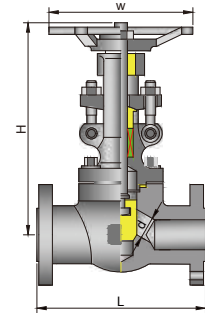
BOLTED BONNET STANDART POTR API602 / ISO15761-FULL PORT TO BS5352  
Outside Screw & Yoke - Flange Ends

Full Bore	NPS	1/2"		3/4"		1"		1-1/4"		1-1/2"		2"	
		mm	in	mm	in	mm	in	mm	in	mm	in	mm	in
End to End (L)	(RF,BW)	264	10.39	273	10.75	308	12.13			384	15.12	451	17.76
	(RTJ)	264	10.39	273	10.75	308	12.13			387	15.24	454	17.87
Hand wheel	W	125	4.92	160	6.30	160	6.30			200	7.87	240	9.45
Center to Open	H	207	8.15	240	9.45	258	10.16			355	13.98	300	11.81
Dia. of port	d	11	0.43	14	0.55	19	0.75			30	1.18	35	1.38
Weight	Kg/Lb	19.5	42.99	9.4	20.72	10.5	23.15			65	143.3	95	209.4

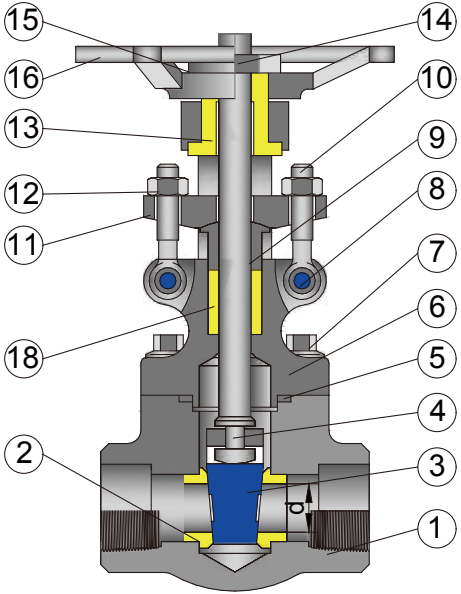
CLASS 2500

PRESSURE SEALED BONNET STANDART POTR API602 / ISO15761-FULL PORT TO BS5352  
Outside Screw & Yoke - Weld Flange Ends

Full Bore	NPS	1/2"		3/4"		1"		1-1/4"		1-1/2"		2"	
		mm	in	mm	in	mm	in	mm	in	mm	in	mm	in
End to End (L)	(RF,BW)	264	10.39	273	10.75	308	12.13	349	13.74	384	15.12	451	17.76
	(RTJ)	264	10.39	273	10.75	308	12.13	349	13.74	387	15.24	454	17.87
Hand wheel	W	300	11.81	200	7.87	280	11.02	280	11.02	280	11.02	300	11.81
Center to Open	H	320	12.60	320	12.60	320	12.60	440	17.32	440	17.32	490	19.29
Dia. of port	d	11	0.43	14	0.55	19	0.75	25	0.98	28	1.10	35	1.38
Weight	Kg/Lb	21.5	47.40	24.7	54.45	30.4	67.02	48.1	106.04	58.1	128.1	130	286.6



GATE VALVE



STANDARD

Design & Manufacture: BS 5352/API 602  
Test & Inspection: API 598  
Marking: MSS SP25  
Flange End: ANSI B16.5  
Socket Weld (SW) End: ANSI B16.11  
Screw (NPT) End: ANSI B1.20.1  
Butt Weld (BW) End: ANSI B16.25  
Outside Screw and Yoke (OS&Y), Self-aligning Packing Gland in Two Parts, Spiral-wound Gasket, Retained Type Integral Backseat  
Ratings:  
-Carbon Steel Class 800: 1975 psig @ 100°F, 138 bar @ +38°C  
-Carbon Steel Class 1500: 3705 psig @ 100°F, 255 bar @ +38°C

**1. BODY.** The body is forged steel and designed to the basic dimensional requirements of the applicable specifications such as API 602 and ASME B16.34. The body is available in both the full or standard port design.

**6. BONNET.** The bonnet is forged steel, has an integral backseat and incorporates the stuffing box, which has dimensions per the applicable specifications such as API 602.

**A. BODY-BONNET JOINT.** Two different bonnet joint designs are available. These are either the bolted bonnet or the threaded and seal welded type.

**5. GASKET.** The bolted bonnet joint design valve uses a contained, controlled compression, spiral wound type gasket.

**5. BONNET BOLTING.** The bonnet bolting is manufactured of alloy steel in accordance with the requirements of the applicable specifications such as API 602 and ASME B16.34.

**2. SEAT RINGS.** The seat rings are steel and makeup part of the valve trim. They are pressed into the valve body and wedged into place, forming a seal with the body. The seating surfaces are ground and lapped.

**3. WEDGE.** The wedge, which is solid design, is forged or investment cast steel and is part of the valve trim. The seating surfaces are ground and lapped.

**4. STEM.** The stem is forged steel and part of the valve trim. It contains an integral back seat shoulder, which mates with the integral backseat of the bonnet. The stem is designed to the basic dimensional requirements of the applicable specifications such as API 602.

**11. GLAND AND FLANGE.** The gland, gland flange assembly utilizes a separate, two piece design. This self aligning design allows the flange to be unevenly tightened while the gland maintains it's parallel alignment with the stem and stuffing box.

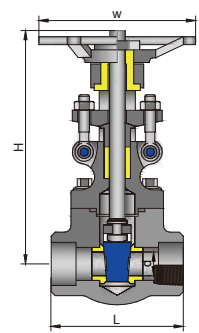
**12. GLAND BOLTS AND NUTS.** The steel/stainless steel gland bolt and nut assembly is a stud, double nut arrangement. This design allows complete removal from the valve when service is required. The use of industry standard thread full length studs and nuts also allows easy replacement should these items be lost or in need of replacement.

**13. YOKE SLEEVE.** The yoke sleeve is of forged stainless steel material having a high melting point and is resistant to wear and corrosion.

**16. HANDWHEEL.** The handwheel is forged carbon steel of an openspoke design. This robust construction along with appropriate sizing allows for ease of operation.



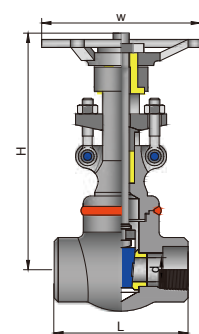
MAIN DIMENSION OF GLOBE VALVE



CLASS 800

BOLTED BONNET STANDART POTR API602 / ISO15761-FULL PORT TO BS5352  
Outside Screw &Yoke - Threaded and Socket Weld Ends.

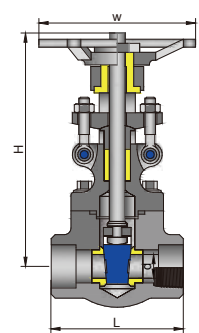
Reduced Bore	NPS			1/2"		3/4"		1"		1-1/4"		1-1/2"		2"		2-1/2"		3"	
		1/4"		3/8"		1/2"		3/4"		1"		1-1/4"		1-1/2"		2"		2-1/2"	
		mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in
End to End	L	79	3.1	79	3.1	92	3.6	111	4.4	120	4.7	120	4.7	140	5.5	178	7.0	180	7.1
Hand wheel	W	100	3.9	100	3.9	100	3.9	125	4.9	160	6.3	160	6.3	180	7.1	200	7.9	220	8.7
Center to Open	H	161	6.3	161	6.3	163	6.4	196	7.7	223	8.8	251	9.9	290	11.4	333	13.1	370	14.6
Dia. of port	d	8	0.3	10.5	0.4	13.5	0.5	18	0.7	24	0.9	29	1.1	36.5	1.4	45	1.8	51	2.0
Weight	Kg/Lb	2.3	5.1	2.2	4.9	2.4	5.3	4.2	9.3	5.7	12.6	7.1	15.5	10.9	24	16.8	37	24	52.9



CLASS 800

WELDED BONNET STANDART POTR API602 / ISO15761-FULL PORT TO BS5352  
Outside Screw &Yoke - Threaded and Socket Weld Ends

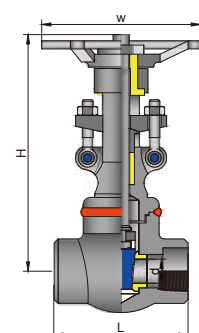
Reduced Bore	NPS			1/2"		3/4"		1"		1-1/4"		1-1/2"		2"		2-1/2"		3"	
		1/4"		3/8"		1/2"		3/4"		1"		1-1/4"		1-1/2"		2"		2-1/2"	
		mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in
End to End	L	79	3.1	79	3.1	92	3.6	111	4.4	120	4.7	120	6.0	140	6.8	178	7.9	180	7.9
Hand wheel	W	100	3.9	100	3.9	100	3.9	125	4.9	160	6.3	160	6.3	180	7.1	200	8.7	220	8.7
Center to Open	H	161	6.3	161	6.3	163	6.4	196	7.7	223	8.8	251	9.9	290	11.4	333	13.1	370	14.6
Dia. of port	d	8	0.3	10.5	0.4	13.5	0.5	18	0.7	24	0.9	29	1.2	36.5	1.4	45	1.8	51	1.8
Weight	Kg/Lb	1.9	4.2	1.9	4.2	2.1	4.6	3.2	7.1	5.2	11.5	6.9	15.2	10.4	22.9	15.8	34.8	22	38.6



CLASS 900  
CLASS 1500

BOLTED BONNET STANDART POTR API602 / ISO15761-FULL PORT TO BS5352  
Outside Screw &Yoke - Threaded and Socket Weld Ends

Reduced Bore	NPS			1/2"		3/4"		1"		1-1/4"		1-1/2"		2"		2-1/2"			
		1/4"		3/8"		1/2"		3/4"		1"		1-1/4"		1-1/2"		2"			
		mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in
End to End	L	92	3.6	111	4.4	111	4.4	120	4.7	120	4.7	140	5.5	178	7.0	180	7.1		
Hand wheel	W	100	3.9	125	4.9	125	4.9	160	6.3	160	6.3	180	7.1	200	7.9	240	9.5		
Center to Open	H	171	6.7	207	8.2	207	8.2	240	9.5	258	10.2	330	13.0	355	14.0	370	14.6		
Dia. of port	d	7	0.3	12	0.5	15	0.6	20	0.8	28	1.1	32	1.26	40	1.6	45	1.8		
Weight	Kg/Lb	2.3	5.1	3.7	8.2	3.6	7.9	3.6	7.9	7.6	16.8	11.6	25.6	15	33.1	21.9	48.3		

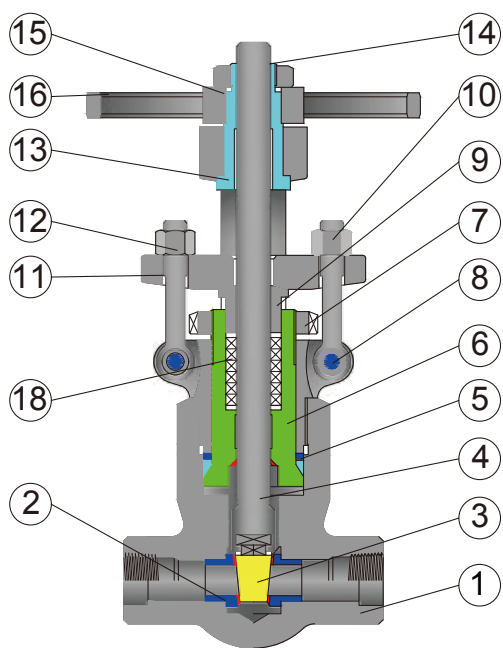


CLASS 900  
CLASS 1500

PRESSURE SEALED BONNET STANDART POTR API602 / ISO15761-FULL PORT TO BS5352  
Outside Screw &Yoke - Weld Flange Ends

Reduced Bore	NPS			1/2"		3/4"		1"		1-1/4"		1-1/2"		2"		2-1/2"			
		1/4"		3/8"		1/2"		3/4"		1"		1-1/4"		1-1/2"		2"			
		mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in
End to End	L	92	3.62	111	4.37	111	4.37	120	4.72	152	5.98	172	6.77	200	7.87	220	8.66		
Hand wheel	W	100	3.94	125	4.92	125	4.92	160	6.30	160	6.30	180	7.09	200	7.87	240	9.45		
Center to Open	H	171	6.7	207	8.1	207	8.1	240	9.4	258	10.2	330	13.0	355	14.0	370	14.6		
Dia. of port	d	8	0.3	10.5	0.4	13.5	0.5	18	0.7	24	0.9	29	1.1	36.5	1.4	45	1.8		
Weight	Kg/Lb	2.3	5.1	4	8.8	4	8.8	4.8	10.6	7.1	15.7	11	24.3	16	35.3	22.8	50.3		

PRESSURE SEALED BONNET GATE VALVE



STANDARD

Design & Manufacture: BS 5352/API 602

Test & Inspection: API 598

Marking: MSS SP25

Flange End: ANSI B16.5

Socket Weld (SW) End: ANSI B16.11

Screw (NPT) End: ANSI B1.20.1

Butt Weld (BW) End: ANSI B16.25

Outside Screw and Yoke (OS&Y), Self-aligning Packing Gland in Two Parts, Spiral-wound Gasket, Retained Type Integral Backseat

Ratings:

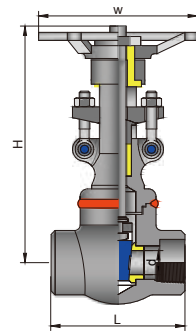
-Carbon Steel Class 800: 1975 psig @ 100°F, 138 bar @ +38°C

-Carbon Steel Class 1500: 3705 psig @ 100°F, 255 bar @ +38°C

1. BODY. The body is forged steel and designed to the basic dimensional requirements of the applicable specifications such as API 602 and ASME B16.34. The body is available in both the full or standard port design.
6. BONNET. The bonnet is forged steel, has an integral backseat and incorporates the stuffing box, which has dimensions per the applicable specifications such as API 602.
3. BODY-BONNET JOINT. Two different bonnet joint designs are available. These are either the bolted bonnet or the threaded and seal welded type.
5. GASKET. The bolted bonnet joint design valve uses a contained, con- trolled compression, spiral wound type gasket.
7. BONNET BOLTING. The bonnet bolting is manufactured of alloy steel in accordance with the requirements of the applicable specifications such as API 602 and ASME B16.34.
2. SEAT RINGS. The seat rings are steel and makeup part of the valve trim. They are pressed into the valve body and wedged into place, forming a seal with the body. The seating surfaces are ground and lapped.
3. WEDGE. The wedge, which is solid design, is forged or investment cast steel and is part of the valve trim. The seating surfaces are ground and lapped.
- B. When a stainless steel pressure seal gasket is used, the body contact surface is provided with a stainless steel overlay to ensure a tight seal over the life of the valve.
- C.The pressure seal bonnet is offered in two different designs: 1.For small sizes the thrust ring, made of stainless steel, is screwed on the body. 2.For larger sizes the thrust ring is a segmented ring inserted in the body cavity.
4. STEM. The stem is forged steel and part of the valve trim. It contains an integral back seat shoulder, which mates with the integral backseat of the bonnet. The stem is designed to the basic dimensional require- ments of the applicable specifications such as API 602.
9. GLAND AND FLANGE. The gland, gland flange assembly utilizes a separate, two piece design. This self aligning design allows the flange to be unevenly tightened while the gland maintains it's parallel align- ment with the stem and stuffing box.
10. GLAND BOLTS AND NUTS. The steel/stainless steel gland bolt and nut assembly is a stud, double nut arrangement. This design allows complete removal from the valve when service is required. The use of industry standard thread full length studs and nuts also allows easy replacement should these items be lost or in need of replacement.
11. YOKE SLEEVE. The yoke sleeve is of forged stainless steel material having a high melting point and is resistant to wear and corrosion.
12. HANDWHEEL. The handwheel is forged carbon steel of an openspoke design. This robust construction along with appropriate sizing allows for ease of operation.
- D.Flowks pressure seal valves are designed in accordance with ASME B16.34 and where applicable with API Std 600 or ISO 10434.Ratings: 900 - 1500 and 2500 lbs standard and special class according to ANSI B16.34.



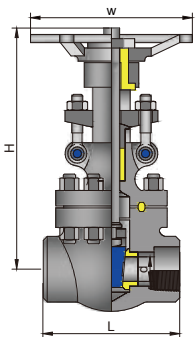
GATE VALVE



CLASS 2500

WELDED BONNET STANDART POTR API602 / ISO15761-FULL PORT TO BS5352  
Outside Screw &Yoke - Threaded and Socket Weld Ends

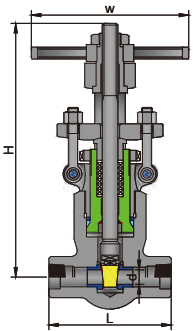
Full Bore	NPS	1/4"		3/8"		1/2"		3/4"		1"		1-1/4"	
		mm	in	mm	in	mm	in	mm	in	mm	in	mm	in
End to End	(L)			111	4.4	120	4.7	120	4.7	120	4.7	140	5.5
Hand wheel	W			125	4.9	160	6.3	160	6.3	180	7.1	220	8.7
Center to Open	H			215	8.5	218	8.6	220	8.7	238	9.4	281	11.1
Dia. of port	d			14	0.6	14	0.6	14	0.6	19	0.7	25	1.0
Weight	Kg/Lb			5.1	11.2	8.7	19.2	8.7	19.2	11.7	25.8	14	30.9



CLASS 2500

BOLTED BONNET STANDART POTR API602 / ISO15761-FULL PORT TO BS5352  
Outside Screw &Yoke - Threaded and Socket Weld Ends

Full Bore	NPS	1/2"		3/4"		1"		1-1/4"		1-1/2"		2"	
		mm	in	mm	in	mm	in	mm	in	mm	in	mm	in
End to End	L	1500Lb	110	4.3	150	5.9	150	5.9		210	8.3	235	9.3
		2500Lb	150	5.9	150	5.9	210	8.3		235	9.3	235	9.3
Hand wheel	W	1500Lb	110	4.3	130	5.1	130	5.1		180	7.1	250	9.8
		2500Lb	130	5.1	130	5.1	250	9.8		300	11.8	300	11.8
Center to Open	H	1500Lb	277	10.9	300	11.8	390	15.4		400	15.7	435	17.1
		2500Lb	293	11.5	300	11.8	390	15.4		435	17.1	435	17.1
Dia. of port	d	1500Lb	14	0.6	17	0.7	22	0.9		35	1.4	37	1.5
		2500Lb	14	0.6	14	0.6	14	0.6		25	1.0	30	1.2
Weight	Kg/Lb	1500Lb	5.1	11.2	11	24.3	12.1	26.7		22	48.5	37	81.6
		2500Lb	11	24.3	11.3	24.9	22.4	49.4		38	83.8	38	83.8

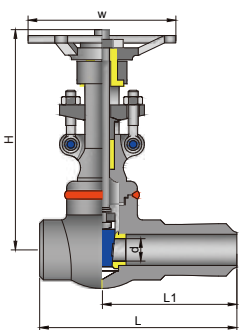


CLASS 4500

PRESSURE SEALED BONNET STANDART POTR API602 / ISO15761-FULL PORT TO BS5352  
Outside Screw &Yoke - Threaded and Socket Weld Ends

Full Bore	NPS	3/8"		1/2"		3/4"		1"		1-1/4"			1-1/2"		2"	
		mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	
End to End	L	1500Lb	140	5.5	140	5.5	140	5.5	140	5.5	178	7.0	178	7.0	216	8.5
		2500Lb	186	7.3	186	7.3	186	7.3	186	7.3	232	9.1	232	9.1	279	11.0
Hand wheel	W	1500Lb	200	7.9	200	7.9	200	7.9	200	7.9	280	11.0	280	11.0	300	11.8
		2500Lb	200	7.9	200	7.9	200	7.9	200	7.9	280	11.0	280	11.0	300	11.8
Center to Open	H	1500Lb	318	12.5	318	12.5	318	12.5	322	12.7	467	18.4	468	18.4	540	21.3
		2500Lb	325	12.8	325	12.8	325	12.8	327	12.9	467	18.4	468	18.4	540	21.3
Dia. of port	d	1500Lb	14	0.6	14	0.6	14	0.6	19	0.7	25	1.0	30	1.2	36.5	1.4
		2500Lb	14	0.6	14	0.6	14	0.6	19	0.7	25	1.0	30	1.2	36.5	1.4
Weight	Kg/Lb	1500Lb	11.5	25.4	11.5	25.4	10.8	23.8	10.5	23.1	19.6	43.2	21	46.3	55.4	122.1
		2500Lb	12.3	27.1	12.3	27.1	11.6	25.6	10.8	23.8	26.5	7.3	28.4	62.6	60	132.3

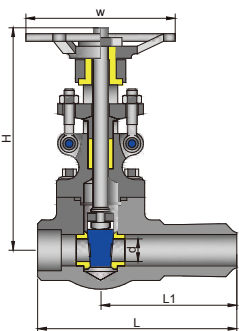
GATE VALVE



CLASS 800

WELDED BONNET STANDART POTR API602 / ISO15761-FULL PORT TO BS5352  
Outside Screw &Yoke - Threaded and Socket Weld Ends

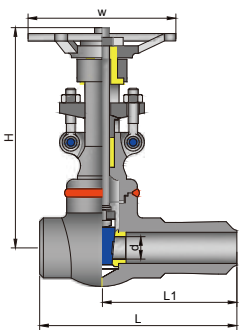
Full Bore	NPS	1/2"		3/4"		1"		1-1/4"		1-1/2"		2"	
		mm	in	mm	in	mm	in	mm	in	mm	in	mm	in
End to End	L	192	7.56	215	8.46	239	9.41	239	9.41	258	10.16	262	10.31
		153	6.02	153	6.02	182	7.17	182	7.17	216	8.50	216	8.50
End to End Extended	L1	152	5.98	170	6.69	184	7.24	184	7.24	193	7.60	197	7.76
		108	4.25	108	4.25	127	5.00	127	5.00	152	5.98	152	5.98
Hand wheel	W	100	3.94	100	3.94	125	4.92	160	6.30	160	6.30	180	7.09
Center to Open	H	161	6.34	163	6.42	196	7.72	223	8.78	251	9.88	290	11.42
Dia. of port	d	10.5	0.41	13.5	0.53	18	0.71	24	0.94	29	1.14	36.5	1.44



CLASS 800

BOLTED BONNET STANDART POTR API602 / ISO15761-FULL PORT TO BS5352  
Outside Screw &Yoke - Threaded and Socket Weld Ends

Full Bore	NPS	1/2"		3/4"		1"		1-1/4"		1-1/2"		2"	
		mm	in	mm	in	mm	in	mm	in	mm	in	mm	in
End to End	L	192	7.56	215	8.46	239	9.41	239	9.41	258	10.16	262	10.31
		153	6.02	153	6.02	182	7.17	182	7.17	216	8.50	216	8.50
End to End Extended	L1	152	5.98	170	6.69	184	7.24	184	7.24	193	7.60	197	7.76
		108	4.25	108	4.25	127	5.00	127	5.00	152	5.98	152	5.98
Hand wheel	W	100	3.94	100	3.94	125	4.92	160	6.30	160	6.30	180	7.09
Center to Open	H	161	6.34	163	6.42	196	7.72	223	8.78	251	9.88	290	11.42
Dia. of port	d	10.5	0.41	13.5	0.53	18	0.71	24	0.94	29	1.14	36.5	1.44



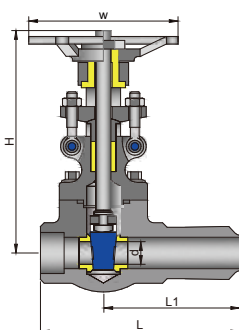
CLASS 900

WELDED BONNET STANDART POTR API602 / ISO15761-FULL PORT TO BS5352

CLASS 1500

Outside Screw &Yoke - Threaded and Socket Weld Ends

Full Bore	NPS	1/2"		3/4"		1"		1-1/4"		1-1/2"		2"	
		mm	in	mm	in	mm	in	mm	in	mm	in	mm	in
End to End	L	239	9.41	239	9.41	239	9.41	258	10.16	262	10.31	264	10.39
		182	7.17	182	7.17	182	7.17	216	8.50	216	8.50	264	10.39
End to End Extended	L1	184	7.24	184	7.24	184	7.24	193	7.60	197	7.76	189	7.44
		127	5.00	127	5.00	127	5.00	152	5.98	152	5.98	189	7.44
Hand wheel	W	125	4.92	125	4.92	160	6.30	160	6.30	180	7.09	200	7.87
Center to Open	H	207	8.15	207	8.15	240	9.45	258	10.16	330	12.99	370	14.57
Dia. of port	d	10.5	0.41	13.5	0.53	18	0.71	24	0.94	29	1.14	36.5	1.44



CLASS 900

BOLTED BONNET STANDART POTR API602 / ISO15761-FULL PORT TO BS5352

CLASS 1500

Outside Screw &Yoke - Threaded and Socket Weld Ends

Full Bore	NPS	1/2"		3/4"		1"		1-1/4"		1-1/2"		2"	
		mm	in	mm	in	mm	in	mm	in	mm	in	mm	in
End to End	L	239	9.41	239	9.41	239	9.41	258	10.16	262	10.31	264	10.39
		182	7.17	182	7.17	182	7.17	216	8.50	216	8.50	264	10.39
End to End Extended	L1	184	7.24	184	7.24	184	7.24	193	7.60	197	7.76	189	7.44
		127	5.00	127	5.00	127	5.00	152	5.98	152	5.98	189	7.44
Hand wheel	W	125	4.92	125	4.92	160	6.30	160	6.30	180	7.09	200	7.87
Center to Open	H	207	8.15	207	8.15	240	9.45	258	10.16	330	12.99	370	14.57
Dia. of port	d	10.5	0.41	13.5	0.53	18	0.71	24	0.94	29	1.14	36.5	1.44



GATE VALVE

CLASS 150  
CLASS 300  
CLASS 600

BOLTED BONNET STANDART POTR API602 / ISO15761-FULL PORT TO BS5352  
Outside Screw &Yoke - Flange Ends

Full Bore	NPS	1/2"		3/4 "		1"		1-1/4"		1-1/2"		2"		1-1/2"	
		mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in
End to End (RF) (BW)	150Lb	108	4.25	117	4.61	127	5.00	140	5.51	165	6.50	178	7.01	190	7.48
	300Lb	140	5.51	152	5.98	165	6.50	178	7.01	190	7.48	216	8.50	241	9.49
	600Lb	165	6.50	190	7.48	216	8.50	229	9.02	241	9.49	292	11.50	330	13
Hand wheel	W	100	3.94	100	3.94	125	4.92	160	6.30	160	6.30	180	7.09	200	7.87
	150 300 Lb	176	6.93	184	7.24	217	8.54	226	8.90	250	9.84	290	11.42	357	14.06
	600Lb	161	6.34	163	6.42	196	7.72	226	8.90	250	9.84	290	11.42	357	14.06
Dia. of port	d	10	0.39	13.5	0.53	18	0.71	24	0.94	29	1.14	36.5	1.44	45	1.77
Weight RF (Kg/Lb)	150Lb	3.4	7.50	3.98	8.77	6.12	13.49	7.2	15.87	10.4	22.93	15.5	34.17	24.5	54
	300Lb	3.77	8.31	7.89	17.39	7.23	15.94	9.6	21.16	12.6	27.78	18	39.7	26.2	57.8
	600Lb	4.2	9.26	5.8	12.8	8.8	19.4	12.1	26.7	15.6	34.4	19.5	43	32	70.6

CLASS 900  
CLASS 1500

BOLTED BONNET STANDART POTR API602 / ISO15761-FULL PORT TO BS5352  
Outside Screw &Yoke - Flange Ends

Full Bore	NPS	1/2"		3/4"		1"		1-1/4"		1-1/2"		2"	
		mm	in	mm	in	mm	in	mm	in	mm	in	mm	in
End to End (L)	(RFBW)	216	8.50	229	9.02	254	10.00	279	11	305	12.01	368	14.5
	(RTJ)	216	8.50	229	9.02	254	10.00	279	11	305	12.01	371	14.6
Hand wheel	W	125	4.92	125	4.92	160	6.30	180	7.1	200	7.87	220	8.7
Center to Open	H	191	7.52	192	7.56	219	8.62	257	10.1	296	11.65	316	12.4
Dia. of port	d	13.5	0.53	18	0.71	24	0.94	29	1.1	36.5	1.44	45	1.8
Weight	Kg/Lb	7.2	15.87	11.5	25.35	15.6	34.39	16.2	35.7	22.6	49.82	28.2	62.2

CLASS 2500

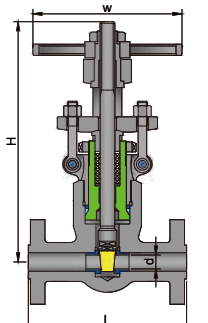
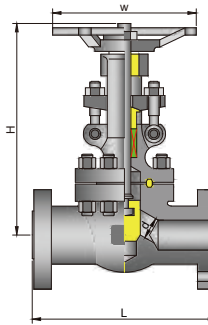
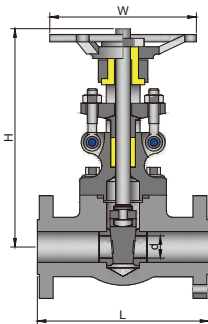
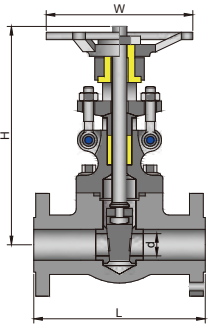
BOLTED BONNET STANDART POTR API602 / ISO15761-FULL PORT TO BS5352  
Outside Screw &Yoke - Flange Ends

Full Bore	NPS	1/2"		3/4"		1"		1-1/4"		1-1/2"		2"	
		mm	in	mm	in	mm	in	mm	in	mm	in	mm	in
End to End (L)	(RFBW)	264	10.4	273	10.75	308	12.13			384	15.12	451	17.76
	(RTJ)	264	10.4	273	10.75	308	12.13			387	15.24	454	17.87
Hand wheel	W	125	4.9	160	6.3	160	6.30			200	7.87	240	9.45
Center to Open	H	207	8.15	240	9.45	258	10.16			355	14	370	14.6
Dia. of port	d	13.5	0.53	13.5	0.53	19	0.75			30	1.18	36.5	1.44
Weight	Kg/Lb	19.5	43	21.5	47.4	42	92.6			65	143.3	95	209.4

CLASS 2500

PRESSURE SEALED BONNET STANDART POTR API602 / ISO15761-FULL PORT TO BS5352  
Outside Screw &Yoke - Flange Ends

Full Bore	NPS	1/2"		3/4"		1"		1-1/4"		1-1/2"		2"	
		mm	in	mm	in	mm	in	mm	in	mm	in	mm	in
End to End (L)	(RFBW)	264	10.4	273	10.75	308	12.13			384	15.12	451	17.76
	(RTJ)	264	10.4	273	10.75	308	12.13			387	15.24	454	17.87
Hand wheel	W	200	7.87	200	7.87	200	7.87			280	11.02	300	11.81
Center to Open	H	325	12.8	325	12.8	327	12.87			478	18.82	540	21.26
Dia. of port	d	13.5	0.53	13.5	0.53	19	0.75			30	1.18	36.5	1.44
Weight	Kg/Lb	4.6	10.14	6.8	15	7.6	16.76			15	33.07	21.5	47.40



CHECK VALVE

STANDARD

Design & Manufacture: BS 5352/API 602

Test & Inspection: API 598

Marking: MSS SP25

Flange End: ANSI B16.5

Socket Weld (SW) End: ANSI B16.11

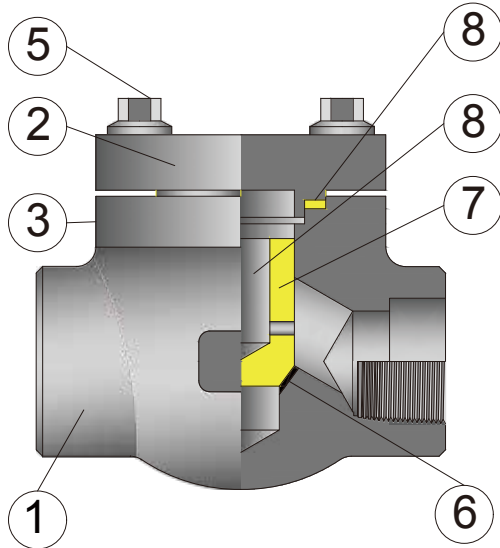
Screw (NPT) End: ANSI B1.20.1

Butt Weld (BW) End: ANSI B16.25

Ratings:

-Carbon Steel Class 800: 1975 psig @ 100°F, 138 bar @ +38

-Carbon Steel Class 1500: 3705 psig @ 100°F, 255 bar @ +38



**1. BODY.** The body is forged steel and designed to the basic dimensional requirements of the applicable specifications such as API 602 and ASME B16.34. The body is available in both the full or standard port design.

**6. BONNET.** The bonnet is forged steel, has an integral backseat and incorporates the stuffing box, which has dimensions per the applicable specifications such as API 602.

**3. BODY-BONNET JOINT.** Two different bonnet joint designs are available. These are either the bolted bonnet or the threaded and seal welded type.

**5. GASKET.** The bolted bonnet joint design valve uses a contained, controlled compression, spiral wound type gasket.

**5. BONNET BOLTING.** The bonnet bolting is manufactured of alloy steel in accordance with the requirements of the applicable specifications such as API 602 and ASME B16.34.

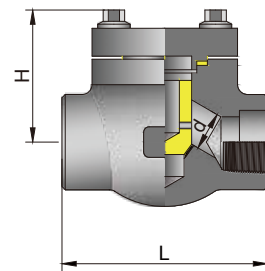
**6. SEAT RINGS.** The seat rings are steel and makeup part of the valve trim. They are pressed into the valve body and wedged into place, forming a seal with the body. The seating surfaces are ground and lapped.

**7.DISC.** The disc is forged steel and is part of the valve trim. The disc seating surface is of the tapered or plug type design. The disc is attached to the stem using a loose or swivel disc arrangement.





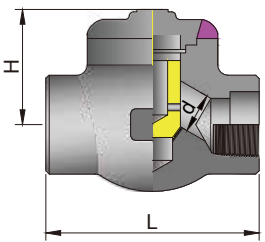
CHECK VALVE



CLASS 800

BOLTED BONNET STANDART POTR API602 / ISO15761-FULL PORT TO BS5352  
Outside Screw &Yoke - Threaded and Socket Weld Ends

Reduced Bore	NPS			1/2"		3/4"		1"		1-1/4"		1-1/2"		2"		2-1/2"	
		1/4"		3/8"		1/2"		3/4"		1"		1-1/4"		1-1/2"		2"	
Full Bore		mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in
End to End L	Lift	79	3.1	79	3.1	92	3.6	111	4.4	120	4.7	152	6.0	172	6.8	200	7.9
	Swing	79	3.1	79	3.1	92	3.6	111	4.4	120	4.7	152	6.0	172	6.8	200	7.9
Center to Open H	Lift	61	2.4	61	2.4	61	2.4	78	3.1	84	3.3	84	3.3	118	4.6	132	5.2
	Swing	61	2.4	61	2.4	61	2.4	78	3.1	84	3.3	84	3.3	120	4.7	133	5.2
Dia. of port d	Lift	7	0.3	9	0.4	13	0.5	17.5	0.7	23	0.9	30	1.2	35	1.4	46	1.8
	Swing	8	0.3	10.5	0.4	13.5	0.5	18	0.7	24	0.9	29	1.1	36.5	1.4	45	1.8
Weight Kg/Lb	Lift	1.2	2.6	1.5	3.3	1.7	3.7	3.3	7.3	4.2	9.3	4.2	9.3	10.5	23.1	12.5	27.6
	Swing	1.4	3.1	1.5	3.3	1.7	3.7	3.3	7.3	4.2	9.3	4.2	9.3	8.5	18.7	10.9	24.0



CLASS 800

WELDED BONNET STANDART POTR API602 / ISO15761-FULL PORT TO BS5352  
Outside Screw &Yoke - Threaded and Socket Weld Ends

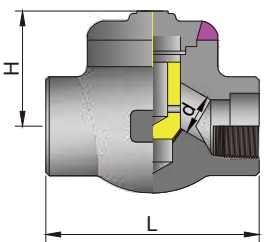
Reduced Bore	NPS			1/2"		3/4"		1"		1-1/4"		1-1/2"		2"		2-1/2"	
		1/4"		3/8"		1/2"		3/4"		1"		1-1/4"		1-1/2"		2"	
Full Bore		mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in
End to End	L	79	3.1	79	3.1	92	3.6	111	4.4	120	4.7	152	6.0	172	6.8	200	7.9
Center to Open	H	61	2.4	61	2.4	61	2.4	78	3.1	84	3.3	103	4.1	118	4.6	132	5.2
Dia. of port	d	7	0.3	7	0.3	13	0.5	17.5	0.7	23	0.9	30	1.2	35	1.4	46	1.8
Weight	Kg/Lb	1.2	2.6	1.2	2.6	1.5	3.3	3	6.6	3.9	8.6	6	13.2	10	22	12	26.5

CLASS 900

CLASS 1500

BOLTED BONNET STANDART POTR API602 / ISO15761-FULL PORT TO BS5352  
Outside Screw &Yoke - Threaded and Socket Weld Ends

Reduced Bore	NPS			1/2"		3/4"		1"		1-1/4"		1-1/2"		2"	
		Full Bore		1/4"		3/8"		1/2"		3/4"		1"		1-1/4"	
		mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in
End to End L	Lift	92	3.6	111	4.4	111	4.4	120	4.7	152	6.0	172	6.8	200	7.9
	Swing	92	3.6	111	4.4	111	4.4	120	4.7	120	4.7	140	5.5	178	7.0
Center to Open H	Lift	61	2.4	78	3.1	78	3.1	84	3.3	103	4.1	118	4.6	132	5.2
	Swing	61	2.4	78	3.1	78	3.1	84	3.3	101	4.0	120	4.7	133	5.2
Dia. of port d	Lift	7	0.3	12	0.5	15	0.6	20	0.8	28	1.1	32	1.3	40	1.6
	Swing	8	0.3	10.5	0.4	13.5	0.5	18	0.7	24	0.9	29	1.1	45	1.8
Weight Kg/Lb	Lift	1.5	3.3	3.4	7.5	3.3	7.3	4.2	9.3	6.3	13.9	10.5	23.1	5.2	27.6
	Swing	1.5	3.3	3.4	7.5	3.3	7.3	4.2	9.3	5	11.0	8.5	18.7	10.9	24.0



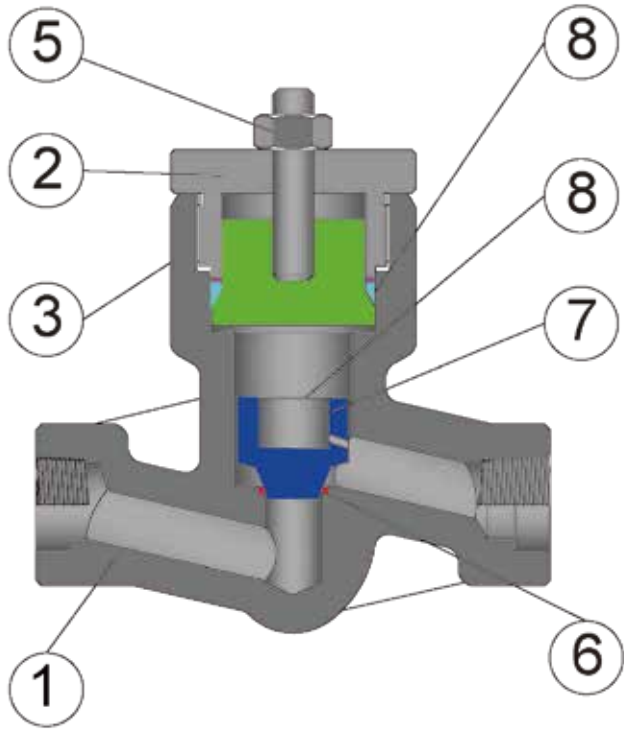
CLASS 900

CLASS 1500

WELDED BONNET STANDART POTR API602 / ISO15761-FULL PORT TO BS5352  
Outside Screw &Yoke - Threaded and Socket Weld Ends

Reduced Bore	NPS			1/2"		3/4"		1"		1-1/4"		1-1/2"		2"	
		1/4"		3/8"		1/2"		3/4"		1"		1-1/4"		1-1/2"	
Full Bore		mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in
End to End	L	92	3.6	111	4.4	111	4.4	120	4.7	152	6.0	172	6.8	200	7.9
Center to Open	H	61	2.4	78	3.1	78	3.1	84	3.3	103	4.1	118	4.6	132	5.2
Dia. of port	d	7	0.3	12	0.5	15	0.6	20	0.8	28	1.1	32	1.3	40	1.6
Weight	Kg/Lb	1.3	2.9	3.1	6.8	3.1	6.8	3.9	8.6	5.8	12.8	10	22	11.5	25.4

PRESSURE SEALED BONNET CHECK VALVE



STANDARD

Design & Manufacture: BS 5352/API 602  
Test & Inspection: API 598  
Marking: MSS SP25  
Flange End: ANSI B16.5  
Socket Weld (SW) End: ANSI B16.11  
Screw (NPT) End: ANSI B1.20.1  
Butt Weld (BW) End: ANSI B16.25  
Ratings:  
-Carbon Steel Class 800: 1975 psig @ 100°F, 138 bar @ +38  
-Carbon Steel Class 1500: 3705 psig @ 100°F, 255 bar @ +38  
255 bar + 38° C

**1. BODY.** The body is forged steel and designed to the basic dimensional requirements of the applicable specifications such as API 602 and ASME B16.34. The body is available in both the full or standard port design.

**2. BONNET.** The bonnet is forged steel, has an integral backseat and incorporates the stuffing box, which has dimensions per the applicable specifications such as API 602.

**A. BODY-BONNET JOINT.** Two different bonnet joint designs are available. These are either the bolted bonnet or the threaded and seal welded type.

**8. GASKET.** The bolted bonnet joint design valve uses a contained, controlled compression, spiral wound type gasket.

**5. BONNET BOLTING.** The bonnet bolting is manufactured of alloy steel in accordance with the requirements of the applicable specifications such as API 602 and ASME B16.34.

**6. SEAT RINGS.** The seat rings are steel and makeup part of the valve trim. They are pressed into the valve body and wedged into place, forming a seal with the body. The seating surfaces are ground and lapped.

**7.DISC.** The disc is forged steel and is part of the valve trim. The disc seating surface is of the tapered or plug type design. The disc is attached to the stem using a loose or swivel disc arrangement.

**B.** When a stainless steel pressure seal gasket is used, the body contact surface is provided with a stainless steel overlay to ensure a tight seal over the life of the valve.

**C.**The pressure seal bonnet is offered in two different designs:  
1.For small sizes the thrust ring, made of stainless steel, is screwed on the body.  
2.For larger sizes the thrust ring is a segmented ring inserted in the body cavity.

**5. GLAND BOLTS AND NUTS.** The steel/stainless steel gland bolt and nut assembly is a stud, double nut arrangement. This design allows complete removal from the valve when service is required. The use of industry standard thread full length studs and nuts also allows easy replacement should these items be lost or in need of replacement.

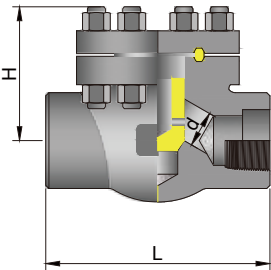
**D.**Flowks pressure seal valves are designed in accordance with ASME B16.34 and where applicable with API Std 600 or ISO 10434.Ratings: 900 - 1500 and 2500 lbs standard and special class according to ANSI B16.34.



CHECK VALVE

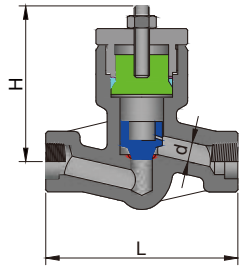
CLASS 900 CLASS 1500 BOLTED BONNET STANDART POTR API602 / ISO15761-FULL PORT TO BS5352 Outside Screw &Yoke - Threaded and Socket Weld Ends

Full Bore	NPS	1/4"		3/8"		1/2"		3/4"		1"		1-1/4"		1-1/2"		2"	
		mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in
End to End	L	110	4.3	110	4.3	110	4.3	110	4.3	150	5.9	150	5.9	210	8.3	235	9.3
Center to Open	H	166	6.5	166	6.5	171	6.7	207	8.1	240	9.4	258	10.2	330	13.0	355	14
Dia. of port d	Lift	9	0.4	10	0.4	12	0.5	15	0.6	20	0.8	28	1.1	32	1.3	40	1.6
	Swing	8	0.3	10.5	0.4	13.5	0.5	18	0.7	24	0.9	29	1.1	36.5	1.4	45	1.8
Weight RF (Kg/Lb)	Lift	2	4.4	2.1	4.6	1.9	4.2	4	8.8	5.1	11.2	7.2	15.9	12.1	26.7	14	30.9
	Swing	1.9	4.2	2.3	5.1	2.3	5.1	4.35	9.6	5.3	11.7	7.8	17.2	12.5	27.6	14.6	32.2



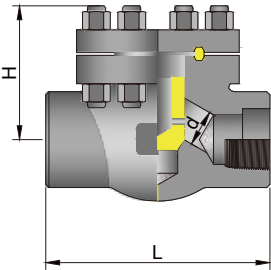
CLASS 900 CLASS 1500 PRESSURE SEALED BONNET STANDART POTR API602 / ISO15761-FULL PORT TO BS5352 Outside Screw &Yoke - Threaded and Socket Weld Ends

Reduced Bore Full Bore	NPS	1/2"		3/4"		1"		1-1/4"		1-1/2"		2"	
		3/8"		1/2"		3/4"		1"		1-1/4"		1-1/2"	
		mm	in	mm	in	mm	in	mm	in	mm	in	mm	in
End to End	L	140	5.5	140	5.5	140	5.5	178	7.0	216	8.5	216	8.5
Center to Open	H	117	4.6	117	4.6	117	4.6	152	6.0	195	7.7	195	7.7
Dia. of port	d	12	0.5	15	0.6	20	0.8	28	1.1	28	1.1	40	1.6
Weight	Kg/Lb	7.5	16.5	7	15.4	6.8	15.0	18.5	40.8	18.5	40.8	22	48.5



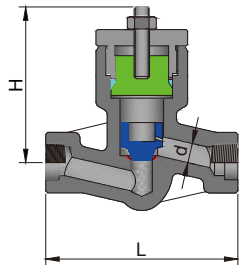
CLASS 2500 BOLTED BONNET STANDART POTR API602 / ISO15761-FULL PORT TO BS5352 Outside Screw &Yoke - Threaded and Socket Weld Ends

Full Bore	NPS	3/8"		1/2"		3/4"		1"		1-1/4"		1-1/2"		2"	
		mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in
End to End	L	150	5.9	150	5.9	150	5.9	210	8.3	235	9.3	235	9.3	235	9.3
Center to Open	H	166	6.5	171	6.7	207	8.1	240	9.4	258	10.2	330	13.0	355	14.0
Dia. of port	d	10.5	0.4	11	0.4	14	0.6	19	0.7	25	1.0	28	1.1	35	1.4
Weight	Kg/Lb	2.3	5.1	17	37.5	46	101.4	62	136.7	73	160.9	58	127.9	85	187.4



CLASS 2500 PRESSURE SEALED BONNET STANDART POTR API602 / ISO15761-FULL PORT TO BS5352 Outside Screw &Yoke - Threaded and Socket Weld Ends

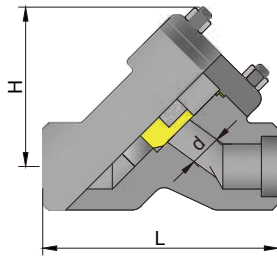
Full Bore	NPS	1/2"		3/4"		1"		1-1/4"		1-1/2"		2"	
		mm	in	mm	in	mm	in	mm	in	mm	in	mm	in
End to End	L	186	7.3	186	7.3	186	7.3	232	9.1	232	9.1	279	11.0
Center to Open	H	117	4.6	117	4.6	117	4.6	152	6.0	152	6.0	195	7.7
Dia. of port	d	11	0.4	14	0.6	14	0.6	25	1.0	28	1.1	35	1.4
Weight	Kg/Lb	11.8	26.0	11	24.3	11	24.3	23	50.7	26.4	58.2	39	86.0



Y-CHECK VALVE

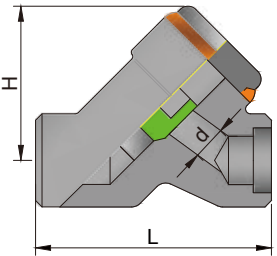
CLASS 800 BOLTED BONNET STANDART POTR API602 / ISO15761-FULL PORT TO BS5352 Outside Screw &Yoke - Threaded and Socket Weld Ends

Reduced Bore Full Bore	NPS	1/2"		3/4"		1"		1-1/4"		1-1/2"		2"		2-1/2"	
		1/4"		3/8"		1/2"		3/4"		1"		1-1/4"		1-1/2"	
		mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in
End to End	L	98	3.9	98	3.9	98	3.9	111	4.4	140	5.5	140	5.5	155	6.1
Center to Open	H	70	2.8	100	3.9	70	2.8	100	3.9	110	4.3	120	4.7	120	4.7
Dia. of port	d	7	0.3	10	0.4	13	0.5	17.5	0.7	23	0.9	30	1.2	35	1.4
Weight	Kg/Lb	2.2	4.9	2	4.4	2.1	4.6	4.2	9.3	9	19.8	8.9	19.6	10	22



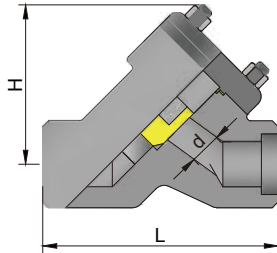
CLASS 800 WELDED BONNET STANDART POTR API602 / ISO15761-FULL PORT TO BS5352 Outside Screw &Yoke - Threaded and Socket Weld Ends

Reduced Bore Full Bore	NPS	1/2"		3/4"		1"		1-1/4"		1-1/2"		2"		2-1/2"	
		1/4"		3/8"		1/2"		3/4"		1"		1-1/4"		1-1/2"	
		mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in
End to End	L	79	3.1	79	3.1	92	3.6	100	3.9	140	5.5	140	5.5	155	6.1
Center to Open	H	65	2.6	65	2.6	65	2.6	95	3.7	105	4.1	110	4.3	110	4.3
Dia. of port	d	7	0.3	10	0.4	13	0.5	17.5	0.7	23	0.9	30	1.2	35	1.4
Weight	Kg/Lb	1.8	4.0	1.8	4.0	2	4.4	3.5	7.7	8	17.6	8	17.6	12	26.5



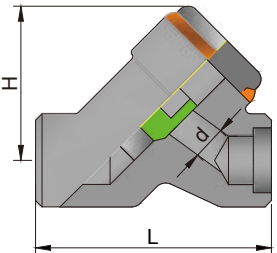
CLASS 900 CLASS 1500 BOLTED BONNET STANDART POTR API602 / ISO15761-FULL PORT TO BS5352 Outside Screw &Yoke - Threaded and Socket Weld Ends

Full Bore	NPS	3/8"		1/2"		3/4"		1"		1-1/4"		1-1/2"		2"	
		mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in
End to End	L	98	3.9	111	4.4	111	4.4	140	5.5	140	5.5	155	6.1	170	6.7
Center to Open	H	70	2.8	70	2.8	100	3.9	110	4.3	110	4.3	120	4.7	150	5.9
Dia. of port	d	9	0.4	12	0.5	15	0.6	20	0.8	28	1.1	32	1.3	40	1.6
Weight	Kg/Lb	2.1	4.6	4.2	9.3	9	19.8	8.9	19.6	10	22.0	18.6	41	20	44.1



CLASS 900 CLASS 1500 WELDED BONNET STANDART POTR API602 / ISO15761-FULL PORT TO BS5352 Outside Screw &Yoke - Threaded and Socket Weld Ends

Full Bore	NPS	3/8"		1/2"		3/4"		1"		1-1/4"		1-1/2"		2"	
		mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in
End to End	L	92	3.6	100	3.9	100	3.9	140	5.5	140	5.5	155	6.1	170	6.7
Center to Open	H	65	2.6	65	2.6	65	2.6	105	4.1	110	4.3	110	4.3	140	5.5
Dia. of port	d	9	0.4	12	0.5	15	0.6	20	0.8	32	1.3	28	1.1	40	1.6
Weight	Kg/Lb	2	4.4	3.5	7.7	3.5	7.7	8	17.6	12	26.5	12	26.5	18	39.7





**CLASS 2500** WELDED BONNET STANDART POTR API602 / ISO15761-FULL PORT TO BS5352  
Outside Screw &Yoke - Threaded and Socket Weld Ends

Full Bore	NPS	3/8"		1/2"		3/4"		1"		1-1/4"		1-1/2"		2"	
		mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in
End to End	L	186	7.3	186	7.3	186	7.3	186	7.3	232	9.1	232	9.1	310	12.2
Center to Open	H	115	4.5	115	4.5	120	4.7	150	5.9	150	5.9	150	5.9	160	6.3
Dia. of port	d	9	0.4	11	0.4	14	0.6	19	0.7	25	1.0	28	1.1	35	1.4
Weight	Kg/Lb	11.2	24.7	11.5	25.4	10.6	23.4	10.8	23.8	25	55.1	22	48.5	39	86

**CLASS 2500** PRESSURE SEALED BONNET STANDART POTR API602 / ISO15761-FULL PORT TO BS5352  
Outside Screw &Yoke - Threaded and Socket Weld Ends

Full Bore	NPS	3/8"		1/2"		3/4"		1"		1-1/4"		1-1/2"		2"	
		mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in
End to End	L	186	7.3	186	7.3	186	7.3	186	7.3	232	9.1	232	9.1	310	12.2
Center to Open	H	233	9.2	233	9.2	233	9.2	233	9.2	256	10.1	256	10.1	330	13.0
Dia. of port	d	9	0.4	11	0.4	14	0.6	19	0.7	25	1.0	28	1.1	35	1.4
Weight	Kg/Lb	11.2	24.7	11.5	25.4	10.6	23.4	10.8	23.8	25	55.1	22	48.5	39	86.0

**CLASS 4500** WELDED BONNET STANDART POTR API602 / ISO15761-FULL PORT TO BS5352  
Outside Screw &Yoke - Threaded and Socket Weld Ends

Full Bore	NPS	3/8"		1/2"		3/4"		1"		1-1/4"		1-1/2"		2"	
		mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in
End to End	L	155	6.1	155	6.1	155	6.1	155	6.1			225	8.9	225	8.9
Center to Open	H	120	4.7	120	4.7	120	4.7	145	5.7			160	6.3	160	6.3
Dia. of port	d	9	0.4	11	0.4	11	0.4	15	0.6			26	1.0	28	1.1
Weight	Kg/Lb	8.7	19.2	8.7	19.2	8.7	19.2	8	17.6			16.5	36.4	16	35.3

**CLASS 4500** PRESSURE SEALED BONNET STANDART POTR API602 / ISO15761-FULL PORT TO BS5352  
Outside Screw &Yoke - Threaded and Socket Weld Ends

Full Bore	NPS	3/8"		1/2"		3/4"		1"		1-1/4"		1-1/2"		2"	
		mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in
End to End	L	200	7.9	200	7.9	200	7.9	200	7.9	250	9.8	250	9.8	330	13
Center to Open	H	140	5.5	140	5.5	140	5.5	140	5.5	160	6.3	160	6.3	180	7.1
Dia. of port	d	9	0.4	11	0.4	11	0.4	15	0.6	20	0.8	26	1.0	28	1.1
Weight	Kg/Lb	20	44.1	20	44.1	20	44.1	20	44.1	28	61.7	28	61.7	45	99.2

**CLASS 150**  
**CLASS 300**  
**CLASS 600** BOLTED BONNET STANDART POTR API602 / ISO15761-FULL PORT TO BS5352  
Outside Screw &Yoke - Weld Flange Ends

Full Bore	NPS	1/2"		3/4"		1"		1-1/4"		1-1/2"		2"	
		mm	in	mm	in	mm	in	mm	in	mm	in	mm	in
End to End (L) (RF) (BW)	150Lb	108	4.25	117	4.61	127	5.00	140	5.51	165	6.50	203	7.99
	300Lb	152	5.98	178	7.01	203	7.99	216	8.50	229	9.02	267	10.51
	600Lb	165	6.50	190	7.48	216	8.50	229	9.02	241	9.49	292	11.50
Center to Open(H)	150 300 Lb	77	3.0	81	3.2	93	3.7	95	3.7	103	4.1	118	4.6
	600Lb	61	2.4	78	3.1	84	3.3	101	4.0	120	4.7	133	5.2
Dia. of port	d	10	0.4	13	0.5	17.5	0.7	23	0.9	30	1.2	35	1.4
Weight RF (Kg/Lb)	150Lb	3.6	7.9	4.6	10.1	8.5	18.7	9.2	20.3	12.5	27.6	14.8	32.6
	300Lb	3.7	8.2	4.8	10.6	8.8	19.4	9.6	21.2	13.7	30.2	17.8	39.2
	400Lb	4	8.8	5.8	12.8	9.5	20.9	10.4	22.9	15.6	34.4	24.5	54.0

**CLASS 150**  
**CLASS 300**  
**CLASS 600** BOLTED BONNET STANDART POTR API602 / ISO15761-FULL PORT TO BS5352  
Outside Screw &Yoke - Weld Flange Ends

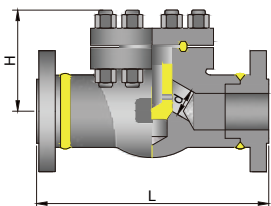
Full Bore	NPS	1/2"		3/4"		1"		1-1/4"		1-1/2"		2"	
		mm	in	mm	in	mm	in	mm	in	mm	in	mm	in
End to End (L) (RF) (BW)	150Lb	108	4.25	117	4.61	127	5.00	140	5.51	165	6.50	203	7.99
	300Lb	152	5.98	178	7.01	203	7.99	216	8.50	229	9.02	267	10.51
	600Lb	165	6.50	190	7.48	216	8.50	229	9.02	241	9.49	292	11.50
Center to Open(H)	150 300 Lb	77	3.0	81	3.2	93	3.7	95	3.7	103	4.1	118	4.6
	600Lb	61	2.4	78	3.1	84	3.3	101	4.0	120	4.7	133	5.2
Dia. of port	d	10	0.4	13	0.5	17.5	0.7	23	0.9	30	1.2	35	1.4
Weight RF (Kg/Lb)	150Lb	3.6	7.9	4.6	10.1	8.5	18.7	9.2	20.3	12.5	27.6	14.8	32.6
	300Lb	3.7	8.2	4.8	10.6	8.8	19.4	9.6	21.2	13.7	30.2	17.8	39.2
	400Lb	4	8.8	5.8	12.8	9.5	20.9	10.4	22.9	15.6	34.4	24.5	54.0



CHECK VALVE

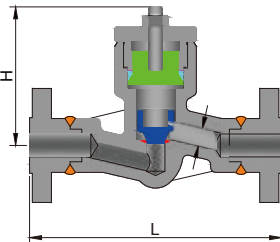
**CLASS 900**  
**CLASS 1500** BOLTED BONNET STANDART POTR API602 / ISO15761-FULL PORT TO BS5352  
Outside Screw &Yoke - Weld Flange Ends

Full Bore	NPS	1/2"		3/4"		1"		1-1/4"		1-1/2"		2"	
		mm	in	mm	in	mm	in	mm	in	mm	in	mm	in
End to End (L)	(RTJ,BW)	216	8.5	229	9.0	254	10.0	280	11.0	305	12.0	371	14.6
Center to Open	H	81	3.2	93	3.7	95	3.7	101	4.0	118	4.6	130	5.1
Dia. of port d	Lift	12	0.5	15	0.6	20	0.8	28	1.1	32	1.3	40	1.6
	Swing	13.5	0.5	18	0.7	24	0.9	29	1.1	36.5	1.4	45	1.8
Weight RF (Kg/Lb)	Lift	5.2	11.5	6.8	15.0	10.5	23.1	28	61.7	18	39.7	24	52.9
	Swing	5	11.0	6.1	13.4	10.8	23.8	29	63.9	17.5	38.6	27	59.5



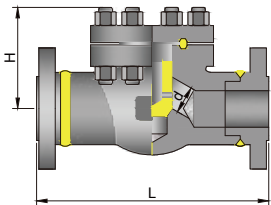
**CLASS 900**  
**CLASS 1500** PRESSURE SEALED BONNET STANDART POTR API602 / ISO15761-FULL PORT TO BS5352  
Outside Screw &Yoke - Weld Flange Ends

Full Bore	NPS	1/2"		3/4"		1"		1-1/4"		1-1/2"		2"	
		mm	in	mm	in	mm	in	mm	in	mm	in	mm	in
End to End (L)	(RFBW)	216	8.5	229	9.0	254	10.0	280	11.0	305	12.0	268	10.6
	(RTJ)	216	8.5	229	9.0	254	10.0	280	11.0	305	12.0	371	14.6
Center to Open	H	117	4.6	117	4.6	117	4.6	152	6.0	152	6.0	195	7.7
Dia. of port	d	12	0.5	15	0.6	20	0.8	28	1.1	32	1.3	40	1.6
Weight	Kg/Lb	10.5	23.1	11.9	26.2	13.9	30.6	19.9	43.9	26.9	59.3	32.5	71.7



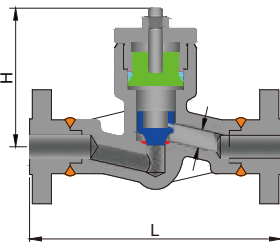
**CLASS 2500** BOLTED BONNET STANDART POTR API602 / ISO15761-FULL PORT TO BS5352  
Outside Screw &Yoke - Weld Flange Ends

Full Bore	NPS	1/2"		3/4"		1"		1-1/4"		1-1/2"		2"	
		mm	in	mm	in	mm	in	mm	in	mm	in	mm	in
End to End (L)	(RFBW)	264	10.4	273	10.7	308	12.1	349	13.7	384	15.1	450	17.7
	(RTJ)	264	10.4	273	10.7	308	12.1	352	13.9	387	15.2	454	17.9
Center to Open	H	81	3.2	93	3.7	95	3.7	101	4.0	118	4.6	130	5.1
Dia. of port	Lift	12	0.5	15	0.6	20	0.8	28	1.1	32	1.3	40	1.6
	Swing	10.5	0.4	13.5	0.5	18	0.7	24	0.9	29	1.1	36.5	1.4
Weight RF (Kg/Lb)	Lift	17	37.5	21	46.3	28	61.7	14.5	32.0	58	127.9	85	187.4
	Swing	5	11.0	6.1	13.4	10.8	23.8	11.2	24.7	17.6	38.8	27	59.5

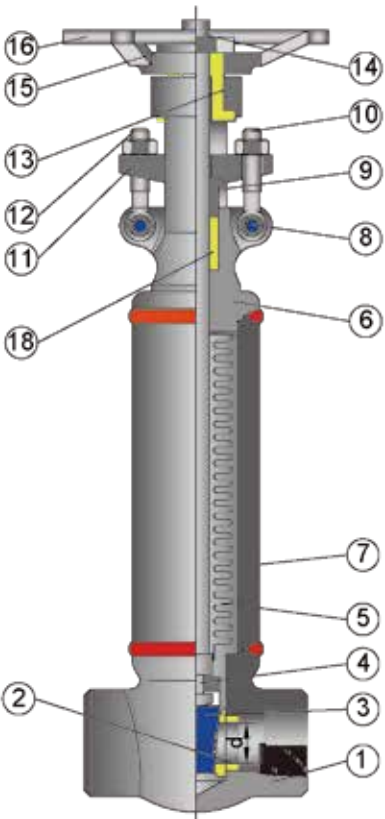


**CLASS 2500** PRESSURE SEALED BONNET STANDART POTR API602 / ISO15761-FULL PORT TO BS5352  
Outside Screw &Yoke - Weld Flange Ends

Full Bore	NPS	1/2"		3/4"		1"		1-1/4"		1-1/2"		2"	
		mm	in	mm	in	mm	in	mm	in	mm	in	mm	in
End to End (L)	(RFBW)	264	10.4	273	10.7	308	12.1	349	13.7	384	15.1	450	17.7
	(RTJ)	264	10.4	273	10.7	308	12.1	352	13.9	387	15.2	454	17.9
Center to Open	H	117	4.6	117	4.6	117	4.6	152	6.0	152	6.0	195	7.7
Dia. of port	d	12	0.5	15	0.6	20	0.8	32	1.3	28	1.1	40	1.6
Weight	Kg/Lb	12.6	27.8	14.9	32.8	16.5	36.4	24.8	54.7	30	66.1	35	77.2



BELLOWS GATE VALVE



STANDARD

Design & Manufacture: BS 5352/API 602  
Test & Inspection: API 598  
Marking: MSS SP25  
Flange End: ANSI B16.5  
Socket Weld (SW) End: ANSI B16.11  
Screw (NPT) End: ANSI B1.20.1  
Butt Weld (BW) End: ANSI B16.25  
Outside Screw and Yoke (OS&Y), Self-aligning Packing Gland in Two Parts, Spiral-wound Gasket, Retained Type Integral Backseat  
Ratings:  
-Carbon Steel Class 800: 1975 psig @ 100°F, 138 bar @ +38°C  
-Carbon Steel Class 1500: 3705 psig @ 100°F, 255 bar @ +38°C

**1. BODY.** The body is forged steel and designed to the basic dimensional requirements of the applicable specifications such as API 602 and ASME B16.34. The body is available in both the full or standard port design.

**6. BONNET.** The bonnet is forged steel, has an integral backseat and incorporates the stuffing box, which has dimensions per the applicable specifications such as API 602.

**5. BELLOWS.** The hydroformed bellows design is in accordance with specifications API 602, and MSS-SP-117.

**7. BONNET EXTENSION.** The bonnet extension is forged steel and of similar material as the body and bonnet and attached by a welded connection.

**A. BODY-BONNET JOINT.** Two different bonnet joint designs are available. These are either the welded or the bolted bonnet type. The bolted bonnet joint design valve uses a contained, controlled compression, spiral wound type gasket. The bonnet bolting is manufactured of alloy steel in accordance with the requirements of the applicable specifications such as API 602 and ASME B16.34.

**2. SEAT RINGS.** The seat rings are steel and make up part of the valve trim. They are pressed into the valve body and wedged into place, forming a seal with the body. The seating surfaces are ground and lapped.

**3. WEDGE.** The wedge, which is a solid design, is forged or investment cast steel and is part of the valve trim. The seating surfaces are ground and lapped.

**4. STEM.** The stem is forged steel and part of the valve trim. It contains an integral back seat shoulder, which mates with the integral backseat of the bonnet. The stem is designed to the basic dimensional requirements of the applicable specifications such as API 602.

**11. GLAND AND FLANGE.** The gland, gland flange assembly utilizes a separate, two piece design. This self aligning design allows the flange to be unevenly tightened while the gland maintains its parallel alignment with the stem and stuffing box.

**12. GLAND BOLTS AND NUTS.** The steel/stainless steel gland bolt and nut assembly is a stud, double nut arrangement. This design allows complete removal from the valve when service is required. The use of industry standard thread full length studs and nuts also allows easy replacement should these items be lost or in need of replacement.

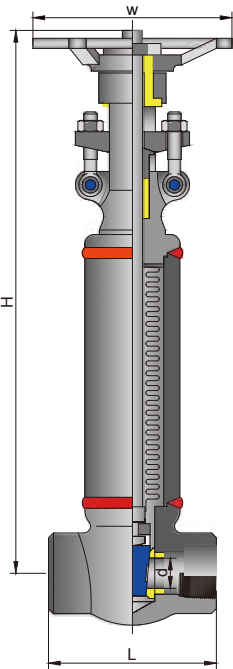
**13. YOKE SLEEVE.** The yoke sleeve is of forged stainless steel material having a high melting point and is resistant to wear and corrosion.

**16. HANDWHEEL.** The handwheel is forged carbon steel of an open spoke design. This robust construction along with appropriate sizing allows for ease of operation.

**B. GREASE FITTING.** The grease fitting is incorporated in the bonnet for stem and yoke sleeve lubrication to ensure smooth operation.

**13. THRUST WASHER.** The thrust washer is between the bonnet and yoke sleeve to help prevent excessive wear of the yoke bushing and reduce operating torque.

BELLOWS GATE VALVE



CLASS 800

WELDED BONNET STANDART POTR API602 / ISO15761-FULL PORT TO BS5352  
Outside Screw &Yoke - Threaded and Socket Weld Ends

Reduced Bore	NPS	1/2"		3/4"		1"		1-1/4"		1-1/2"		2"	
		1/4"		3/8"		1/2"		3/4"		1"		1-1/4"	
		mm	in	mm	in	mm	in	mm	in	mm	in	mm	in
End to End	L	79	3.1	79	3.1	92	3.6	111	4.4	120	4.7	140	5.5
Hand wheel	W	100	3.9	100	3.9	100	3.9	125	4.9	160	6.3	180	7.1
Center to Open	H	287	11.3	287	11.3	312	12.3	368	14.5	465	18.3	595	23.4
Dia. of port	d	7.5	0.3	10.5	0.4	13.5	0.5	18	0.7	24	0.9	29	1.1
Weight	Kg/Lb	3	6.6	3	6.6	3.3	7.3	5.9	13.0	8.7	19.2	10.2	22.5

CLASS 1500

WELDED BONNET STANDART POTR API602 / ISO15761-FULL PORT TO BS5352  
Outside Screw &Yoke - Threaded and Socket Weld Ends

Reduced Bore	NPS	1/2"		3/4"		1"		1-1/4"		1-1/2"		2"	
		1/4"		3/8"		1/2"		3/4"		1"		1-1/4"	
		mm	in	mm	in	mm	in	mm	in	mm	in	mm	in
End to End	L	79	3.1	111	4.4	111	4.4	120	4.7	120	4.7	140	5.5
Hand wheel	W	100	3.9	125	4.9	125	4.9	160	6.3	160	6.3	200	7.9
Center to Open	H	287	11.3	287	11.3	312	12.3	368	14.5	465	18.3	595	23.4
Dia. of port	d	7.5	0.3	10.5	0.4	13.5	0.5	18	0.7	24	0.9	29	1.1
Weight	Kg/Lb	2.9	6.4	4.7	10.4	4.7	10.4	7.4	16.3	10.9	24.0	16	35.3

CLASS 150  
CLASS 300  
CLASS 600

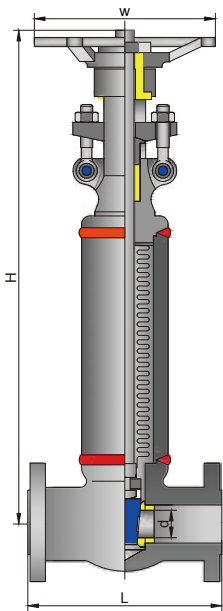
WELDED BONNET STANDART POTR API602 / ISO15761-FULL PORT TO BS5352  
Outside Screw &Yoke - Threaded and Socket Weld Ends

Full Bore	NPS	1/2"		3/4 "		1"		1-1/4"		1-1/2"		2"	
		mm	in	mm	in	mm	in	mm	in	mm	in	mm	in
End to End (L) (RF) (BW)	150Lb	108	4.25	117	4.61	127	5.00	140	5.51	165	6.50	178	7.01
	300Lb	140	5.51	152	5.98	165	6.50	178	7.01	190	7.48	216	8.50
	600Lb	165	6.50	190	7.48	216	8.50	229	9.02	241	9.49	292	11.50
Hand wheel	W	100	3.94	100	3.94	125	4.92	160	6.30	160	6.30	180	7.09
Center to Open	H	287	11.3	312	12.3	368	14.5	465	18.3	595	23.4	627	24.7
Dia. of port	d	10	0.39	13.5	0.53	18	0.71	24	0.94	29	1.14	36.5	1.44

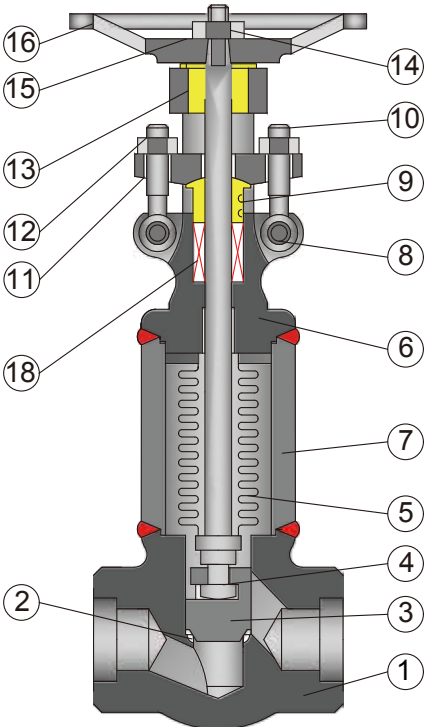
CLASS 900  
CLASS 1500

WELDED BONNET STANDART POTR API602 / ISO15761-FULL PORT TO BS5352  
Outside Screw &Yoke - Threaded and Socket Weld Ends

Full Bore	NPS	1/2"		3/4"		1"		1-1/4"		1-1/2"		2"	
		mm	in	mm	in	mm	in	mm	in	mm	in	mm	in
End to End (L)	(RFBW)	216	8.50	229	9.02	254	10.00	279	11	305	12.01	368	14.5
	(RTJ)	216	8.50	229	9.02	254	10.00	279	11	305	12.01	371	14.6
Hand wheel	W	125	4.92	125	4.92	160	6.30	180	7.1	200	7.87	220	8.7
Center to Open	H	287	11.3	312	12.3	368	14.5	465	18.3	595	23.4	627	24.7
Dia. of port	d	13.5	0.53	18	0.71	24	0.94	29	1.1	36.5	1.44	45	1.8



BELLOWS GLOBE VALVE



STANDARD

Design & Manufacture: BS 5352/API 602  
Test & Inspection: API 598  
Marking: MSS SP25  
Flange End: ANSI B16.5  
Socket Weld (SW) End: ANSI B16.11  
Screw (NPT) End: ANSI B1.20.1  
Butt Weld (BW) End: ANSI B16.25  
Outside Screw and Yoke (OS&Y), Self-aligning Packing Gland in Two Parts, Spiral-wound Gasket, Retained Type Integral Backseat  
Ratings:  
-Carbon Steel Class 800: 1975 psig @ 100°F, 138 bar @ +38°C  
-Carbon Steel Class 1500: 3705 psig @ 100°F, 255 bar @ +38°C

- 1. BODY.** The body is forged steel and designed to the basic dimensional requirements of the applicable specifications such as API 602 and ASME B16.34. The body is available in both the full or standard port design.

**6. BONNET.** The bonnet is forged steel, has an integral backseat and incorporates the stuffing box, which has dimensions per the applicable specifications such as API 602.

**5. BELLOWS.** The hydroformed bellows design is in accordance with specifications API 602, and MSS-SP-117.

**7. BONNET EXTENSION.** The bonnet extension is forged steel and of similar material as the body and bonnet and attached by a welded connection.

**A. BODY-BONNET JOINT.** Two different bonnet joint designs are available. These are either the welded or the bolted bonnet type. The bolted bonnet joint design valve uses a contained, controlled compression, spiral wound type gasket. The bonnet bolting is manufactured of alloy steel in accordance with the requirements of the applicable specifications such as API 602 and ASME B16.34.

**2. SEAT RINGS.** The seat rings are steel and make up part of the valve trim. They are pressed into the valve body and wedged into place, forming a seal with the body. The seating surfaces are ground and lapped.

**3. DISC.** The disc is forged steel and is part of the valve trim. The disc seating surface is of the tapered or plug type design. The disc is attached to the stem using a loose or swivel disc arrangement.
- 4. STEM.** The stem is forged steel and part of the valve trim. It contains an integral back seat shoulder, which mates with the integral backseat of the bonnet. The stem is designed to the basic dimensional requirements of the applicable specifications such as API 602.

**11. GLAND AND FLANGE.** The gland, gland flange assembly utilizes a separate, two piece design. This self aligning design allows the flange to be unevenly tightened while the gland maintains its parallel alignment with the stem and stuffing box.

**12. GLAND BOLTS AND NUTS.** The steel/stainless steel gland bolt and nut assembly is a stud, double nut arrangement. This design allows complete removal from the valve when service is required. The use of industry standard thread full length studs and nuts also allows easy replacement should these items be lost or in need of replacement.

**13. YOKE SLEEVE.** The yoke sleeve is of forged stainless steel material having a high melting point and is resistant to wear and corrosion.

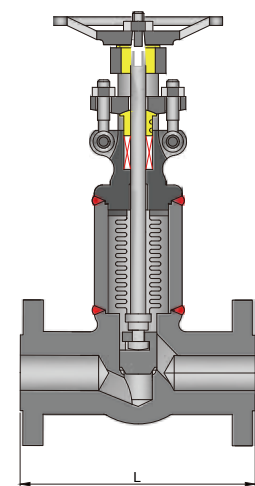
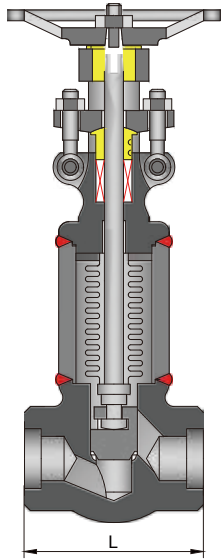
**16. HANDWHEEL.** The handwheel is forged carbon steel of an open spoke design. This robust construction along with appropriate sizing allows for ease of operation.

**B. GREASE FITTING.** The grease fitting is incorporated in the bonnet for stem and yoke sleeve lubrication to ensure smooth operation.

**13. THRUST WASHER.** The thrust washer is between the bonnet and yoke sleeve to help prevent excessive wear of the yoke bushing and reduce operating torque.



BELLOWS GLOBE VALVE



CLASS 800

WELDED BONNET STANDART POTR API602 / ISO15761-FULL PORT TO BS5352  
Outside Screw &Yoke - Threaded and Socket Weld Ends

Reduced Bore	NPS	1/2"		3/4"		1"		1-1/4"		1-1/2"		2"		2-1/2"	
		1/4"		3/8"		1/2"		3/4"		1"		1-1/4"		1-1/2"	
Full Bore		mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in
End to End	L	79	3.1	79	3.1	92	3.6	111	4.4	120	4.7	152	6.0	172	6.8
Hand wheel	W	100	3.9	100	3.9	100	3.9	125	4.9	160	6.3	160	6.3	180	7.1
Center to Open	H	237	6.5	237	6.5	239	6.5	270	8.0	298	8.8	340	10.2	395	11.8
Dia. of port	d	7	0.3	9	0.4	13	0.5	17.5	0.7	23	0.9	30	1.2	35	1.4
Weight	Kg/Lb	2.6	4.2	2.6	5.0	2.7	5.2	4.4	9.5	6.7	12.7	8.8	17.2	15	27.6

CLASS 1500

BWELDED BONNET STANDART POTR API602 / ISO15761-FULL PORT TO BS5352  
Outside Screw &Yoke - Threaded and Socket Weld Ends

Full Bore	NPS	1/4"		3/8"		1/2"		3/4"		1"		1-1/4"		1-1/2"		2"	
		mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in
End to End	L	92	3.6	92	3.6	111	4.4	111	4.4	120	4.7	152	6.0	172	6.8	200	7.9
Hand wheel	W	100	3.9	100	3.9	125	4.9	125	4.9	160	6.3	160	6.3	180	7.1	200	7.9
Center to Open	H	290	11.4	330	13.0	380	15.0	380	15.0	400	15.7	450	17.7	520	20.5	650	25.6
Dia. of port	d	7	0.3	9	0.4	12	0.5	15	0.6	20	0.8	28	1.1	32	1.3	40	1.6
Weight	Kg/Lb	3.3	7.3	3.5	7.7	5	11.0	7.5	16.5	10	22.0	16	35.3	27	59.5	30	66.1

CLASS 150  
CLASS 300  
CLASS 600

WELDED BONNET STANDART POTR API602 / ISO15761-FULL PORT TO BS5352  
Outside Screw &Yoke - Threaded and Socket Weld Ends

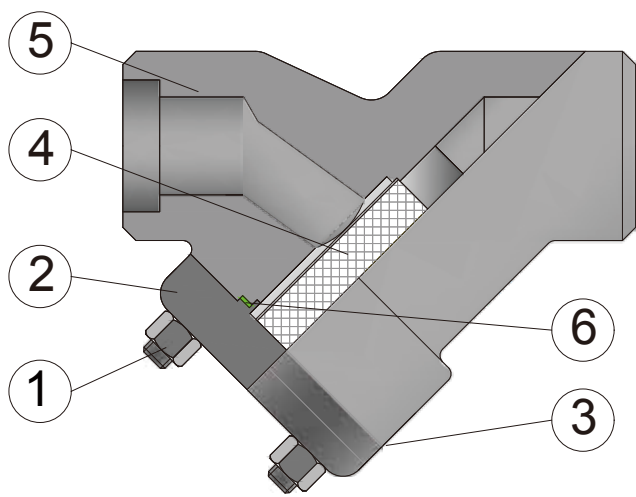
Full Bore	NPS	1/2"		3/4 "		1"		1-1/4"		1-1/2"		2"	
		mm	in	mm	in	mm	in	mm	in	mm	in	mm	in
End to End (L) (RF) (BW)	150Lb	108	4.25	117	4.61	127	5.00	140	5.51	165	6.50	203	7.99
	300Lb	152	5.98	178	7.01	203	7.99	216	8.50	229	9.02	267	10.51
	600Lb	165	6.50	190	7.48	216	8.50	229	9.02	241	9.49	292	11.50
Hand wheel	W	100	3.94	100	3.94	125	4.92	160	6.30	160	6.30	180	7.09
Center to Open	H	360	14.17	360	14.17	390	15.35	430	16.93	500	19.69	600	23.62
Dia. of port	d	9	0.35	13	0.51	17.5	0.69	23	0.91	30	1.18	35	1.38

CLASS 900  
CLASS 1500

WELDED BONNET STANDART POTR API602 / ISO15761-FULL PORT TO BS5352  
Outside Screw &Yoke - Threaded and Socket Weld Ends

Full Bore	NPS	1/2"		3/4"		1"		1-1/4"		1-1/2"		2"	
		mm	in	mm	in	mm	in	mm	in	mm	in	mm	in
End to End (L)	(RFBW)	216	8.50	229	9.02	254	10.00	279	10.98	305	12.01	368	14.49
	(RTJ)	216	8.50	229	9.02	254	10.00	279	10.98	305	12.01	371	14.61
Hand wheel	W	125	4.92	125	4.92	160	6.30	160	6.30	180	7.09	200	7.87
Center to Open	H	380	14.96	380	14.96	400	15.75	450	17.72	520	20.47	650	25.59
Dia. of port	d	12	0.47	15	0.59	20	0.79	28	1.10	32	1.26	40	1.57

Y-STRANINER VALVE

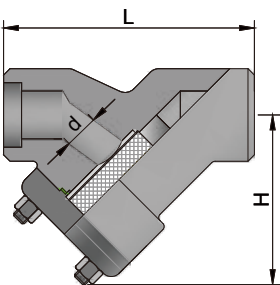


STANDARD

Design & Construction: BS 5352  
Testing according to API 598 - BS 6755  
Marking MSS SP25  
Outside Screw and Yoke (OS&Y) Self aligning packing gland in two parts Spiral-wound gasket retained type  
Integral backseat  
Socket weld Ends to ANSI B16.11  
Screwed Ends (NPT) to ANSIB1.20.1  
Butt Welding Ends to ANSI B.16.25  
Ratings:  
- carbon steel class 800 1975 psig @ 100° F  
138 bar + 38° C  
- carbon steel class 1500 3705 psig @ 100° F

1. BODY. The body is forged steel and designed to the basic dimensional requirements of the applicable specifications such as API 602 and ASME B16.34. The body is available in both the full or standard port design.
6. BONNET. The bonnet is forged steel, has an integral backseat and incorporates the stuffing box, which has dimensions per the applicable specifications such as API 602.
3. BODY-BONNET JOINT. Two different bonnet joint designs are available. These are either the bolted bonnet or the threaded and seal welded type.
5. GASKET. The bolted bonnet joint design valve uses a contained, controlled compression, spiral wound type gasket.
5. BONNET BOLTING. The bonnet bolting is manufactured of alloy steel in accordance with the requirements of the applicable specifications such as API 602 and ASME B16.34.
2. SEAT RINGS. The seat rings are steel and makeup part of the valve trim. They are pressed into the valve body and wedged into place, forming a seal with the body. The seating surfaces are ground and lapped.
7. WEDGE. The wedge, which is solid design, is forged or investment cast steel and is part of the valve trim. The seating surfaces are ground and lapped.

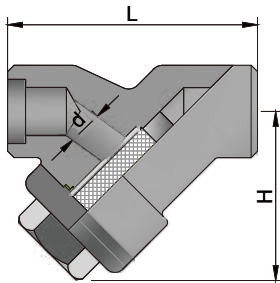




CLASS 800

BOLTED BONNET STANDART POTR API602 / ISO15761-FULL PORT TO BS5352  
Threaded and Socket Weld Ends

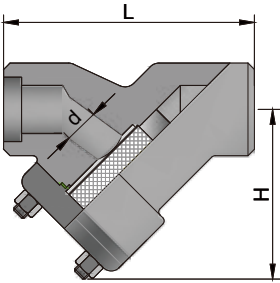
Reduced Bore	NPS			1/2"		3/4"		1"		1-1/4"		1-1/2"		2"		2-1/2"	
		1/4"		3/8"		1/2"		3/4"		1"		1-1/4"		1-1/2"		2"	
		mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in
End to End	L	98	3.9	98	3.9	98	3.9	111	4.4	140	5.5	140	5.5	155	6.1	170	6.7
Center to Open	H	70	2.8	100	3.9	70	2.8	100	3.9	110	4.3	120	4.7	120	4.7	150	5.9
Dia. of port	d	7	0.3	10	0.4	13	0.5	17.5	0.7	23	0.9	30	1.2	35	1.4	46	1.8
Weight	Kg/Lb	2.2	4.9	2	4.4	2.1	4.6	4.2	9.3	9	19.8	8.9	19.6	10	22	18.6	41



CLASS 800

SCREWED BONNET STANDART POTR API602 / ISO15761-FULL PORT TO BS5352  
Threaded and Socket Weld Ends

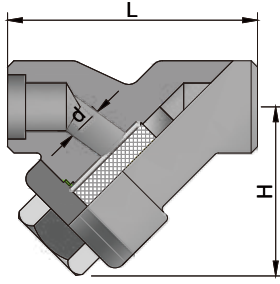
Reduced Bore	NPS			1/2"		3/4"		1"		1-1/4"		1-1/2"		2"		2-1/2"	
		1/4"		3/8"		1/2"		3/4"		1"		1-1/4"		1-1/2"		2"	
		mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in
End to End	L	79	3.1	79	3.1	92	3.6	100	3.9	140	5.5	140	5.5	155	6.1	170	6.7
Center to Open	H	65	2.6	65	2.6	65	2.6	95	3.7	105	4.1	110	4.3	110	4.3	140	5.5
Dia. of port	d	7	0.3	10	0.4	13	0.5	17.5	0.7	23	0.9	30	1.2	35	1.4	46	1.8
Weight	Kg/Lb	1.8	4.0	1.8	4.0	2	4.4	3.5	7.7	8	17.6	8	17.6	12	26.5	16	35.3



CLASS 900  
CLASS 1500

BOLTED BONNET STANDART POTR API602 / ISO15761-FULL PORT TO BS5352  
Threaded and Socket Weld Ends

Full Bore	NPS	3/8"		1/2"		3/4"		1"		1-1/4"		1-1/2"		2"	
		mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in
End to End	L	98	3.9	111	4.4	111	4.4	140	5.5	140	5.5	155	6.1	170	6.7
Center to Open	H	70	2.8	70	2.8	100	3.9	110	4.3	110	4.3	120	4.7	150	5.9
Dia. of port	d	9	0.4	12	0.5	15	0.6	20	0.8	28	1.1	32	1.3	40	1.6
Weight	Kg/Lb	2.1	4.6	4.2	9.3	9	19.8	8.9	19.6	10	22.0	18.6	41	20	44.1



CLASS 900  
CLASS 1500

SCREWED BONNET STANDART POTR API602 / ISO15761-FULL PORT TO BS5352  
Threaded and Socket Weld Ends

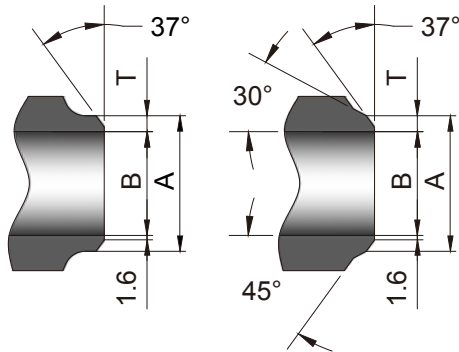
Full Bore	NPS	3/8"		1/2"		3/4"		1"		1-1/4"		1-1/2"		2"	
		mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in
End to End	L	92	3.6	100	3.9	100	3.9	140	5.5	140	5.5	155	6.1	170	6.7
Center to Open	H	65	2.6	65	2.6	65	2.6	105	4.1	110	4.3	110	4.3	140	5.5
Dia. of port	d	9	0.4	12	0.5	15	0.6	20	0.8	32	1.3	28	1.1	40	1.6
Weight	Kg/Lb	2	4.4	3.5	7.7	3.5	7.7	8	17.6	12	26.5	12	26.5	18	39.7

TEMP		A105 LF2						F5						F11					
		150	300	600	800	1500	2500	150	300	600	800	1500	2500	150	300	600	800	1500	2500
-20~100	-29~38	285	740	1480	1975	3705	6170	290	750	1500	2000	3750	6250	290	750	1500	2000	3750	6250
200	93	260	675	1350	1800	3375	5625	260	750	1500	2000	3750	6250	290	710	1425	1900	3560	5930
300	149	230	655	1315	1750	3280	5470	230	730	1455	1940	3640	6070	230	675	1345	1795	3365	5605
400	204	200	635	1270	1690	3170	5280	200	705	1410	1880	3530	5880	200	660	1315	1755	3290	5485
500	260	170	600	1200	1595	2995	4990	170	665	1330	1775	3325	5540	170	640	1285	1710	3210	5350
600	316	140	550	1095	1460	2735	4560	140	605	1210	1615	3025	5040	140	605	1210	1615	3025	5040
650	343	125	535	1075	1430	2685	4475	125	590	1175	1570	2940	4965	125	590	1175	1570	2940	4905
700	371	110	535	1065	1420	2685	4440	110	570	1135	1515	2840	4730	110	570	1135	1515	2840	4730
750	399	95	505	1010	1345	2520	4200	95	530	1065	1420	2660	4430	95	530	1065	1420	2660	4430
800	427	80	410	825	1100	2060	3430	80	500	995	1325	2485	5145	80	510	1015	1355	2650	4230
850	454	65	270	535	715	1340	2230	65	440	880	1170	2195	3660	65	485	975	1300	2435	4060
900	482	50	170	345	460	860	1430	50	355	705	940	1765	2945	50	450	900	1200	2245	3745
950	510							35	260	520	695	1305	2170	35	380	755	1005	2995	3145
1000	538							20	190	385	510	960	1600	20	225	445	595	1115	1860
1050	566								140	280	375	705	1170		140	285	365	685	1145
1100	593								105	205	275	575	860		95	180	225	480	800
1150	621								70	150	185	345	570		50	105	140	260	430
1200	649								45	90	120	225	370		35	70	95	170	285

TEMP		F22						F304&F304H						F316&F316H					
		150	300	600	800	1500	2500	150	300	600	800	1500	2500	150	300	600	800	1500	2500
-20~100	-29~38	290	750	1500	2000	3750	3250	275	720	1440	1920	3600	6000	275	720	1440	1920	3600	6000
200	93	260	715	1430	1910	3580	5965	235	600	1200	1600	3000	5000	240	620	1240	1655	3095	5160
300	149	230	675	1355	1805	3385	5640	205	530	1055	1410	2640	4400	215	560	1120	1465	2795	4660
400	204	200	650	1295	1730	3240	5200	180	470	940	1255	2350	3920	195	515	1030	1370	2570	4280
500	260	170	640	1280	1705	3200	5330	170	435	875	1165	2185	3640	170	480	955	1275	2390	3980
600	316	140	605	1201	1615	3025	5040	140	605	830	1105	3025	3460	140	450	905	1205	2255	3760
650	343	125	590	1175	1570	2940	4905	125	410	815	1090	2040	3400	125	445	890	1185	2220	3700
700	371	110	570	1135	1515	2840	4730	110	405	805	1075	2015	3360	110	430	865	1150	2160	3600
750	399	95	530	1065	1420	2660	4430	95	400	795	1060	1990	3320	95	425	845	1130	2110	3520
800	427	80	510	1015	1355	2540	4230	80	395	790	1050	1970	3280	80	415	830	1105	2075	3460
850	454	65	485	975	1300	2435	4060	65	390	780	1035	1945	3240	65	405	810	1080	2030	3320
900	482	50	450	900	1200	2245	3745	50	385	770	1025	1920	3200	50	395	790	1050	1970	3280
950	510	35	380	755	1005	1885	3145	35	385	750	1000	1870	3120	35	385	775	1030	1930	3220
1000	538	20	270	535	715	1340	2230	20	325	645	860	1610	2685	20	365	725	970	1820	3030
1050	566		200	400	530	955	1660		310	620	825	1545	2570		360	720	960	1800	3000
1100	593		115	225	300	565	945		260	515	685	1285	2145		325	645	860	1610	2680
1150	621		105	205	275	515	860		195	390	520	980	1630		275	550	735	1370	2280
1200	649		55	110	145	275	460		155	310	415	770	1285		205	410	550	1030	1715
1250	677								110	220	295	550	915		180	365	485	910	1515
1300	704								85	195	218	410	685		140	375	365	685	1145

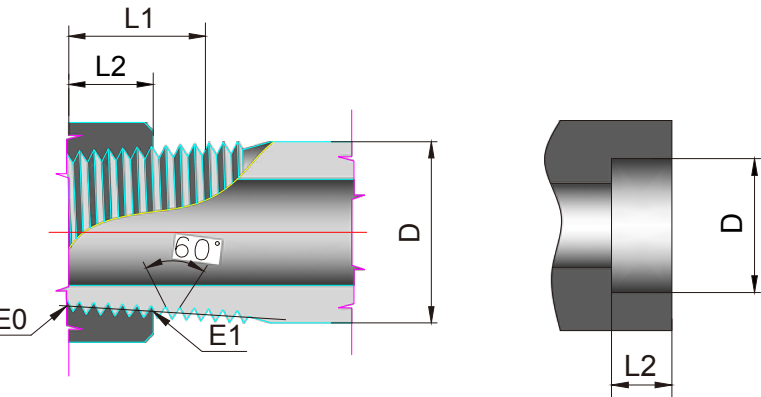
TEMP		F304L&F316L					
		150	300	600	800	1500	2500
-20~100	-29~38	230	600	1200	1600	3000	5000
200	93	195	505	1015	1350	2530	4220
300	149	175	445	910	1210	2270	3780
400	204	160	415	825	1100	2065	4220
500	260	145	380	765	1020	1910	3180
600	316	140	360	720	960	1800	3000
650	343	120	350	700	935	1750	2920
700	371	110	345	685	915	1715	2860
750	399	95	335	670	895	1680	2800
800	427	80	330	660	875	1645	2740
850	454	65	320	645	860	1610	2680
900	482						
950	510						





BUTT-WELDING END ASME B16.25.

in	SCH 40			SCH 80			SCH 160			SCH XXS		
	A	B	T	A	B	T	A	B	T	A	B	T
1/2"	21.3	15.8	2.77	21.3	13.8	3.73	21.3	11.7	4.78	21.3	6.4	7.47
3/4"	26.7	25.0	2.87	26.7	18.9	3.91	26.7	15.6	5.56	26.7	11.1	7.82
1"	33.4	26.6	3.38	33.4	24.3	4.55	33.4	20.7	6.35	33.4	15.2	9.09
1-1/4"	42.2	35.1	3.55	42.2	32.5	4.85	42.2	29.5	6.35	42.2	22.8	9.70
1-1/2"	48.3	41.0	3.68	48.3	38.1	5.08	48.3	33.5	7.41	48.3	28.0	10.15
2"	60.3	52.5	3.91	60.3	49.2	5.54	60.3	42.9	8.74	60.3	38.2	11.07
2-1/2"	73.3	62.7	5.15	73.0	59.0	7.01	73.0	54.0	9.53	73.0	45.0	14.02
3"	88.9	78.0	5.48	88.9	73.7	7.62	88.9	66.6	11.13	88.9	58.4	15.24
4"	114.3	102.3	6.02	114.3	97.2	8.56	114.3	85.3	13.49	114.3	80.1	17.12

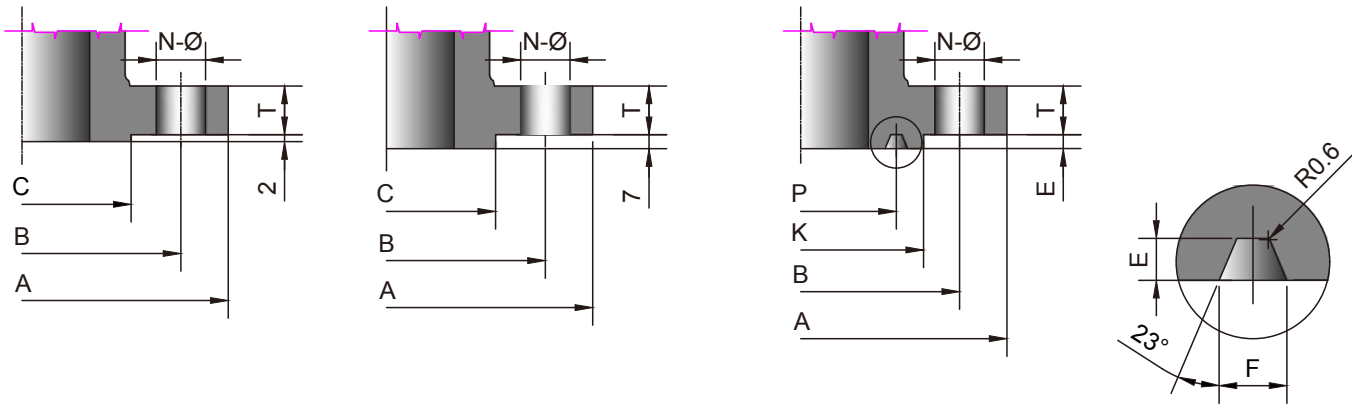


SOCKET-WELD ASME B16.25.

in	ANSI		JIS	
	D	L	D	L
1/4"	14.1	9.6	14.1	9.6
3/8"	17.6	9.6	17.9	9.6
1/2"	21.8	9.6	22.2	9.6
3/4"	27.1	12.7	27.7	12.7
1"	33.8	12.7	34.5	12.7
1-1/4"	42.6	12.7	43.2	12.7
1-1/2"	48.7	12.7	49.1	12.7
2"	61.2	15.9	61.2	15.9

PIPE THREADS, GENERAL PURPOSE ASME B1.20.1.

Nominal Pipe Size	O.D.of Pipe	Threads	Pitch of Thread	Pitch Diam. at Beginning of Externa	Handtight Engagement Length(E1)	Handtight Engagement Length(L1)	Effective Thread, Extern(L2)	Handtight Engagement Length(E2)
in	(D) mm	(n)	(P)mm	Thread (Eo)	Diam	inch	inch	Diam
1/16"	7.93	27	0.94	6.89	7.41	4.06	6.63	0.73
1/8"	10.29	27	0.94	9.23	9.49	4.10	6.70	0.73
1/4"	13.72	18	1.41	12.13	12.49	5.79	10.20	1.13
3/8"	17.15	18	1.41	15.55	15.93	6.10	10.36	1.13
1/2"	21.34	14	1.81	19.26	19.77	8.13	13.56	1.45
3/4"	26.67	14	1.81	24.58	25.12	8.61	13.86	1.45
1"	33.40	11.5	2.21	31.46	31.45	10.16	17.34	1.77
1-1/4"	42.16	11.5	2.21	39.55	40.22	10.67	17.95	1.77
1-1/2"	48.26	11.5	2.21	45.62	46.29	10.67	18.38	1.77
2"	60.33	11.5	2.21	57.63	58.33	11.07	19.22	1.77



PIPE FLANGES END ASME B16.5.

CLASS	NPS	A	B	C	T	Number of Bolts N	Diameter of Bolt Holes Ø	Groove Dimensions				
								K	P	F	E	Ring NO.
150LB	1/2"	90	60.3	34.9	8.0	4	16	-	-	-	-	-
	3/4"	100	69.9	42.9	8.9	4	16	-	-	-	-	-
	1"	110	79.4	50.8	9.6	4	16	63.5	47.63	8.74	6.35	R15
	1 1/4"	115	88.9	63.5	11.2	4	16	73.0	57.15	8.74	6.35	R17
	1 1/2"	125	98.4	73.0	12.7	4	16	82.5	65.07	8.74	6.35	R19
300LB	2"	150	120.7	92.1	14.3	4	20	102.0	82.55	8.74	6.35	R22
	1/2"	95	66.7	34.9	12.7	4	16	51.0	34.14	7.14	5.54	R11
	3/4"	115	82.6	42.9	14.3	4	20	63.5	42.88	8.74	6.35	R13
	1"	125	88.9	50.8	15.9	4	20	70.0	50.80	8.74	6.35	R16
	1 1/4"	135	98.4	63.5	17.5	4	20	79.5	60.33	8.74	6.35	R18
600LB	1 1/2"	155	114.3	73.0	19.1	4	23	90.5	68.27	8.74	6.35	R20
	2"	165	127.0	92.1	20.7	4	20	108.0	82.55	11.91	7.92	R23
	1/2"	95	66.7	34.9	14.3	4	16	51.0	34.14	7.14	5.54	R11
	3/4"	115	82.6	42.9	15.9	4	20	63.5	42.88	8.74	6.35	R13
	1"	125	88.9	50.8	17.5	4	20	70.0	50.80	8.74	6.35	R16
900LB 1500LB	1 1/4"	135	98.4	63.5	20.7	4	20	79.5	60.33	8.74	6.35	R18
	1 1/2"	155	114.3	73.0	22.3	4	23	90.5	68.27	8.74	6.35	R20
	2"	165	127.0	92.1	25.4	8	20	108.0	82.55	11.91	7.92	R23
	1/2"	120	82.6	34.9	22.3	4	23	60.5	39.67	8.74	6.35	R12
	3/4"	130	88.9	42.9	25.4	4	23	66.5	44.45	8.74	6.35	R14
2500LB	1"	150	101.6	50.8	28.6	4	26	71.5	50.80	8.74	6.35	R16
	1 1/4"	160	111.1	63.5	28.6	4	26	81.0	60.33	8.74	6.35	R18
	1 1/2"	180	123.8	73.0	31.8	4	29	92.0	68.27	8.74	6.35	R20
	2"	215	165.1	92.1	38.1	8	26	124.0	95.25	11.91	7.92	R24
	1/2"	135	88.9	34.9	88.9	4	23	65.0	42.88	8.74	6.35	R13
2500LB	3/4"	140	95.2	42.9	95.2	4	23	73.0	50.80	8.74	6.35	R16
	1"	160	108.0	50.8	108.0	4	26	82.5	60.33	8.74	6.35	R18
	1 1/4"	185	130.2	63.5	130.2	4	29	102	72.23	11.91	7.92	R21
	1 1/2"	205	146.0	73.0	146.0	4	32	114	82.55	11.91	7.92	R23
	2"	235	171.4	92.1	171.4	8	29	133	101.60	11.91	7.92	R26